
Universidad de San Andrés
Departamento de Economía
Maestría en Economía

# Concrete doesn't Pay with Votes: Public Works and Electoral Accountability

Agustín DUARTE BARACAT
38893163

Mentor: Martin ROSSI

Buenos Aires, December 21, 2022

Tesis de Maestría en Economía de

# Agustín DUARTE BARACAT

## "El Cemento no Paga con Votos: Obra Pública y Rendición de Cuentas"


### Resumen

Estudio cómo los votantes responden a la obra pública generando incentivos para el comportamiento estratégico de los gobernantes en relación a cómo se asignan los proyectos. Para determinar el efecto electoral, utilizo un enfoque de diferencias en diferencias para la Ciudad Autónoma de Buenos Aires entre las elecciones de 2017 y 2019. Estudié la política de obra pública de manera integral, desagregada por su nivel de visibilidad, desagregada por su tipo y contemplé la posibilidad de efectos heterogéneos por ingreso. No encontré efectos electorales significativos de la política de obras públicas en su conjunto. En cambio, sólo un determinado tipo de proyectos (basado en la clasificación del gobierno de la ciudad) es valorado por una determinada clase social como, por ejemplo, los pobres valoran las inversiones en infraestructura educativa y los ricos valoran la mejora de los espacios públicos.



Palabras clave: [Elecciones, Infraestructura, Obra Pública, Argentina, Rendición de Cuentas]


## "Concrete doesn't Pay with Votes: Public Works and Electoral Accountability"


### Abstract

I study how voters respond to public works generating incentives for the strategic behavior of rulers in relation to how the projects are allocated. To determine the electoral effect, I use a difference in difference approach for the Autonomous City of Buenos Aires between the 2017 and 2019 elections. I studied the public works policy in an integral manner, disaggregated by its level of visibility, disaggregated by its type and I contemplated the possibility of heterogeneous effects by income. I found no significant electoral effect of the public works policy as a whole. Instead, only a determined type of projects (based on city government classification) is valued by a determined social class as for instance, the poor value investments in education infrastructure and the rich value improved public spaces.



Keywords: [Elections, Infrastructure, Public Works, Argentina, Electoral Accountability]

Códigos JEL: D72, D91, H41, H44, H54.

# 1 Introduction

The fundamental concern of any ruler (or political faction) in a democracy is to remain in power, either to implement the public policies that they believe are most beneficial to society or to satisfy their particular interests. The determinants of the electoral vote and how they affect public policy decisions play a fundamental role in this context and have occupied a leading role in the political economy agenda, which is well summarized by Roemer & Roemer (2009) and Persson & Tabellini (2016). Most of the theoretical developments in the literature, as reflected in the above-mentioned books, focus on the perception of the candidates' competence and their representativeness as determinants of the vote. In this sense and given the generally rival and excludable character of the goods and services provided by the state, the allocation of resources can be done with efficiency objectives or respond to the preferences of the rulers and the electorate.

The main contribution of this work lies in studying how the spatial distribution of voters can generate incentives for the strategic behavior of rulers in relation to how public works are allocated. Despite the fundamental importance of this type of intervention, which plays a preponderant role within any government, there is a gap in the literature regarding studies that attempt to evaluate the response of voters to public works policy as a whole (i.e. not to specific interventions but to the entire range of projects carried out). To this end, I estimated a difference-in-difference model to measure the impact of the spatial allocation of resources in public works projects on the subsequent electoral performance of the ruling party in the segment of the electorate directly affected. In other words, the question I want to study is: do voters reward the receipt of resources through public works near where they live? I also propose to evaluate how these effects vary according to the socioeconomic level of those affected and the degree of visibility of the works. For this purpose, I have data from the Subsecretaría de Gestión Estratégica y Calidad Institucional Ciudad Autónoma de Buenos Aires on all public work projects executed from January 2015 up to date. Additionally, I have the data collected by the Cámara Nacional Electoral (CNE) on the 2017 and 2019 elections, as well as the geographical variables related to the location of the polling places. In turn, the election of the city of Buenos Aires is particularly convenient with respect to (i) The mandatory nature of voting, which minimizes problems of attrition; (ii) The proximity of voter's residences to the polling places, given the high population density; and (iii) The heterogeneity of income, which allows for a good degree of external validity with respect to other cities in middle-income countries).

The study contributes primarily to two literatures: First, it contributes to a broad literature on electoral accountability [1]and in particular to empirical studies on the relationship between resource distribution and strategic electoral behavior (e.g. Besley & Case, 1995, 2003; Milesi-Ferretti, Perotti, & Rostagno, 2002; and Finan & Mazzocco, 2016). Among the latter, Levitt (1994) and Levitt & Snyder (1997) were the first that attempt to credibly quantify the impact of public spending on elections, followed by Malhotra (2008) and Litschig & Morrison (2010) while Tamada (2009) studied the opposite relationship. Manacorda, Miguel

[1]Ashworth, S. (2012) provides a thorough review of both empirical and theoretical studies.

& Vigorito (2011), De La O(2013), Zucco Jr (2013), and Imai, King Velasco Rivera (2020) estimated the electoral impact of cash transfers while Pop-Eleches & Pop-Eleches (2012) and Cerda & Vergara (2008) do the same for vouchers and subsidies respectively. Chen (2013) founds that distributive spending increases the ruling party's turnout while the opposition's decreases. Bechtel & Hainmueller (2011) compares how the effects of the investment vary over different lengths of time. Strömberg (2004) studied how American counties with more access to mass media, and thus more informed voters, receive more public spending. Cole (2009) investigated how the Indian government strategically targets agricultural loans among more contested districts. On the other hand, the work relates more specifically to the literature on the impact of public works on electoral performance. Regarding Transportation infrastructure, De la Calle & Orriols (2010) and Filc (2019) use a difference in difference to measure the improvement of electoral outcomes near the expansion of underground network. Voigtländer & Voth (2014) followed a similar strategy for railways building in the Alemania Nazi. As for school infrastructure, (Ajzenman & Durante , 2019), took advantage of the quasi-randomness of polling place assignment and they found that individuals assigned to schools with poorer infrastructure conditions where less inclined to vote for the incumbent party.

# 2 Mathematical Model

I present a model with an official candidate trying to maximize his probability of being elected $\pi_L$. Our goal is to focus on the electoral impact of public works by distinguishing between their type (however, the model can easily be generalized to include any kind of policies). The candidate faces a continuum of voters normalized to 1, whose income $y_i$ follows a normal distribution. For simplicity, I assume that the behavior of potential competitors is given and that it does not depend on their behavior. For the official candidate, the probability of being voted for depends positively on income. This is since I assume greater affinity with the middle and upper sectors as an attribute. In addition, it depends positively on the provision of public goods and negatively on taxes of $T$. The provision of public goods ($B_k$) is given by the following equation

$$B_k = T^{\alpha} C^{(1-\alpha)} \quad /0 < \alpha < 1 \tag{1}$$

where $C$ represents the candidate's capacities to execute public policies. Taxes are a lump sum and $k$ is the type of public work. Then, the official candidate solves the following problem:

$$\max \pi_L = \lim_{n \to 1} \int_i^n P_i(L, V(B_1, ..., B_k)|y_i, -T)di \;\; s.a. \;\; B_k = T^{\alpha} C^{(1-\alpha)} \tag{2}$$

Where the control variables of the candidate are $T$ and $B_k$ while L represents their intrinsic characteristics. In this way, the first order conditions are:

$$P_V V_{B_h} = P_V V_{B_j} = P_T \frac{T^{1-\alpha}}{\alpha C^{(1-\alpha)}} \tag{3}$$

Then, the candidate chooses the amount of investment in each kind of public works to equal their marginal contribution to the probability of being elected and to the marginal

electoral cost of the taxes needed. Equation (3) also implies that taxes and candidate capacities affect the level of provision of each type of public work but not the relative quantities. In this sense, the expected impact of all types of public works should be the same, or investment in projects with lower impact would be zero. Nevertheless, reality could impose some restrictions that may prevent this condition to hold. For example, the possible investment could be a discrete function since the minimum project size could be greater than zero. On the other hand, some modifications could help to explain the empirical differences between projects.

$$\max \pi_L = \lim_{n \to 1} \int_i^n P_i(L, V(B_1, ..., B_k), R(\Sigma_{k=1}^K B_k) | y_i, -T) di \;\; s.a. \;\; B_k = T^{\alpha} C^{(1-\alpha)} \tag{4}$$

In equation (4) I incorporated reputation as a control variable to reflect the indirect effect of public works by signalizing capabilities. Other indirect effects could be operationalized in similar ways to extend the model, such as corruption in public works for campaign funding.

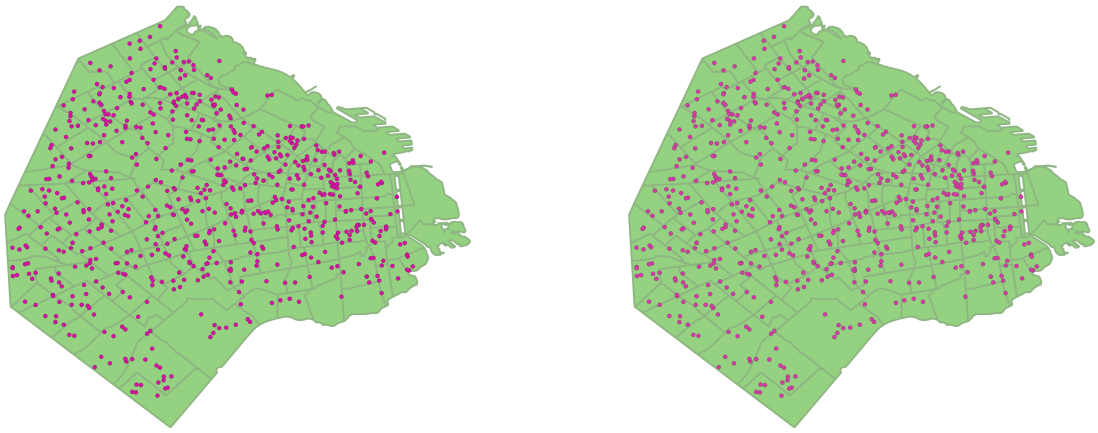
$$P_V V_{B_h} + R_{B_h} = P_V V_{B_j} + R_{B_j} = P_T \frac{T^{1-\alpha}}{\alpha C^{(1-\alpha)}} \tag{5}$$

In the equation (5) we can see how this change in the model adds the indirect channels as an additional term that elevates the probability of being elected in general. This allows investment in projects with a negative direct impact.

# 3 Data and Variables

I focus on the public works of the city of Buenos Aires due to the availability of reliable and well systematized data provided by the Gobierno de la Ciudad de Buenos Aires (GCBA) and the advantages that the city offers for our identification strategy. The database contains all the works executed from 2014 to 2020 with exact location, type of work, cost specified by contract, start and end date. Based on the data described, I center on the 2017 and 2019 elections. In Argentina, people vote in voting places (typically, schools) assigned according to their residence address. The city of Buenos Aires is divided into 15 comunas and subdivided into 167 electoral circuits with a total of 814 and 791 voting places in 2017 and 2019, as shown in the Figure 1.

Figure 1: Distribution of polling places



(2017) (2019)

Sources: Authors' own elaboration based on data from the National Electoral Directorate. (`https://www.argentina.gob.ar/interior/dine`) and the National Electoral Chamber (`https://mapa2.electoral.gov.ar/descargas`).

In the 2017 elections, they were elected both national and provincial deputies and community leaders, while in 2019 they were additionally elected national senators and the head of the city government and the president of the nation as executive positions as well. The elections are held in two stages: first, the Primarias Abiertas Simultaneas y Obligatorias (PASO) which defines which parties are eligible to run for national elections (those that obtain at least 1,5% of the validly cast votes) and the list representing each political party. Second, general elections, which are also mandatory and of which the results are final. Here I am focused on the second stage given its higher level of participation and from it I construct the variable $Share_{it}$ as the proportion of official votes for both provincial and national legislators because of its strong local content and for the Head of Government over the total number of positive votes, where $i$ denotes the voting place[2] while $t$ denotes the election year. I exclude the votes for argentinean President because of its greater national component and for the communal chiefs because of their lower political relevance. The data comes from the CNE in charge of supervising the election[3].

On the other hand, I define $D_{oi}^2$ as the square distance of each work (denoted by $o$) to the voting place and together with the cost per contract $C_o$, I determine the treatment as the sum of the ratios between both variables for all public works. I utilize this formula as a way of operationalizing the fact that the impact of public works on the neighbors depends on how "near" they are. While other similar measurements are possible, supposing that the

[2]Ideally I would like to take each voter as a unit. However, since the vote is secret, it is not possible to associate the votes with the domicile of the voters. Although for each voting location the data is at the level of the tables to which the voters are designated by groups, since I can only associate the treatment to the voting location and not to the address of residence of the voter, I do not use the disaggregated data since this would generate artificial statistical power.

[3]I thank Andy Tow for providing some data that is currently no longer available.

importance of public works decreases faster with distance (in a quadratic way) sounds the most reasonable to me. The exception is that it is not divided by distance if the construction site is less than 50 meters from the polling place. Intuitively, this decision responds to the idea that there are no major differences between public works at any point of this radio. More importantly, it avoids the zero division problem and the existence of multipliers when the distance is between 0 and 1 meters.

$$Ti = \sum_{o} C_o / D_{oi}^2$$

For this purpose, I identified two kinds of public works. First, public works with a general impact that influences voters in the city regardless of their location. This group were exclude due to its nature since it violates our assumptions, as detailed in section 5 below; Secondly, public works with a local impact that influences voters based on how close they live, such as a school or a square. For this second group, I build a subclassification to extract some additional insights as follows:

- Education: construction and refurbishment of educational establishments.
- Recreational Facilities: construction and improvement of parks, squares, and other recreational spaces such as soccer fields or playgrounds.
- Public Spaces: improvements to public spaces such as repair of sidewalks, lighting, ordering of street commerce, etc.
- Building Refurbishment: building enhancement through façade restoration, equipment, etc.
- Health: construction and equipping of health care centers.
- Public Housing: construction and refurbishment of public housing.
- Public Offices: construction and improvement of public offices.
- Security: Works aimed at improving the neighbor's safety, such as the construction and equipping of police stations, walls and fire stations.

Table 1 Shows descriptive statistics for the Public Works by the detailed classification. In the period leading up to 2017 elections, major investments were destinated for recreational facilities and public spaces. Below this, significant disbursements were made in education and public housing. However, in 2019 funding for education projects had grown almost fourfold, even though the number of projects fell by a third. At the same time, there were also dramatic increases in funding for safety, health, and building refurbishment but the change in the number of projects was not very important. In addition, as can be seen in Figure 2, the total investment is well distributed throughout the city in both periods.

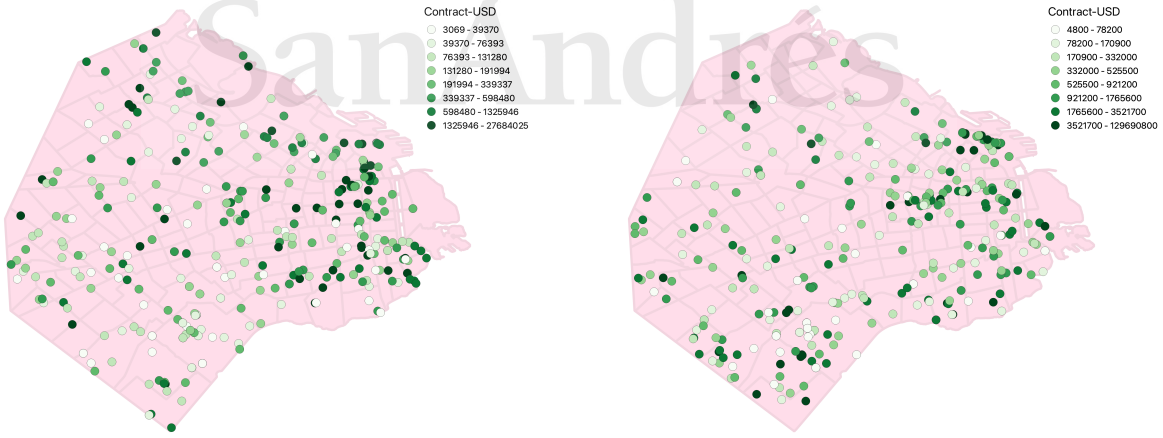
Table 1: Descriptive Statistics of Public Works

| | Sum | Mean | SD | Min | Max | N |
|---|---|---|---|---|---|---|
| Contracts 17 (USD) | 2.5e+08 | 6.6e+05 | 1.8e+06 | 3,069 | 27,684,024 | 373 |
| Education 17 (USD) | 30,933,757 | 2.7e+05 | 8.1e+05 | 3,069 | 7,871,561 | 116 |
| Recreational Facilities 17 (USD) | 69,147,965 | 8.8e+05 | 3.1e+06 | 3,708 | 27,684,024 | 79 |
| Health 17 (USD) | 16,628,719 | 3.3e+05 | 3.9e+05 | 22,250 | 2,353,249 | 50 |
| Public Spaces 17 (USD) | 84,068,382 | 1.4e+06 | 1.6e+06 | 61,051 | 11,795,744 | 60 |
| Public Housing 17 (USD) | 5,489,015 | 4.6e+05 | 6.9e+05 | 27,325 | 1,836,066 | 12 |
| Public Offices 17 (USD) | 26,666,217 | 1.1e+06 | 1.5e+06 | 27,489 | 4,473,417 | 24 |
| Building Refurbishment 17 (USD) | 10,297,421 | 3.8e+05 | 6.7e+05 | 16,325 | 3,479,044 | 27 |
| Security 17 (USD) | 1,825,847 | 4.6e+05 | 5.3e+05 | 88,217 | 1,213,205 | 4 |
| Contracts 19 (USD) | 9.3e+08 | 2.6e+06 | 1.0e+07 | 4,816 | 1.3e+08 | 353 |
| Education 19 (USD) | 1.5e+08 | 1.9e+06 | 4.7e+06 | 7,390 | 36,932,252 | 78 |
| Recreational Facilities 19 (USD) | 75,896,978 | 8.4e+05 | 2.9e+06 | 4,816 | 26,613,626 | 90 |
| Health 19 (USD) | 40,423,744 | 1.0e+06 | 1.2e+06 | 6,402 | 5,694,996 | 40 |
| Public Spaces 19 (USD) | 97,452,828 | 1.7e+06 | 2.1e+06 | 73,136 | 13,564,868 | 58 |
| Public Housing 19 (USD) | 4.8e+08 | 1.3e+07 | 2.8e+07 | 14,135 | 1.3e+08 | 36 |
| Public Offices 19 (USD) | 51,301,401 | 3.9e+06 | 7.1e+06 | 104026 | 26,816,048 | 13 |
| Building Refurbishment 19 (USD) | 31,317,992 | 1.3e+06 | 2.7e+06 | 31,487 | 13,238,317 | 24 |
| Security 19 (USD) | 780,4748 | 6.5e+05 | 6.8e+05 | 42,280 | 2,142,685 | 12 |

This table shows descriptive statistics for the public works by year based on data from the General Secretariat and International Relations of the City of Buenos Aires.



Figure 2: Public Works by Level of Investment (in Current Dollars)




(2017) (2019)

Sources: Authors' own elaboration based on data from the General Secretariat and International Relations of the City of Buenos Aires. (`https://data.buenosaires.gob.ar/dataset/ba-obras`).

Table 2 Shows descriptive statistics for the total treatment and the treatment disaggregated again by the detailed classification. The total number of observations is 754 since the

voting places remaining couldn't be matched between elections due to errors in the data. Although 23 were lost because of changes in the voting places, 37 were errors in the matching with ballot boxes. However, schools with data problems are well distributed throughout the city (Figure 3), and there is no reason to think that the missings are not random. Regarding treatment, on average, a citizen receives more investment in public offices, education, and public spaces, but there is good variability in how much each one receives.

Figure 3: Voting Places with Missing Results

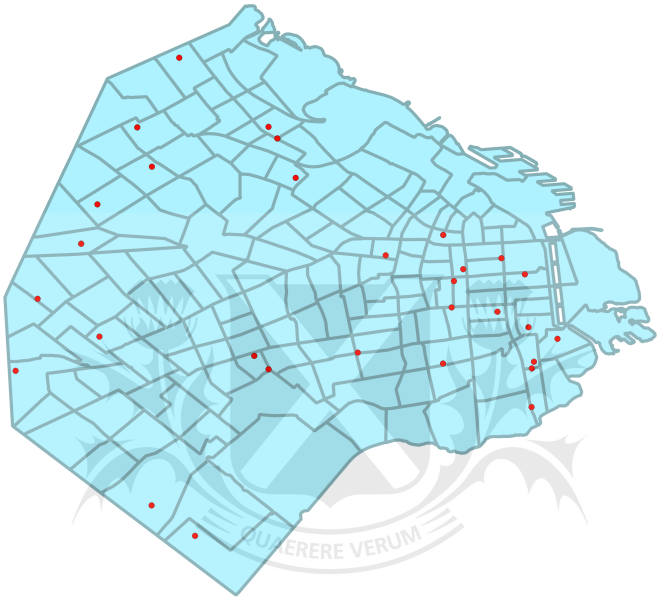




Table 2: Descriptive Statistics of the Treatment

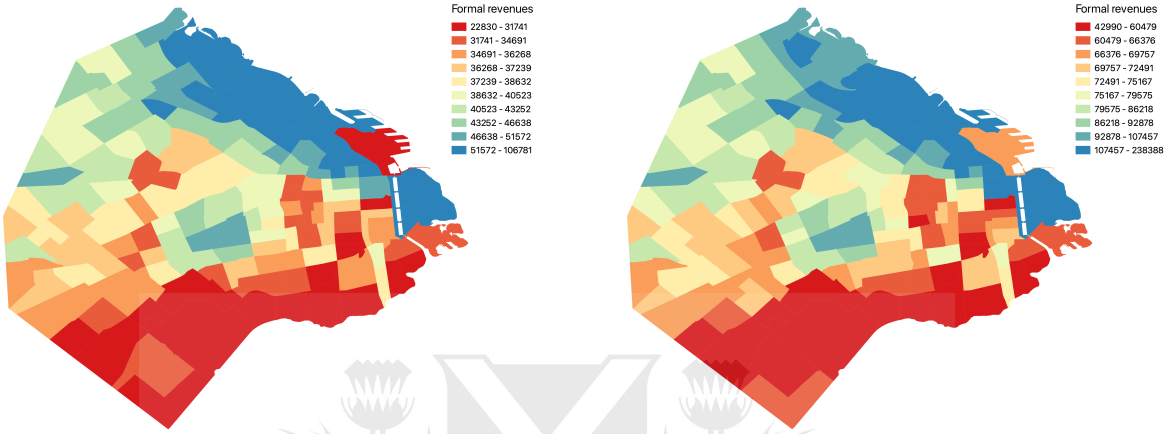
| | Mean | SD | Min | Max | N |
|---|---|---|---|---|---|
| Treatment | 0.37 | 2.70 | 0.00 | 54.70 | 754 |
| Education | 0.14 | 0.89 | 0.00 | 15.33 | 754 |
| Recreational Facilities | 0.01 | 0.16 | 0.00 | 3.56 | 754 |
| Public spaces | 0.07 | 1.30 | 0.00 | 30.13 | 754 |
| Building Refurbishment | 0.01 | 0.14 | 0.00 | 3.87 | 754 |
| Health | 0.00 | 0.11 | 0.00 | 3.11 | 754 |
| Public Housing | 0.00 | 0.00 | 0.00 | 0.00 | 754 |
| Public Offices | 0.14 | 2.19 | 0.00 | 54.70 | 754 |
| Security | 0.00 | 0.00 | 0.00 | 0.00 | 754 |

This table shows descriptive statistics for the variable constructed in this document based on data from the General Secretariat and International Relations of the City of Buenos Aires, and units are expressed in USD/$m^2$

Finally, I propose to use average income data per electoral circuits from the Argentine Integrated Pension System, as can be seen in Figure 4. These maps show how various

electoral circuits changed their relative positions between elections in terms of income. This is presumably explained by the fact that the economic crisis that Argentina suffered in April 2018 had redistributive effects that may have influenced electoral choices. For this reason, this variable was included as a control in some specifications.

Figure 4: Formal revenues




(2017) (2019)

Sources: Authors' own elaboration based on data from the Argentine Integrated Pension System (SIPA).

# 4 Identification Strategy & Main Results

The city of Buenos Aires offers me a good scenario to study the effect of the different perception of resources through public works on electoral support. First, although the building works are distributed fairly evenly among the different neighborhoods of the city throughout the two elections, there is considerable variability with respect to their exact location and the size of the projects in terms of the volume of funding required (Figure 2). In addition, having information on two pre-election periods and their subsequent results allows us to take advantage of the resulting panel variability. Secondly, the mandatory and highly compliant elections allow us to minimize possible attrition problems. However, these problems arise mainly from two components: (i) First, from those who are unable to vote in one of the two elections and by the new cohorts that are incorporated into the census when they turn 16 and 18 years old. (ii) Second, those who decide not to comply with the obligation to vote, which is usually attributed (given the costs and benefits) to political cynicism and lack of confidence in the leaders or in the elections[4]. The first thing that can be observed with respect to this second component is that the level of attendance seems to be not only high but also relatively constant during the last elections both in the PASO and in the general elections[5]. Additionally, observing the Government Confidence Index reported by the Tor-

[4]Bühlmann & Freitag (2006), Grönlund, K & Setälä (2007) and Carreras & İrepoğlu (2013).

[5]In the PASOs the participation was 75%, 74,9%, 74,9% y 76,4% for the elections held between 2013 and 2019 while in the general election it was 77.2%, 81,2%, 78% y 80,8% for the same electoral episodes according to the Dirección Nacional Electoral.

cuato Di Tella University that measures citizens' trust in the national government, there does not seem to be a significant variation between the 2017 and 2019 elections according to (2.53 and 2.2 for the PASO and 2.83 and 2.01 for the 2017 and 2019 General elections respectively). The combination of these two factors makes it unlikely that there has been a sharp drop in the credibility of the political system as a whole.

Accordingly, I use the results of the general election[6] to estimate a model of differences in differences by ordinary least squares by adjusting for standard errors. As seen in the equation (6), I take as an outcome variable the rate of official votes *Share*. I incorporated a series of dummies $\alpha_i$ that identify the school (polling place) $i$ in order to isolate the fix effects over time such as the sociological characteristics of the voters. Another advantage of the city is that due to its high density, the schools where the voting takes place are generally located less than 300 meters from their place of residence, which is why they function as a good approximation of their domicile. In the same way, I incorporated a dummy $\mu_t$ that indicates the election $t$ to distinguish the differences between periods and I incorporate two specifications of average income $X$ as a control that I detail a in the following section. Additionally, since voters may be spatially correlated, it is recommended to cluster the errors at school level to make the inference. For robustness, I also propose to take the most conservative position possible by clustering at the commune level.

$$Share_{it} = \alpha_i + \mu_t + \beta_1 T_{it} + \gamma X_{it} + u_{it} \tag{6}$$

In Table 3, I present our main results based on equation (6). I found that public works as an integral policy have no significant effect on election results over our three specifications. Column (1) presents the results of the difference in difference without adding controls. In columns (2) and (3) I add remuneration as a control in the thousand Argentine pesos and U.S. dollars, respectively. Both of these controls are significant in congruence with our hypothesis that the Argentine crises of April 2018 implied a heterogeneous income shock with electoral effects. I reported in parenthesis robust errors and in brakets clustered robust errors at the commune level.

All of these results contradict the predictions of our mathematical model in its simplest form. In this regard, I have two hypotheses in line with the extension : The first is that only certain types of public works are visible to the electorate, and thus the net effect of public policy is dissolved. I explore this possibility in section 6. In the following section, I try to have some first insights by classifying the works by their type as detailed in the section 3 and additionally I observe if there are heterogeneous effects between different socioeconomic levels. The second is that the strategy of the public works policy does not partially or completely obey electoral but economic objectives. In other words, some projects, for example, could be carried out to pay favors to economic actors who finance the campaign without having any significant benefit for the citizens. This hypothesis is difficult to prove with the information I have. However, there are several examples of this conduct well documented by journalism (see for example Alconada Mon, 2018). Other literature argues

[6]This decision is not trivial since while general elections have a higher attendance, the PASO better reflect voter preferences since there is less of a strategic component to prevent another party from winning. Both specifications could be used to test the robustness of the results.

that politicians are not driven by voters' assessment of the normative desirability of public policies but by how this policies reflect competence or ideology (Ashworth, 2012). While this strategy may be effective for identity building, it may not be as effective for vote winning. That is to say, while both fundraising and identity motivation may have electoral effects, there is no reason to think that this should be related to the location where public works are carried out.

Table 3: Impact of Public Works

| | (1) | (2) | (3) |
|---|---|---|---|
| Treatment | 0.018 | −0.007 | −0.012 |
| | (0.027) | (0.028) | (0.023) |
| | [0.027] | [0.020] | [0.014] |
| Elecction 2019 | 2.861 | −0.975 | −7.016 |
| | (0.141)*** | (1.051) | (0.952)*** |
| | [0.654]*** | [2.158] | [2.080]*** |
| Wage (thousands of ARS) | | 0.098 | |
| | | (0.027)*** | |
| | | [0.053]* | |
| Wage (thousands of USD) | | | −8.202 |
| | | | (0.805)*** |
| | | | [1.572]*** |
| Constant | 49.057 | 45.109 | 68.051 |
| | (0.070)*** | (1.126)*** | (1.852)*** |
| | [0.327]*** | [2.124]*** | [3.723]*** |
| Observations | 1508 | 1508 | 1508 |

This table estimates the electoral efect of public works based on 1508 observations.

Dependent Variable: Share of votes of the ruling party´s candidate

Cluster errors at school level are shown in parenthesis and clustered errors at the comune level are shown in square brackets.

* Statistically significant at the 10%level, ** at the 5% level, and *** at the 1% level.

# 5 Identification Assumptions & Further Results

Typically, our main identification assumption would be that previous differences between voters would have remained constant in the absence of treatment and in particular that they were not affected by heterogeneous shocks. However, recent developments in DiD literature found that this is not enough when the treatment is continuous and all observations are treated (Callaway, Goodman-Bacon & Sant'Anna, 2021) . Thus, the assumption needed is that the average change in outcomes across all units if they had been assigned that amount of dose is the same as the average change in outcomes for all units that experienced that dose. This assumption is achieved if the outcome distribution for each dose is symmetric (e.g. normal), and we do not have reasons for supposing an asymmetrical distribution. This assumption allows for some amount of selection at any observation in particular but not

on average. At the same time, the no-heterogeneous shocks assumption is still needed. The main shock to which voters are exposed is that they face a legislative election in 2017 while in 2019 they also elect executive positions. However, it is reasonable to think that the elections are equally different for all voters and that therefore this will be captured in the fixed effect.

Another important assumption is the absence of reverse causality, that is, the ruler does not decide to invest more in some areas according to some criteria in relation to his level of adherence in each electoral circuit. The first thing to note about this is that the incentives regarding where to invest from the electoral point of view are not clear. On the one hand, it could invest more in unfavorable areas to try to have a better result, but on the other hand, it could prefer to keep the more favorable electorate captive. One might think that there would be an incentive to invest where elections are closest. However, the distribution of votes throughout the city is not as important as the quantity. The exception to this is the communal chiefs, but it is implausible that public works policy should be subordinated to this, given its almost total political irrelevance. Assuming that the rulers have some criteria that I am not contemplating anyway, the nature of the public works carried out by the BAG, as I was able to consult with experts[7], This determines that these are long term projects and therefore their distribution is difficult to respond to short-term political strategies, with the exception of smaller projects. One way to test the robustness of the results would be to exclude those works that have been planned and executed in the periods between elections but it is not possible to isolate its effect from that of the other projects. In the other hand, in a reduced range of years the other differences for electoral reasons should remain relatively constant in line with long-term strategies and therefore be captured in the fixed effects. Buenos Aires offers another advantage in this regard, where maintaining the same political sign for the period studied ensures that these long-term strategies exist and are not discontinued.

Besides, there are much more important determinants of the location of public works such as the level of population that will be directly affected. Nevertheless, population differences should remain relatively constant in relative terms, especially in short periods such as the one I am studying, and are therefore also captured in the fixed effects. In line with the above, the government prefers to allocate more resources to those areas that have better accessibility, since this also affects the number of people not only affected but also visible to the works. First, it is easy to verify that there were no extension on the subway line during the period and in general the number of lines of different types of public transport accessible to each polling place remain relatively constant. In turn, the income could be associated with sociological characteristics that explain the vote and in turn could determine the amount of funds allocated to public works since the rulers may be interested in the relative wealth to make the allocations. For this reason I control the average income per electoral circuits based on data from the Argentine Integrated Pension System. Finally, and in relation to the above, public works generate a significant demand for unskilled labor. If this demand

[7]I am grateful to Fabián de la Fuente, President of the Professional Council of Architecture and Urbanism for his perceptions on the political aspect in the decision making around public works and to the architect Federico Bonessi for his multiple clarifications on the technical determinants of these decisions

is channeled to the treated area, I would not be able to differentiate between the effect of the treatment and that of the increase in employment. However, this is highly implausible in most parts of of the city with high and medium incomes. To test the robustness of the results, I use our main specification but dividing the sample by their socioeconomic level (high, medium or low; equation (6)) approximated from the average income per commune according to terciles. As can be seen in Table 4, the results continue to be non-significant for the three socioeconomic level, ruling out that the results are explained by the low-income areas who benefit from having more jobs.

Table 4: Impact of Public Works by Socioeconomic Level

| | (1) | (2) | (3) |
|---|---|---|---|
| Treatment | −0.018 | 0.092 | −0.030 |
| | (0.047) | (0.174) | (0.025) |
| | [0.056] | [0.217] | [0.016]* |
| Election 2019 | −0.060 | 3.577 | 5.167 |
| | (0.208) | (0.178)*** | (0.216)*** |
| | [0.479] | [0.280]*** | [0.361]*** |
| Constant | 42.423 | 46.271 | 58.595 |
| | (0.102)*** | (0.090)*** | (0.105)*** |
| | [0.237]*** | [0.123]*** | [0.190]*** |

This table estimates the electoral efect of public works based on 1508 observations.

Dependent Variable: Share of votes of the ruling party´s candidate

Cluster errors at school level are shown in parenthesis and clustered errors at the comune level are shown in square brackets.

* Statistically significant at the 10%level, ** at the 5% level, and *** at the 1% level.



While there are no studies that attempt to assess voter response to public works policy as a whole, different specific types of public works have been examined. In particular for the city of Buenos Aires, Ajzenman & Durante (2019) examine how the quality of the infrastructure of the school where citizens were assigned to vote influenced their choice, finding a small but significant effect in favor of the ruling party. However, I do not find that the fact of carrying out public works in education has any significant electoral effect on any specification. However, both facts are consistent if we think that the electorate values this type of policies only in the immediate moment when they are present, such as when they see the school where they are going to vote. Table 5 shows that health and social housing infrastructure are the only types of public work with a significant impact, which is indeed adverse for the ruling party in our three specifications.

Table 5: Impact of Public Works by Type

| | (1) | (2) | (3) |
|---|---|---|---|
| Education | 0.095 | 0.097 | 0.024 |
| | (0.087) | (0.081) | (0.110) |
| | [0.106] | [0.110] | [0.143] |
| Recreational Facilities | 0.461 | −1.951 | 1.124 |
| | (1.998) | (4.213) | (0.832) |
| | [2.029] | [3.946] | [0.855] |
| Public spaces | −0.005 | 0.016 | 0.038 |
| | (0.088) | (0.066) | (0.048) |
| | [0.068] | [0.062] | [0.056] |
| Building Refurbishment | −0.197 | 2.153 | −1.216 |
| | (1.843) | (3.874) | (0.771) |
| | [1.852] | [3.629] | [0.794] |
| Health | −1.037 | −0.937 | −0.621 |
| | (0.049)*** | (0.049)*** | (0.054)*** |
| | [0.217]*** | [0.172]*** | [0.170]*** |
| Public Housing | −82,373.539 | −81155.743 | −58,732.824 |
| | (20,576.715)*** | (21,929.957)*** | (16,629.660)*** |
| | [28,504.803]** | [17,295.965]*** | [12,430.584]*** |
| Public Offices | 0.036 | 0.010 | 0.002 |
| | (0.035) | (0.027) | (0.021) |
| | [0.038] | [0.029] | [0.023] |
| Security | 17,037.120 | 184.679 | −3,741.002 |
| | (11,142.258) | (11,490.817) | (7,570.758) |
| | [9,580.300]* | [10,898.229] | [6,175.615] |
| Election 2019 | 3.151 | −0.978 | −6.723 |
| | (0.164)*** | (1.002) | (0.965)*** |
| | [0.695]*** | [1.987] | [2.117]*** |
| Wage (thousands of ARS) | | 0.107 | |
| | | (0.026)*** | |
| | | [0.047]** | |
| Wage (thousands of USD) | | | −8.183 |
| | | | (0.813)*** |
| | | | [1.579]*** |
| Constant | 49.347 | 45.095 | 68.277 |
| | (0.109)*** | (1.072)*** | (1.873)*** |
| | [0.258]*** | [1.864]*** | [3.711]*** |
| Observations | 1508 | 1508 | 1508 |

This table estimates the electoral efect of public works based on 1508 observations.

Dependent Variable: Share of votes of the ruling party´s candidate

Cluster errors at school level are shown in parenthesis and clustered errors at the comune level are shown in square brackets.

* Statistically significant at the 10%level, ** at the 5% level, and *** at the 1% level.

In addition, I repeat the last exercise but again by dividing the sample by their socioeconomic level in table 6. In column (1), we see that only the lower class responds to investment in education infrastructure which makes sense if we consider that they are the ones who benefit the most from investments in public education. Moreover, this valuation is not low given that every million dollars per square meter invested increases my electoral result by 27 points. Another way to interpret this result is that for every million dollars invested, on average the votes for the ruling party increase 27 percent between the people who are right next door to the school (this effect decreasing as we move away). Another interesting result is that lower classes respond negatively to health infrastructure investment as opposed to middle or high income people (columns 2 and 3). This result is a bit surprising, given that the likelihood of wealthy people using public health is relatively low in Buenos Aires, which is not so evident in the case of education and yet they don't value it electorally. Similarly, the construction of social housing decreases votes among the middle and lower classes that more probably benefit and has no significant effect among the upper classes. On the other hand, security infrastructure, whose main component is the construction of police stations, is not very concentrated in low-income areas where it has no significant effect. A displacement of crime from middle income areas to wealthier areas could explain the drop in votes among the wealthier and the rise among the middle class. One possible explanation is that these works are not highly valued but that their implementation generates negative externalities such as noise and dirt.

Table 6: Impact of Public Works by Type and Socioeconomic Level

| | (Low) | (Middle) | (High) |
|---|---|---|---|
| Education | 0.273 | −0.016 | −0.038 |
| | (0.138)** | (0.238) | (0.054) |
| | [0.128]* | [0.300] | [0.112] |
| Recreational Facilities | 1,010.769 | −539.725 | 0.208 |
| | (1,129.142) | (341.248) | (0.918) |
| | [1,810.405] | [304.659] | [1.118] |
| Public spaces | 0.002 | −1.600 | 0.029 |
| | (0.020) | (0.362)*** | (0.028) |
| | [0.034] | [0.542]** | [0.009]*** |
| Building Refurbishment | −486.900 | −1642.646 | −0.687 |
| | (2,342.472) | (687.654)** | (0.854) |
| | [3,896.783] | [381.683]*** | [1.107] |
| Health | −0.558 | 6,833.819 | 6166.271 |
| | (0.134)*** | (1,570.655)*** | (3,589.515)* |
| | [0.186]** | [2,343.400]** | [5,975.050] |
| Public Housing | −39,919.297 | −95,857.241 | −599.189 |
| | (19,059.143)** | (48,945.537)* | (17,002.965) |
| | [20,061.069]* | [45,026.776]* | [7,266.005] |
| Public Offices | −3.246 | −7,466.345 | −0.027 |
| | (2.245) | (3,910.137)* | (0.019) |
| | [0.542]*** | [1,721.511]*** | [0.014]* |
| Security | 12,061.014 | 31,150.060 | −16,641.116 |
| | (21,019.210) | (15,426.382)** | (4,677.738)*** |
| | [24,969.911] | [6,148.032]*** | [3,527.787]*** |
| Wage (thousands of ARS) | 0.257 | 0.160 | −0.063 |
| | (0.068)*** | (0.081)* | (0.017)*** |
| | [0.084]** | [0.086]* | [0.016]*** |
| Election 2019 | −7.617 | −2.137 | 8.289 |
| | (2.110)*** | (2.937) | (0.861)*** |
| | [2.590]** | [3.068] | [0.904]*** |
| Constant | 34.118 | 40.246 | 61.626 |
| | (2.312)*** | (3.171)*** | (0.836)*** |
| | [2.803]*** | [3.346]*** | [0.580]*** |
| Observations | 512 | 494 | 502 |

This table estimates the electoral efect of public works based on 1508 observations.

Dependent Variable: Share of votes of the ruling party´s candidate by socioeconomic level (low, middle and high). Cluster errors at school level are shown in parenthesis and clustered errors at the comune level are shown in square brackets.

* Statistically significant at the 10%level, ** at the 5% level, and *** at the 1% level.

# 6 Possible Concerns and External Validity

Since the study scenario is a natural experiment and the presumption of exogenousness comes from the structure of the data, the presence of other unobservable variables that attempt against the possibility of making causal inference cannot be completely ruled out, despite the numerous precautions already detailed. In other words, one cannot be sure of having isolated the possible problems related to heterogeneous shocks between groups, processes of reversion to the mean, or to a certain reverse causality that may occur not about the realization of the works per se but about manipulating the date of conclusion of the building works.

Another possible complication may be the noncompliance of the stable unit treatment value assumption from the measure used regarding the heterogeneity of the treatment. This arises from differences in the quality of the implementation of the works[8]and in line with this to the efficiency with which the funds are invested (i.e. how much above the minimum theoretical cost of the executed work). In addition, it is possible that the works executed register a different level of visibility given that access to information can have an impact on the degree of accountability (Pande, 2011).

As hypothesized above, the works can generate employment in low income areas also altering the homogeneity of the treatment, but this does not seem to be a problem in our case. Finally, one characteristic of public works is that while they can presumably have a positive impact once completed, it is not clear that citizens value them during execution. On the one hand, voters may anticipate the benefits of the building works and reward them electorally but on the other hand they may have a negative impact due to the noise pollution they produce. These problems are difficult to solve and can generate biases whose direction is undetermined depending on which of the effects prevails.

With respect to external validity, I expected that the results would be extrapolated to cities in middle-income countries. While income heterogeneity within the city allows us to see the effect on a broad population spectrum, the capacity to carry out public works or levels of corruption may vary for countries with different income levels and therefore affect treatment. While this issue places some constraints, there are a large number of cities with moderately comparable characteristics.

Finally, there is another dimension that I identify as potentially relevant. The classification of the works by the city government allows us to differentiate the treatment according to the degree of visibility of the works, since it is likely to have heterogeneous impacts (Vergne, 2009). As can be seen in Table 7 and according to the perception of the experts consulted, I can classify Recreational Facilities, Public Spaces, Public Housing and Building Refurbishment as high visibility works, Education, Health and Security as middle visibility and Public Offices as low visibility. Given that the number of works is moderately balanced in this

[8]This could even reverse the sign of the effect if the intervention is of very poor quality. The poor execution of the sidewalk repair led the city government to a major revision of its hiring policy as a result of citizen complaints. https://www.buenosaires.gob.ar/noticias/rodriguez-larreta-presento-el-plan-integral-de-veredas-esto-es-para-cuidar-todos-los

dimension, I can define three different treatments according to the degree of visibility as can be seen in the equation (7).

$$Share_{it} = \alpha_i + \mu_t + \beta_{1H} T_{iH} + \beta_{1M} T_{iM} + \beta_{1L} T_{iL} + \gamma X_{it} + u_{it} \tag{7}$$

Table 7: Public Works by Visibility Level

| Level of visibility | Type of project | Elections 2017 | | Elections 2019 | |
|---|---|---|---|---|---|
| High | Recreational Facilieties | 79 | 178 | 90 | 208 |
| | Public Spaces | 60 | | 58 | |
| | Public Housing | 12 | | 36 | |
| | Building Refurbishment | 27 | | 24 | |
| Middle | Education | 116 | 170 | 78 | 130 |
| | Health | 50 | | 40 | |
| | Security | 4 | | 12 | |
| Low | Public Offices | 24 | | 13 | |

In line with our expectations, Table 8 shows that the works with the highest visibility are the only significant ones once I control for income (either in Argentine pesos or dollars in columns two and three). However, the effect of investing one million dollars in high visibility works is a reduction of between 6.5 and 12% of the votes in the immediacies of the work (a percentage that decreases with the higher distance to the project).

Table 8: Impact of Public Works by Level of Visibility

| | (1) | (2) | (3) |
|---|---|---|---|
| High visibility | −0.053 | −0.102 | −0.065 |
| | (0.046) | (0.020)*** | (0.014)*** |
| | [0.050] | [0.029]*** | [0.016]*** |
| Middle visibility | 0.062 | 0.074 | 0.010 |
| | (0.099) | (0.085) | (0.105) |
| | [0.112] | [0.110] | [0.142] |
| Low visibility | 0.038 | 0.015 | 0.004 |
| | (0.032) | (0.025) | (0.020) |
| | [0.036] | [0.027] | [0.021] |
| Election 2019 | 2.858 | −1.000 | −7.010 |
| | (0.142)*** | (1.052) | (0.953)*** |
| | [0.657]*** | [2.156] | [2.086]*** |
| Wage (thousands of ARS) | | 0.098 | |
| | | (0.027)*** | |
| | | [0.053]* | |
| Wage (thousands of USD) | | | −8.196 |
| | | | (0.805)*** |
| | | | [1.574]*** |
| Constant | 49.054 | 45.084 | 68.036 |
| | (0.070)*** | (1.128)*** | (1.853)*** |
| | [0.322]*** | [2.116]*** | [3.724]*** |
| Observations | 1508 | 1508 | 1508 |

This table estimates the electoral efect of public works based on 1508 observations.

Dependent Variable: Share of votes of the ruling party´s candidate

Cluster errors at school level are shown in parenthesis and clustered errors at the comune level are shown in square brackets.

* Statistically significant at the 10%level, ** at the 5% level, and *** at the 1% level.



# 7 Conclusions

This paper explores what incentives politicians have to carry out public works based on how their voters respond. I found that, comprehensively, the public works policy carried out in the Autonomous City of Buenos Aires from 2015 to 2019 didn't have any significant electoral impact on the ruling party. To the best of my understanding, this can be attributable to at least three reasons, two of which I have addressed here.

First, I evaluated the electoral effect of the public works by their level of visibility. I found that those projects that are more visible have a negative electoral impact of between 6.5% and 12% for the ruling party (right just on the square meter around the construction site and decreasing with distance). In addition, I specifically found a negative effect of infrastructure on health and social housing. Second, I examined the existence of heterogeneous effects by income in light of the possibility that the generation of construction jobs could be generating

an indirect electoral effect in low-income areas. Not only was this not a problem, but the impact remained insignificant at all levels with respect to the general public works policy. In addition, the rich value the improvement of public spaces and penalize investment in security infrastructure, while the opposite is true for the middle class. The poor, on the other hand, penalize investment in health infrastructure and social housing while they value investment in education infrastructure.

Finally, the reason that exceeds the scope of this paper is that the rulers may be inefficiently allocating resources to public works that have revenue-raising or identity-creation purposes. Projects of this nature may not have direct electoral effects but at the same time they may be more important for the final objective of being elected. However, even though this may be true, people are likely to punish the lack of infrastructure but not reward its provision. Even the provision of this infrastructure for some parts of the city may highlight its lack in other areas by contrast. In this sense, this paper points out some of the incentive problems that city governments may face when designing public policy.

Departamento de Economía Maestría en Economía

# References


- Alconada Mon, H. (2018). La raíz (de todos los males). Cómo el poder montó un sistema para la corrupción y la impunidad en la Argentina.
- Ashworth, S. (2012). Electoral accountability: Recent theoretical and empirical work. Annual Review of Political Science, 15, 183-201.
- Ajzenman, N., & Durante, R. (2019). Salience and Accountability: School Infrastructure and Last-Minute Electoral Punishment.
- Besley, T., & Case, A. (1995). Does electoral accountability affect economic policy choices? Evidence from gubernatorial term limits. The Quarterly Journal of Economics, 110(3), 769-798.
- Besley, T., & Case, A. (2003). Political institutions and policy choices: evidence from the United States. Journal of Economic Literature, 41(1), 7-73.
- Bechtel, M. M., & Hainmueller, J. (2011). How lasting is voter gratitude? An analysis of the short-and long-term electoral returns to beneficial policy. American Journal of Political Science, 55(4), 852-868.
- Bühlmann, M., & Freitag, M. (2006). Individual and contextual determinants of electoral participation. Swiss Political Science Review, 12(4), 13-47.
- Callaway, B., Goodman-Bacon, A., & Sant'Anna, P. H. (2021). Difference-in-differences with a continuous treatment. arXiv preprint arXiv:2107.02637.
- Carreras, M., & İrepoğlu, Y. (2013). Trust in elections, vote buying, and turnout in Latin America. Electoral Studies, 32(4), 609-619.
- Cerda, R., & Vergara, R. (2008). Government subsidies and presidential election outcomes: evidence for a developing country. World Development, 36(11), 2470-2488.
- Chen, J. (2013). Voter partisanship and the effect of distributive spending on political participation. American Journal of Political Science, 57(1), 200-217.
- Cole, S. (2009). Fixing market failures or fixing elections? Agricultural credit in India. American economic journal: applied economics, 1(1), 219-50.
- De la Calle, L., & Orriols, L. (2010). Explaining the electoral effects of public investments: The case of the expansion of the underground in Madrid, 1995–2007. European Journal of Political Research, 49(3), 393-417.
- De La O, A. L. (2013). Do conditional cash transfers affect electoral behavior? Evidence from a randomized experiment in Mexico. American Journal of Political Science, 57(1), 1-14.
- Filc, G. (2019). Voting with feet? Implementing with head? Effects of public transport accessibility on voting behavior. Working Paper.

- Finan, F., & Mazzocco, M. (2016). Electoral incentives and the allocation of public funds (No. w21859). National Bureau of Economic Research.
- Grönlund, K., & Setälä, M. (2007). Political trust, satisfaction and voter turnout. Comparative European Politics, 5(4), 400-422.
- Imai, K., King, G., & Velasco Rivera, C. (2020). Do nonpartisan programmatic policies have partisan electoral effects? Evidence from two large-scale experiments. The Journal of Politics, 82(2), 714-730.
- Levitt, S. D. (1994). Using repeat challengers to estimate the effect of campaign spending on election outcomes in the US House. Journal of Political Economy, 102(4), 777-798.
- Levitt, S. D., & Snyder Jr, J. M. (1997). The impact of federal spending on House election outcomes. Journal of political Economy, 105(1), 30-53.
- Litschig, S., & Morrison, K. (2010). Government spending and re-election: Quasi-experimental evidence from Brazilian municipalities.
- Malhotra, N. (2008). The impact of public financing on electoral competition: Evidence from Arizona and Maine. State Politics & Policy Quarterly, 8(3), 263-281.
- Manacorda, M., Miguel, E., & Vigorito, A. (2011). Government transfers and political support. American Economic Journal: Applied Economics, 3(3), 1-28.
- Milesi-Ferretti, G. M., Perotti, R., & Rostagno, M. (2002). Electoral systems and public spending. The quarterly journal of economics, 117(2), 609-657.
- Pande, R. (2011). Can informed voters enforce better governance? Experiments in low-income democracies. Annu. Rev. Econ., 3(1), 215-237.
- Persson, T., & Tabellini, G. (2016). Political economics. Cambridge, MA: MIT press.
- Pop-Eleches, C., & Pop-Eleches, G. (2012). Targeted government spending and political preferences. Quarterly Journal of Political Science, 7(3), 285-320.
- Roemer, J. E., & Roemer, J. E. (2009). Political competition: Theory and applications. Harvard University Press.
- Strömberg, D. (2004). Radio's impact on public spending. The Quarterly Journal of Economics, 119(1), 189-221.
- Tamada, K. (2009). The effect of election outcomes on the allocation of government spending in Japan: evidence from the weather on election days. Japanese Economy, 36(1), 3-26.
- Vergne, C. (2009). Democracy, elections and allocation of public expenditures in developing countries. European Journal of Political Economy, 25(1), 63-77.

- Voigtländer, N., & Voth, H. J. (2014). Highway to hitler (No. w20150). National Bureau of Economic Research.
- Zucco Jr, C. (2013). When payouts pay off: Conditional cash transfers and voting behavior in Brazil 2002–10. American journal of political science, 57(4), 810-822.