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Electoral incentives, investment in roads, and safety on local roads

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Abstract

It is widely recognized that politicians deliberately allocate goods and services just prior to the election, and road investments are arguably among the most visible infrastructure to influence voters. Using a comprehensive dataset on Italian municipalities over the period 2010-2015, we test whether investments in roads and transport services are affected by political manipulations close to elections. We exploit the staggered time of local election to show, indeed, that investment spending on road and transport in the year before election is 30% higher than in the electoral year. Further analyses suggest that our results are more marked (i) in cities guided by a mayor who can run for re-election and (ii) in municipalities with a lower share of educated voters. Moreover, we isolate the portion of the (exogenous) correlation between the probability of observing an accident and the amount of expenditure on road services that is induced by the political cycle by using the year-in-the-term dummies as instruments. We do not detect any relationship between the increase of investments in road services induced by the political cycle and the local need for road safety, as the probability of having an accident in local roads remained unchanged. Taken together, these findings suggest that politicians manipulate the budget only for re-electoral purposes. Therefore, we discuss two policy rules that would allow such an inefficient spending to be reduced, by properly programming investment according to real needs and not to electoral convenience.

Keywords: Political Budget Cycle, road accidents, municipalities, local elections, road investments

JEL Codes: D72, H12, H77, Z18

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1. Introduction

Politics is all about "who gets what, when, how", claimed Harold Lasswell in 1936, suggesting that decisions regarding the allocation of public goods and services are the essence of the politics. Along these lines, the timing of allocations play an important role, as politicians, seeking to improve their chances of winning a forthcoming election, might deliberately allocate goods and services just prior to the election (Golden and Min, 2013). Political economists call this phenomenon "political budget cycle" (Nordhaus, 1975; Rogoff and Sibert, 1988; Rogoff, 1987), and the key questions is therefore whether – and to what extent – politicians have incentives to strategically manipulate policy decisions close to elections.

There are plenty of examples around the world documenting mayors while inaugurating new roads, bridges or sidewalks, as well as paving city streets just before elections. In this regard, in 2021, council leaders in Edinburgh have set out proposals to invest an extra £6 million to improve roads, including £2 million to repair potholes and £4 million to resurface roads and pavements. Such an announcement has been labelled by the opposite coalition to be '[…] a cynical attempt' so close to the election to '[…]influence the public' (*The Herald,* 27th April 2021). In a similar vein, in July 2021, the mayor of the city of Powell River in Canada declared to spend up to $2 million to deal with roads in disrepair the year before elections. Likewise, the recommendations to the Government made by the Norwegian Public Roads Administration highlighted that '[…]the good functioning of roads is important issue in local elections' (p. 9).[4] Yet, the I.T. Transport blog illustrates the point clearly, as it outlined that there is no political return in clearing out mud and debris from culverts along 300 kilometres of rural road or re-grading the road after the wet season has passed. However, it continues, '[…]opening a new road, and being there in person to cut the ribbon itself, with as much fanfare as possible – that gets attention, media interest, tweeted and shared all over the country – is what gets you re-elected.'[5] Eventually, this phenomenon has recently called for extra attention also in the media to the point that, for example, the title page of *la Gazzetta del Mezzogiorno,* an important newspaper in Southern Italy, in its edition of 18 June 2018 read "2019 Election, new streets and sidewalks: get started with the festival of hypocrisies".

Together with this anecdotal evidence, there is a large body of literature documenting and empirically investigated the presence of the political budget cycle. While most studies are based on cross-country samples of central government budgets, only a few works provide causal evidence of the presence of

[4] The document is available at the following link: https://www.piarc.org/ressources/documents/451,4.2-TC3-20-2002-Levik.pdf.

[5] I.T. Transport provides consultancy services, focused on, and appropriate to, the needs of the transport, infrastructure, and development sectors in developing countries. More details can be found here: https://www.ittransport.co.uk/blog/why-planning-design-and-engineering-are-really-the-silent-partners-in-infrastructure-development/.

political cycles at the local level because in most countries local elections generally occur at the same time, so that it is difficult to separate the years of the term effect from simple time effects, leading to identification issues (Sjahrir *et al.*, 2013).[6] We return to this point later.

Evidence of local political budget cycles is detected by Kneebone and McKenzie (2001), who use data on Canadian provinces over the period 1966–1997, finding that more visible expenditure functions—such as education, transportation and communication, re-creation, and culture—expand in election years versus non-election years. Similar results are reported by Drazen and Eslava (2010), who show that prior to elections Colombian municipalities significantly expand their spending on public infrastructures, since this type of spending is considered more attractive to voters. Akhmedov and Zhuravskaya (2004) use a monthly panel dataset of Russian provinces over the period 1998–2003, finding significant political cycles both for overall spending and for budget composition. Khemani (2004) considers the 14 major Indian states over the period 1960–1992, showing that in election years tax collection from specific producer groups is lower and public investment spending is higher than in non- electoral years. In a similar vein, Alesina and Paradisi (2017), Ferraresi *et al.*, (2019) and Repetto (2018) exploit the staggered time of elections in Italian municipalities finding evidence of political budget cycle for taxes, current and investment spending.

While it exists a well-established evidence explicitly focusing on the provision of public polices according to the electoral cycle, these works primarily focus either on general taxes or on total spending, thereby impeding to fully understand if there are specific items of the budget that are manipulated during the electoral cycle. Evidently, there are complex mechanisms behind municipal council's decisions of budget allocation, but intuition would suggest that more visible expenditures are those likely to be manipulated— the point here being that if politicians, seeking to improve their chances of winning a forthcoming election, deliberately allocate goods and services just prior to the election, investment expenditure, such as roads and pavements, are expected to be strongly affected by political cycles.

Italy illustrates this point clearly. Over the period 2010-2015, municipalities spent, on average, approximately 4 billion euros for investment in roads and transport services during pre-electoral years, with the same amount being, on average, equal to 2.8 billion euros in the other years of the term. In practice, spending on roads and transport services increases of about 45% in the year preceding the election as compared to no pre-electoral years. Developing from this preliminary evidence, we ask two questions: is spending devoted to road and traffic services plagued by political

[6] See Alesina *et al.* (1997) and Persson and Tabellini (2000), among others, for evidence of the political budget cycle in developed countries; for developing countries, see the discussions in Shi and Svensson (2006).

manipulations close the elections? And, if so, is such an increase motivated by a real need of improving citizens' safety?

To address these questions, we use a comprehensive dataset at the local level in Italy, which allows detailed information on balance sheet of Italian municipalities to be properly analysed. More in depth, we have access to information on all spending functions, as well as on every single service within each of these functions. In turn, this granularity allows us to focus on some specific components of the budget over which the mayor can truly enjoy discretion. To establish the presence of political cycles, we exploit the exogenous variation in spending decisions due to the political cycle. Italian cities are characterized by staggered election times, so that it is possible to overcome identification issues, that is, since in each year only a fraction of municipalities holds elections, it is possible to control for any other shock common to all municipalities, i.e., change in macroeconomic conditions, by the inclusion of time-specific dummies.

Following this approach, we find that politicians deliberately increase investment spending on the roads and transport expenditure function prior the election, an item of the budget that it is not only economically relevant, but it is also arguably among the most visible to voters. Specifically, our estimates suggest that three years before election spending on this municipal function increases of about 16% in relation to the election year (14 per capita euros), and it continues to grow both two (+24%; 20 per capita euros) and one year before election (+32%; 27 per capita euros), while decreasing in the year just after the election.

Our main results survive several robustness checks. Further analyses indicate that our findings are entirely driven by services devoted to roads. For the other two components of the road and traffic expenditure function, public lighting, and public transport, we do not observe any path consistent with the theory of the political budget cycle. In practice, these results seem to indicate that politicians manipulate policy outcome before elections and, in doing so, they increase the amount of investment allocated to a very visible good: municipal roads.

Finally, we document that, political cycles on road services are guided by municipalities governed by no term limited mayors. Moreover, we find support that the presence of more educated voters weakens the incentives for politicians to strategically raise spending before elections. At the same time, we detect no relationship between the increase of investments in road services induced by the political cycle and the local need for road safety, as the probability of having an accident in local roads remains substantially unchanged. Taken together, these findings support the hypothesis that, indeed, politicians manipulate the road expenditures only for re-electoral purposes.

Our work is mostly related to the strand of research focusing on testing for the presence of political cycles on both local taxes and expenditure (Aidt and Mooney, 2014; Baleiras and Costa; 2004;

Baskaran *et al.*, 2016; Eslava, 2011; Ferraresi, 2020; Foremny and Riedel, 2014; Foremny *et al.*, 2018; Galindo-Silva, 2015; Geys, 2007; Kis-Katos and Sjahrir, 2017; Klein and Sakurai, 2015; Veiga and Veiga, 2007). We complement this literature by focusing on specific items of the budget to better assess where the political incentive to manipulate policy outcomes materializes. When documenting that political cycles are more marked in areas characterised by less educated voters, our paper overlaps with the small yet growing strand of papers looking into the role of voters' information in shaping the size of the political budget cycle (Garcia and Hayo, 2021; Repetto, 2018). Lastly, our research also ties in with the emerging literature tackling the challenges, especially at the local level, of linking political cycles and other domains of public policy, including lending policies (Englmaier and Stowasser, 2017), electricity service provision (Baskaran *et al.*, 2015), public hospital (Takako and Bessho, 2018) and injury rate of car accidents (Bertoli and Grembi, 2021).

The remainder of this work is structured as follows. Section 2 illustrates the institutional context, Section 3 describes the data, while the econometric strategy is presented in Section 4. Findings and robustness tests are discussed in Sections 5 and 6, respectively. Heterogeneous effects are analysed in Section 7, while Section 8 further investigates the mechanism behind our findings. The last section offers some concluding remarks.

2. Institutional setting

The Italian Constitution defines four administrative layers of government: the central government, regions, provinces, and municipalities. While most regions and provinces are ruled by ordinary statutes, some of them—the autonomous regions and provinces—are ruled by special statutes.[7] Furthermore, Italy counts 107 provinces, which have been reformed by law 56/2014 that reduced their public competences and eliminated the possibility of direct election of their own representatives. Finally, municipalities are the smallest level of jurisdiction and number around 8,000; the average size is around 6,400 inhabitants, and most have fewer than 15,000 inhabitants (approximately 90%).

Italian municipalities are responsible for a large array of important public programmes in the fields of welfare services, territorial development, local transport, infant schools, sports and cultural facilities, local police services, as well as infrastructure spending. As a share of the general government budget, in the timespan covered by our empirical analysis (2010–2015), municipalities account on average for about 8% of total public expenditure, which corresponds to €66 billion per year. The same figure account, on average, for 20% in the case of investments, corresponding to €13 billion per year. In

[7] Italy has five autonomous regions (Sicily and Sardinia, which are insular territories, and Valle d'Aosta, Trentino-Alto Adige, and Friuli-Venezia Giulia, which are northern boundary territories) and two autonomous provinces (Trento and Bolzano).

relation to the timing of policy decisions, every December the municipal government prepares a draft of the budget, a planning document that details both the total amount and distribution of the municipal expenditures across functions in the year to come and how they will be financed. The budget is discussed in the council and must be approved by the end of the year.

According to the structure of the balance sheets of Italian municipalities, the expenditure on investments can be grouped into functional classification. It is thus possible to get information on the amount of spending devoted to the twelve expenditure functions (administration and management, justice, police, education, culture, sport, tourism, roads and transport, planning and environment, social welfare, in-house production services, and economic development). Among these functions. approximately 80% is concentrated in four main tasks: administration and management, roads and transport services, planning and environment, and education (Figure 1). The remaining 20% of capital expenditure is allocated to the municipal police, welfare, culture, sports, and tourism. Finally, a very low level of resources goes to three other functions: economic development, in-house production services, and justice.

INSERT HERE FIGURE 1

In relation to the municipal-level electoral system, since 1993 Italy has opted for a mayor– council system: the municipal council members and the mayor are separately and directly elected by citizens in elections normally held every 5 years. The mechanism of direct election implies that the mayor is endowed with strong powers over municipal politics (a basic feature of presidential government), thereby making herself as the main decision maker as it regards local expenditure and local taxes, even though the council retains the power to dismiss the mayor by means of a vote of no confidence (a basic feature of parliamentary government).

3. Data

The empirical analysis is based on a dataset for Italian municipalities resulting from a combination of different archives publicly available from the Italian Ministry of the Interior, the Italian Ministry of the Economy, and the Italian National Institute of Statistics. It includes a full range of information organized into three sections: (1) municipal financial data; (2) municipal demographic and socioeconomic data such as population size, age structure, and average income of inhabitants; and (3) personal characteristics of the mayors.

As it was already alluded to, in Italy there are regions and provinces ruled by special statutes, which due to their special autonomy are allowed to set their own fiscal rules and transfer policies for their municipal governments, thereby leading to biased conclusions if compared to municipalities

belonging to regions of ordinary status. Therefore, we restrict the sample to municipalities located in ordinary-statute regions, and we do not include municipalities with missing values. We obtain a balanced panel sample of 6,574 municipalities, including 39,444 observations spanning 2010 to 2015. The summary statistics for all variables used in the analysis are reported in Table A1 of the Online Appendix

3.1 Dependent variable

As previously mentioned, investment decisions of local governments can be grouped into twelve expenditure functions. According to the spending distribution across functions, from Figure 1 it emerges that on average, the largest portion is allocated to roads and transport (26%, 61 euros per capita), followed by planning and environment (25%, 59 euros per capita) and administrative services (25%, 59 euros per capita). Therefore, as our main variable of interest, we adopt the per capita spending on investment allocated to roads and transport (*Roads&Transport*) expenditure function. This variable is not only the most relevant item of the budget, as it takes its lion's part, but investment decisions on roads are also pretty much visible to citizens, and hence, are expected to be strongly manipulated by local policymakers close to elections. Spending in this function consists of – but it is not limited to – (i) investments in new municipal roads and sidewalks and its maintenance, including repairing of potholes and resurface of roads and pavements; (ii) investment and maintenance of public lighting and, (iii) investments in public transportation, including the purchase of buses, trams and subways.

3.2 Municipal Elections

Municipal elections are normally held every 5 years between April and June, but the timing is not the same for all municipalities. The staggering of electoral dates is the result of local governments having to resign before the end of their term because of not being able to form a majority in the city council supporting the local government, or because of political scandals or judicial impeachment.[8] As a result, each municipality follows its own electoral cycle. Along these lines, Figure 2 demonstrates that municipalities indeed follow different election schedules. Specifically, more than half of the

[8] More specifically, the staggered nature of local elections can be attributed to historical reasons. In fact, at the end of the Second World War in 1946, all the ruling war councils had to be replaced. Despite the replacement occurring at the same time for all cities, in subsequent decades several municipalities (including Roma) faced government crises, and new elections took place. Moreover, early terminations for other reasons, such as dissolution for suspected mafia infiltration in the council, commissioner intervention, merging with other municipalities and violations of the law and absence of candidates, changed the length of terms and the timing of elections.

municipalities in the sample had elections in 2014. Of the remaining municipalities, 465 (7%) voted in 2010, 1,162 (18%) in 2011, 784 (12%) in 2012, 539 (8%) in 2013, and 509 (8%) in 2015.

INSERT HERE FIGURE 2

3.3 Control variables

The dataset also includes some time-varying control variables that account for differences among municipalities in terms of their population structure and economic conditions. The demographic and socio-economic controls include total population (*population*), the population density (*density*), calculated as the ratio between the municipal surface (in square kilometres) and its population, the per capita base of the personal income tax (*income per capita*), the ratio between the active population (aged between 15 and 64) and the inactive population (aged between 0 and 4 or over 65) (*age dependency ratio*), as these variables can capture the presence of scale economies in the provision of public goods and also account for some specific age-related public needs such as nursery schools and nursing homes.

Since 2001, the Italian Central Government, to fulfil the obligations of the European Stability and Growth Pact, imposes on each municipality with more than 5,000 inhabitants (and above 1,000 since 2013) the so-called Domestic Stability Pact, that implies a constrained municipal deficit. Hence, we include a dummy (*domestic stability pact*) that equals 1 if a municipality must fulfil the Domestic Stability Pact, and zero otherwise; this variable should lead to a lower level of expenditure (Grembi *et al.*, 2016). In addition, considering the recent findings of Galletta (2017), who shows that the presence of a commissioner significantly reduces local investments, we include a dummy variable accounting for whether a municipality has been put under a commissioner (*commissioner*). Finally, the personal characteristics of the mayors may affect policy outcome at the local level (Ferraresi and Gucciardi, 2021). Therefore, in further specifications we account for the mayor's age (*age*), gender (*gender*), education (*edu*), past occupation (*profession*), and the difference in vote share between the mayor and the second candidate in the last election (*margin of victory*).[9]

[9] In more detail, *gender* is a dummy variable that is equal to one if the mayor is female and zero otherwise. *Edu*, is a categorical variable that captures the level of education of the mayor, corresponding to 1 for having obtained a middle school diploma, 2 for a high school diploma, and 3 for a bachelor's degree and higher. *Profession* is a categorical variable ranging from 1 to 8, where 1 = managers; 2 = high-level professions (engineers, doctors, etc.); 3 = freelancers, teachers, and educators; 4 = office workers; 5 = traders and dealers; 6 = artisans and farmers; 7 = factory workers; 8 = unemployed, job seekers, retirees, and others; 9 = police and military.

4. Empirical strategy

We are interested in understanding how investment decisions are affected by political incentives. Nevertheless, it is worth mentioning that providing causal evidence of the existence of the political budget cycle is not an easy task, as it might be difficult to separate any year-of-the-term effect from other changes in macroeconomic conditions. A possible way to overcome this issue is to exploit the staggered time of elections: a typical feature of Italian municipalities. More specifically, the staggered timing of the Italian municipal elections determines a sort of random assignment of the political cycle of municipalities, so that the position in the term of a single municipality each year can be considered as good as randomly assigned.[10] Therefore, the model we estimate take the following form:

$$y_{it} = \alpha + \beta \boldsymbol{d_{it}} + \gamma \boldsymbol{X}_{it} + \tau_i + \mu_t + \epsilon_{it} \quad (1),$$

where y_{it} is the per capita investment spending on the road and transport function of municipality *i* at the year *t*, $\boldsymbol{d_{it}}$ is a set of four dummies for each municipality and for each year in the term defined as follows:

$$\boldsymbol{d_{it}} = \begin{cases} d_{it}^{\tau-3} = 1 \text{ three years before election} \\ d_{it}^{\tau-2} = 1 \text{ two years before election} \\ d_{it}^{\tau-1} = 1 \text{ one year before election} \\ d_{it}^{\tau+1} = 1 \text{ one year after election} \end{cases}$$

and zero otherwise, where the indicator for an election year, d_{it}^{τ} , is excluded from estimation to avoid perfect multicollinearity, which would make it impossible to estimate all five year-in-term indicators, and so all coefficients should be interpreted as deviations from the election year. The vector $\mathbf{X_{it}}$ includes municipality, mayor-level and political controls as described in section 3.3. τ_i is an unobserved municipal specific effect, μ_t is a year specific effect and ϵ_{it} is the classical error term, clustered at the municipal level. In practice, following the specification outlined in Eq. (1), the year-in-term indicators capture any fluctuations in spending due to the political cycle and vary cross-sectionally by municipality, as municipalities are at different points of the electoral cycle. Moreover, given that in each year there are municipalities that hold elections and municipalities that do not hold elections, it is possible to control for common shocks to all municipalities (as changes in macroeconomics conditions) by including time dummies.

[10] See Coviello and Gagliarducci (2017) for a discussion of the exogeneity of election dates in Italy.

5. Findings

The first round of results is shown in Table 1. Each of the four columns correspond to different specifications of Equation (1). The baseline specification, which factors in municipal and year fixed effects, is reported in column (1). The model in column (2) includes all socio-demographic and economic factors described in Section 3.3 to control for characteristics of the municipalities varying across time and space that are potentially correlated to the political cycles and the spending variable. Column (3) allows for the personal characteristics of the mayors to be accounted for. Since Italian regions might grant municipalities of additional transfers for investment purposes, one might argue that there could be some other unobservable characteristics related to the specific region that might influence the municipal decision on investment in the road and transport function across time, thus affecting our dependent variable. Along these lines, column (4) includes a set of region-by-year fixed effects to account for unobservable region-specific characteristics that vary over time.

The results in Table 1 show a path consistent with the presence of the political budget cycle at the local level. Taking the election year as the baseline, our estimates suggest that municipal investment in road and transport increases as elections get close and then drops just after elections, before continuing to rise again. In terms of point estimates, and following col. 3, expenditures two years before an election are approximately 20 euros per capita higher with respect to an election year, an amount corresponding to 23% increase as compared to the average value of investments in roads and transport expenditure function observed in the electoral year (85 euros per capita). Spending further increases in the year immediately before an election, accounting for 27 euros per capita (+32%). In the year after election there is a drop in the expenditure, even though the differential effect with respect to the electoral year is not statistically significant, and three years before the next election, the cycle seems to begin again, as the per capita expenditure is found to be higher than that of the electoral year of about 14 euros per capita (16%).

Taken together, these results corroborate the presence of the political budget cycle for Italian municipalities, investments are higher close to elections as compared to other years of the term. In practice, the municipal spending in investments on road and traffic in the year before election increase by 25 to 27 euros (depending on the adopted specification) per capita as compared to electoral years, an absolute amount corresponding to about 29-32% increase with respect to the average value of investment spending observed during electoral years.

INSERT TABLE 1 HERE

6. Robustness tests

In this section, the validity of the previous results is confirmed by a battery of robustness tests that are intended to address possible issues related to the research design that could bias the baseline estimates.

To begin with, as outlined by Repetto (2018) and Ferraresi (2020), council resignation and/or dismissal among municipalities might create concerns about identification, as the resignation/dismissal could be endogenous to local area circumstances. To account for this, we construct an artificial political cycle for all municipalities by using 'predicted' years relative to the election, regardless of commissioner status. We fix the election cycle timing to that at the beginning of the study period, and we assume that each municipality votes again every 5 years. That is, if a municipality is in its pre-electoral year at the beginning of the sample period (2010), implying that it holds elections in 2011, it is automatically assumed to vote again in 2016 and thus be in its pre-electoral year in 2015. We repeat the same procedure according to the specific year of the term in which municipalities are in 2010. Using these theoretical electoral schedules, we build five dummy variables, one for each year of the predicted term, and we estimate Eq. (1) by adopting these (predicted) dummies. Columns 1 through 4 of Table 2 report the results of this analysis and show that coefficients are statistically significant and very similar to those obtained in the baseline specification, suggesting that endogenous resignation is not a serious concern.

INSERT TABLE 2 HERE

Second, if it is true that the presence of political cycles is associated with the incentive to manipulate policy decisions close to elections, one should expect to find no effect of the political cycle on outcomes variables that cannot be influenced by the local policy maker. Since vertical transfers are determined by the central government, elected officials do not have discretion in setting them. Hence, we collect information on vertical transfers, and we use this variable as our outcome. The results of this analysis are reported in Table 3. Reassuringly, the level of per capita grants is not affected by the political cycles as the dummy coefficients turn out to be not statically significant.

INSERT TABLE 3 HERE

As was already alluded to, our main dependent variable is given by the level of investment targeted to road and transport expenditure function and expressed in per-capita terms. However, one might argue that the use of levels would not allow the local preferences in spending categories to be captured, as any spending fluctuations might be simply due, for example, to favourable macro-economic circumstances, leading to a general increase in all expenditure functions, Therefore, a common practice to rule out this possibility, besides the inclusion of year fixed effects, is to use spending

variables expressed in shares. In this way, if the increase in investment observed close to elections really reflects a council's preference towards road and transport function, the use of shares, rather than levels, would allow the evidence of the existence of political cycles to be reinforced.

Motivated by this concern, as a further test, we replicate our analysis by using our dependent variable as a share (over the total amount on expenditure in investments) instead of levels. Shown in Table 4, results support the prediction that also in the case of shares decisions on investments in road and traffic function are affected by political cycles.

INSERT TABLE 4 HERE

As a final robustness test, we check whether our main findings are sensitive to the exclusion of a single region, given the key role of regional governments in setting additional grants to municipalities for investment purposes. For this reason, we have estimated Equation (1) dropping one region at a time. The result of the estimated coefficients of the political cycles and its 95% confidence interval are shown in Figure A1 through A3, and the results are very similar to those obtained in our baseline specification. Hence, it can be concluded that our main results are not driven by a particular region and are thus generalizable.

To sum up, the analyses carried out in this section have strengthened the evidence of a political cycle on investment decisions in road and traffic services. In addition, the results indicate that it is very likely that such an effect is due to the staggered time of municipal elections, as no other plausible explanations that clearly hold as arguments against a causal interpretation of this relationship are found.

7. Heterogeneous effects

To investigate whether there is evidence of a heterogeneous response within the road and transport function, we analyse how the effect varies along several services equipped in this specific municipal function. More in details, we exploit the granularity of our database which allows the different composition of investment within the road and transport function to be isolated and analysed. Along these lines, the road and transport function is composed by three services: (i) roads; (ii) public lighting, and (iii) public transport.

As for the *road* service, spending on this category includes the construction of new streets, repairing of potholes and resurface of roads and pavements, as well as construction, pavements, and maintenance of sidewalks. In terms of *public lighting*, investments mainly regard the installation –

and its maintenance – of light points. Finally, *public transport* deals with investments in the purchase of vehicles.

Turning now to the distribution of these services within the Roads and Transport expenditure function, from Figure 2 it emerges that on average, the largest portion is allocated to roads services (64%), followed by public transport services (30%) and public lighting (6%).

INSERT HERE FIGURE 3

We estimate Equation (1) using, as dependent variables, the per capita investment spending divided by these three categories. In this way, it is possible to detect whether the political budget cycle is associated with a specific component of the road and transport spending function. Results of this analysis are shown in Figure 4 and 5 and indicate that the incentive to manipulate policy outcomes close to election is entirely driven by the road services (Figure 4).[11] In particular, following col. 3 of Table A2, it turns out that, compared to the electoral year, two years before election, municipalities increase investment expenditure on roads by approximately 17 euros per capita (approximately 22% larger if compared to the average expenditure on road services observed in electoral year), with such an effect being also larger the year before election (23 euros per capita; 30% more if compared to the electoral year). After the election, the spending on roads investments decreases while raising again three years before elections (11.5 euros per capita; 15% more than the electoral year). As for the other two items of the road and transport function (Figure 5), it emerges that these services are not plagued by political manipulation as there is no evidence at all, of the political budget cycle for public lighting (Panel A), nor for public transport (Panel B).

INSERT HERE FIGURE 4

INSERT HERE FIGURE 5

What all of this seems to indicate is that the incentive to manipulate policy outcome close the election consists of increasing municipal investments devoted to roads. In practice, as elections are approaching, local policy makers invest in the repair potholes and to resurface roads and pavements.

[11] The results of estimates depicted in Figures 4 and 5 are shown in Table A2 and Table A3 of the Online Appendix.

8. Safety need or just political incentives?

So far, we have shown that incentives for politicians to strategically raise spending before elections are entirely driven by an increase of the amount of investment allocated for road services. Nevertheless, it is not clear yet whether such an increase is due to the fact that policy makers simply want to enhance their probability to get re-elected, as roads are arguably among the most visible infrastructure to voters, or, instead, if the rise in the roads' investment also reflects a way to improve the local need for road safety. To test the plausibility of these assumptions, we collect additional information over the period 2010-2015 on local roads.

*8.1 Road accident*s

A seemingly obvious candidate to test whether the investment for roads service affects safety would be that of relying on information on the quality of municipal roads, and – more precisely – to data that would allow a single euro spent on road investment to be linked with a specific municipal street. Unfortunately, such an information is not available, but one could proxy the (average) quality of roads by recovering municipal data on the number of accidents with at least one injured person or a death occurred in municipal roads. The intuition is that if investments for road services affect safety, that is if the observed increase in the level of investments induced by the political cycle is devoted to repair potholes and to resurface roads and pavements, one should expect to observe a decline in the probability of accidents in municipal roads.

Therefore, we collect data on the number of accidents for the period 2010-2015 and we estimate the extent to which the probability of having an accident in the municipal roads depends on the amount of investment in roads. The model we estimate takes the following form:

$$\Pr Accident_{it} = \gamma' Roads_{it} + \beta' X_{it} + \mu_i + \tau_t + \varepsilon_{it}, \quad (2)$$

where $\Pr Accident_{it}$ is the probability of observing an accident in a road of municipality *i* at time *t*, $Roads_{it}$ is the per-capita level of spending on investments for road services in municipality *i* at time *t*. The vector X_{it} includes control variables described in Section 3.3, while μ_i and τ_t are municipal and year fixed effects. Robust standard errors are clustered at the municipal level.

As it was already alluded to, we are interested in testing whether the increase in road spending observed in pre-electoral years follows an economic rationale, that is if such an increase responds to road-safety related needs. To this end, we must isolate the portion of the (exogenous) correlation between the probability of observing an accident and the amount of expenditure on road services that is induced by the political cycle, identified through the year-in-the-term dummies. To do so, we

exploit the change in spending decisions due to the political cycle in a two-stage model. More in details, we adopt Eq. (1) as the first stage, whose fitted values are used in the second stage (Eq. (2)).[12]

Results of the second stage are presented in Table 5. Col. 1 shows estimates without municipal controls. In col. 2, all demographic and socio-economic covariates described in Section 3.3 are factored-in. The model in col. 3 allows for the personal characteristics of the mayors to be accounted for. Finally, column (4) includes a set of region-by-year fixed effects to account for unobservable region-specific characteristics that vary over time. As for the first stage, the Hansen J-test for overidentifying restrictions reported at the bottom of the table does not reject the validity of the instruments in all specifications. This last evidence, together with the strong statistical significance of the year-in-the-term dummies instruments, detected in the estimate of Eq. (1), indicates that the instruments are valid.[13] Central to the issues at hand is, however, the coefficient of *Roads*, which turns out to be negative but not distinguishable from zero in all models. If we consider these results, it seems unlikely that the observed increase in investment spending on roads services induced by the political cycle is motivated by road safety-security reasons.

INSERT TABLE 5 HERE

8.2 Term-limit

As previously mentioned, the existence of political cycles might be theoretically explained by re-election incentives. Since the Italian municipal electoral system establishes a limit of no more than two consecutive mandates for the office of mayor[14], this feature can be used to investigate whether the incentive to manipulate policy outcomes close to elections differ according to the status of the mayor (i.e., first or second term in office). In the presence of political cycles, no term-limited majors are expected to strategically manipulate investment before elections, while such incentives should be less marked – or even null – for term-limited mayors. Hence, we build the *termlimit* dummy variable, equal to one if the mayor in office is at her last mandate and zero otherwise, and we further divide the sample in two according to mayors' term-limited mandate. To ease the interpretation, we show the results of Eq. (1) in Figure 6.[15] In panel A of Table A5, where estimates on the subsample of term-limited mayors are reported, it turns out that the political budget cycle vanishes, as coefficients are no

[12] It is worth mentioning that such a two-stage estimation strategy allows to mitigate the endogeneity bias, due to the fact that the decision of investing in roads infrastructure might be simultaneously determined with the probability of observing an accident.
[13] First stage, which corresponds to the previous estimate of equation (1), and reduced form results are shown in Table A4 of the online Appendix, Panel A and B, respectively. It is interesting to note that the probability of observing a road accident seems to be not affected directly by the political cycles, as year-in-the-term dummies turn out to be indistinguishable from zero.
[14] The limit was further extended to three mandates in April 2014, only for municipalities with a number of inhabitants lower than 3,000.
[15] Full results are shown in Table A5 of the Online Appendix.

longer statistically significant at the conventional level. Conversely, in Panel B of Table A5 – where the subsample of no term-limited mayors is used, it emerges a clear-cut path consisting with the existence of political cycles. What emerges, therefore, is that the increase in investments on roads services close to election is driven by re-electoral concerns, as the cycle fluctuations vanish when electoral incentives are absent, namely when mayor cannot run for re-election.

INSERT HERE FIGURE 6

8.3 Level of education

To strengthen the evidence that the political cycles are mainly driven by electoral motivation, we collected information on the level of education at municipal level. The intuition is that if politicians strategically raise spending before elections to buy consensus, one should expect this effect to be stronger for less educated voters, as also argued by Garcia and Hayo (2021) and Repetto (2018). To test this hypothesis, we use the median share of population with a university degree to divide municipalities into those in which the level of education is small (below the sample median) and those in which the level of education is large (above the sample median).[16] We then estimate Eq. (1) for the two samples. As before, we report point estimates (and their 95% confidence in interval) in Figure 6.[17] While in both sub-samples we find evidence of political cycles, it turns out that political fluctuations close to elections are more marked in the subsample of low educated municipalities (Panel A of Table A6), as compared to the more educated one (Panel B of Table A6). These results seem to strengthen the evidence on the education hypothesis and reveal that the presence of more educated voters weakens the incentives for politicians to strategically raise spending before elections

INSERT HERE FIGURE 7

9. Conclusions

The political economy literature predicts that benefits and costs of "visible" programs are easily observed and verified by voters, especially when elections get closed. Nevertheless, empirical evidence on both the existence of the political budget cycle and on the type of spending items that are manipulated is rather scarce. Along these lines, Italy is a good laboratory to test whether local policy makers have incentives to strategically manipulate policy decisions close to elections, for at least two reasons. First, Italian municipalities are characterized by staggered election times, so that it is possible to separate the year-in-term effects from any other shock common to all municipalities. Second, the

[16] Estimates using the median share of population with a college degree yield similar findings. Results are available upon request.
[17] Full results are shown in Table A6 of the Online Appendix.

granularity of the balance-sheet of municipalities allows information on all spending functions, as well as on every single service within each of these functions, to be collected and analysed.

In this paper, we have exploited these unique features to analyse whether road and transport services, an economically relevant and very visible to voters spending item of the budget, are plagued by political manipulations close to elections. We found evidence of political cycles, as investment for roads and transport services three years before elections increase around 16% in relation to the election year, and it continues to grow two years before and one year before the election, respectively of about 23% and 32%, while decreasing in the year just after the election. Our main results survive several robustness checks. Further analyses indicate that our findings are entirely driven by services devoted to roads.

To shed lights on the potential channels, we investigated whether the increase in investments on roads services observed before elections is driven by politicians who simply want to enhance their probability to get re-elected, as roads are arguably among the most visible infrastructure to voters, or, instead, if the rise in the roads' investment also reflects a way to improve the local need for road safety. In doing so, we have gathered additional information on the number of accidents occurred in every municipal road for the period 2010-2015 and we tested, in a two-stage least square framework, whether the probability of having an accident depends on the amount spent on road investment. We isolated the portion of the (exogenous) correlation between the probability of observing an accident and the amount of expenditure on road services that is induced by the political cycle by using the year-in-the-term dummies as instruments. Intriguingly, we did not detect any relationship between the increase of investments in road services induced by the political cycle and the local need for road safety, as the probability of having an accident in local roads remained substantially unchanged. Furthermore, our findings indicated that the political cycle is more marked in the presence of mayors that can be re-elected, and it is more pronounced in presence of less educated voters: a path of results supporting the hypothesis that, indeed, politicians manipulate the budget only for re-electoral purposes.

What all of this seems to point to is that the budget cycle in Italian municipal spending is sizeable, as investment in roads and transport services the year before elections is almost one-third higher on average than in election years, corresponding to about 1.2 billion more. At the same time, such an increase does not seem to be motivated by road safety-security reasons, but – rather – it is only guided by re-electoral concerns. Therefore, it is necessary to think about some rules to avoid this inefficient behavior. Along these lines, a first approach could be that of setting a spending threshold in the year before the election for some items of the budget, and precisely those that are likely to be the more visible ones, such as roads and transport services. An alternative could be that of establishing a formula such that investment spending on some items of the budget cannot exceed, within the

mandate of the mayor, the level of investment set during the previous year. This rule would commit mayors to reshape their investment plan in such a way to reach the maximum level in the first year of their mandate and to have a decreasing, or at least the same level of investment in the following years. In this case, were the level of investment motivated by real needs, such an investment would be constrained to what has been planned in the first year, thereby reinforcing the role of having an adequate, and supervised, investment plan.

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Figures and tables

Figure 1 – Municipal investments by functions, average value 2010-2015.

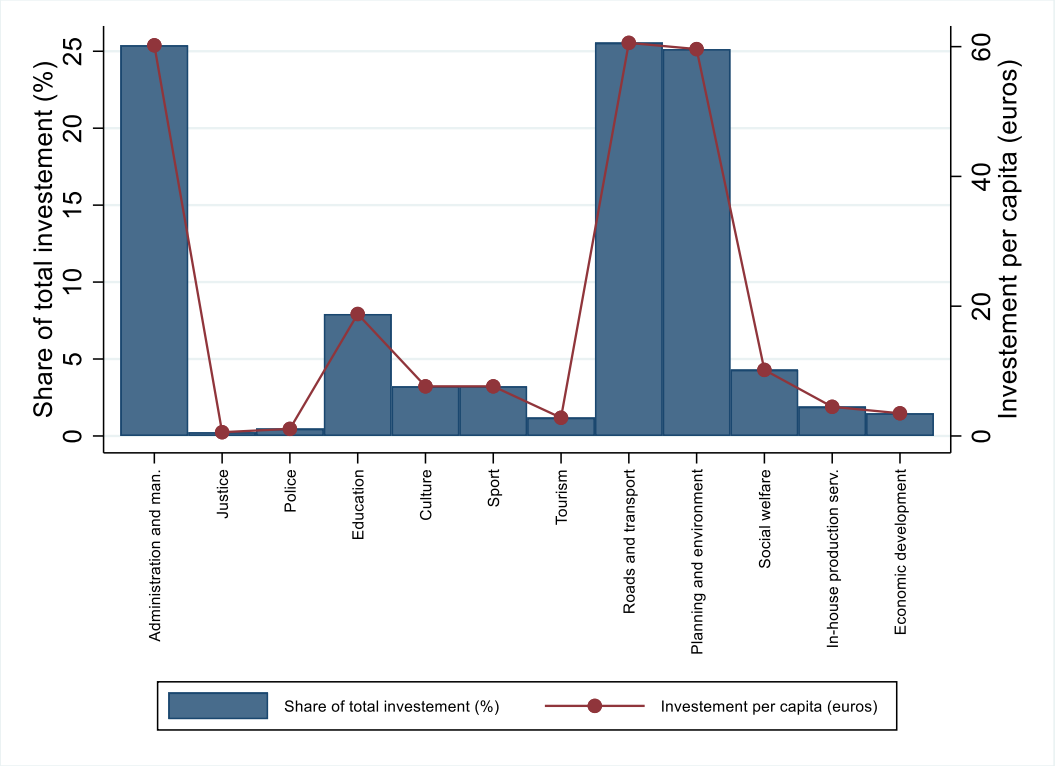

Figure 2 - Timing of municipal elections in Italy

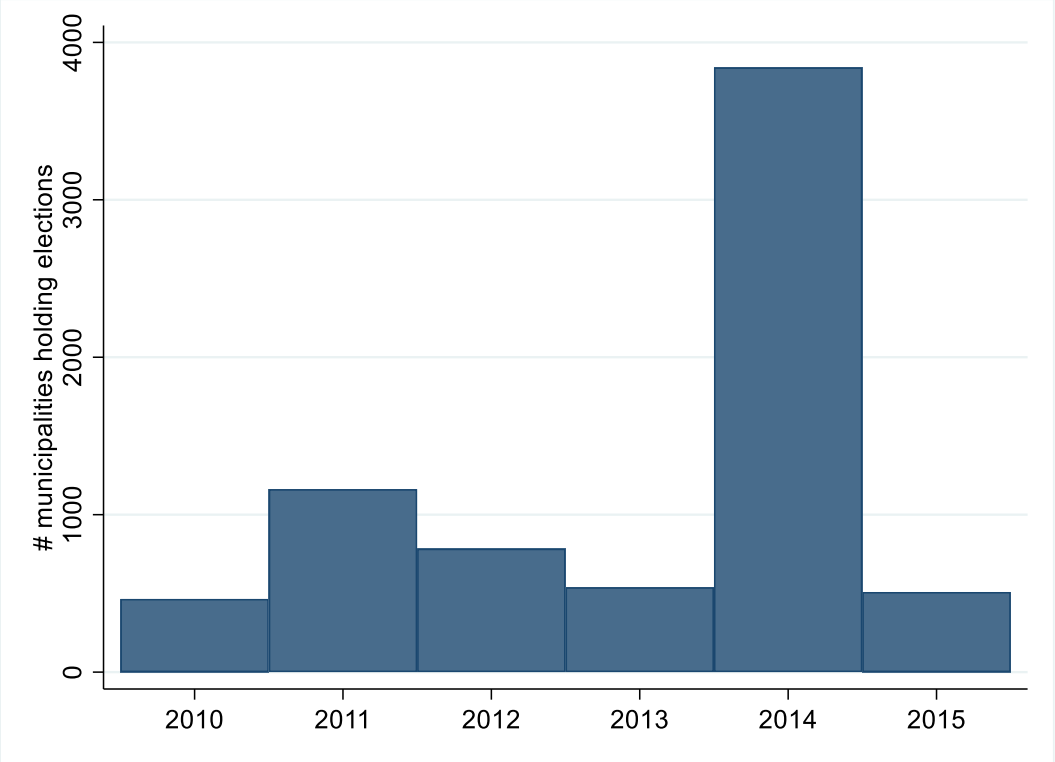

Figure 3 – Composition of road and transport investment.

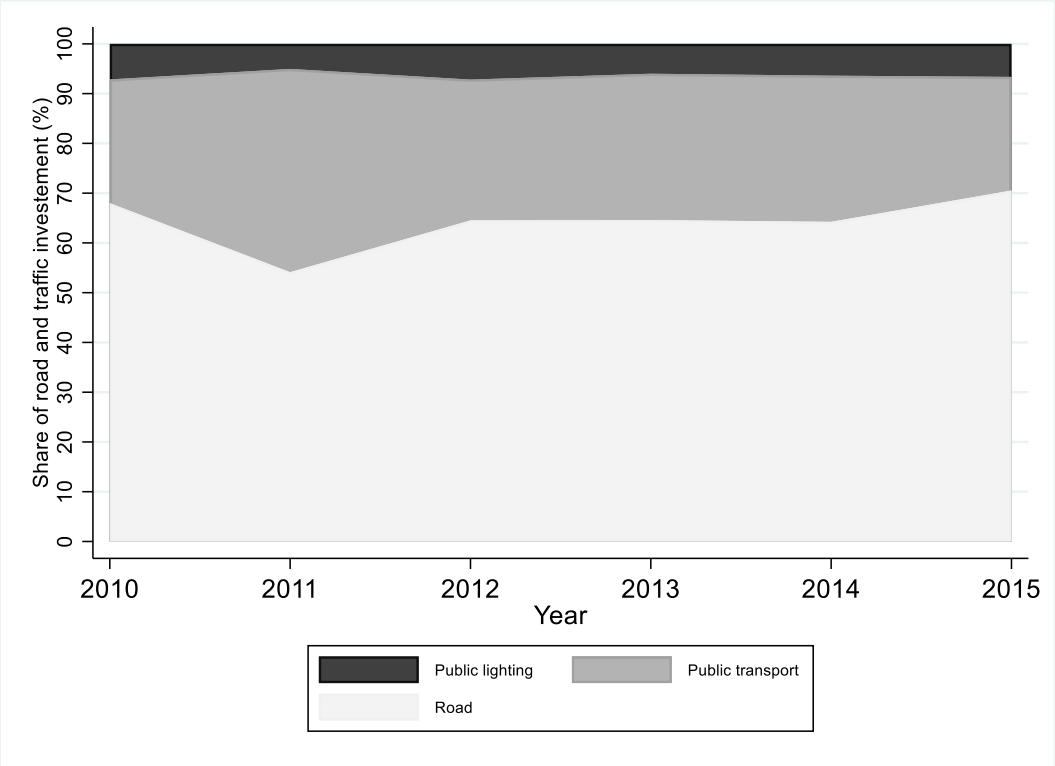

Figure 4 – The political budget cycle in road investment.

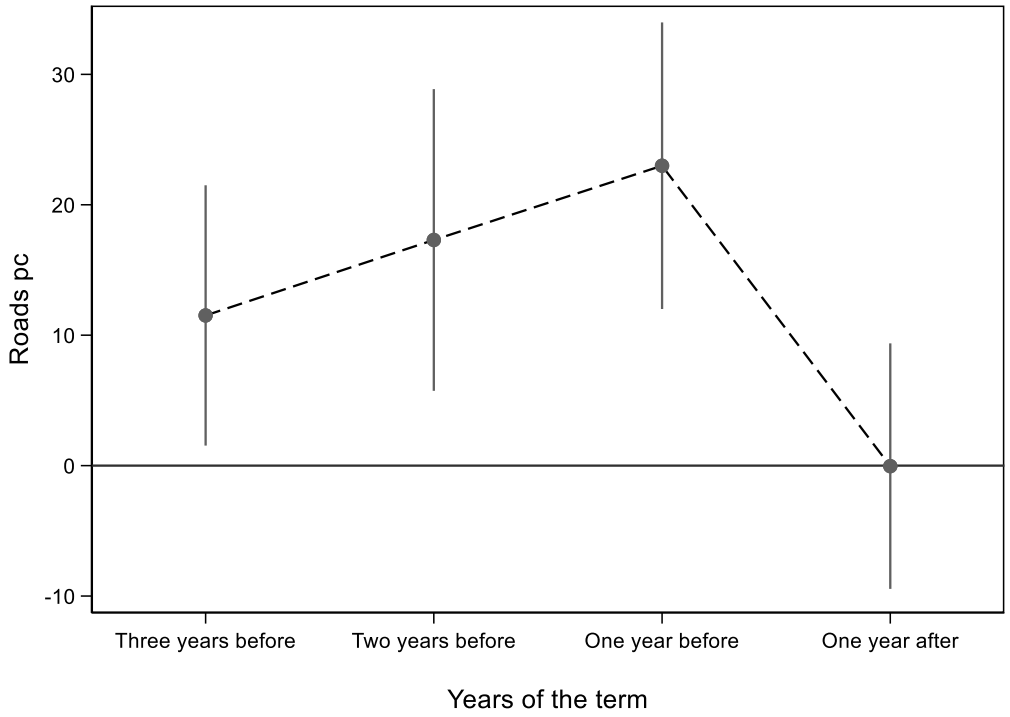

Figure 5 – The political budget cycle in public lighting and public transport investment.

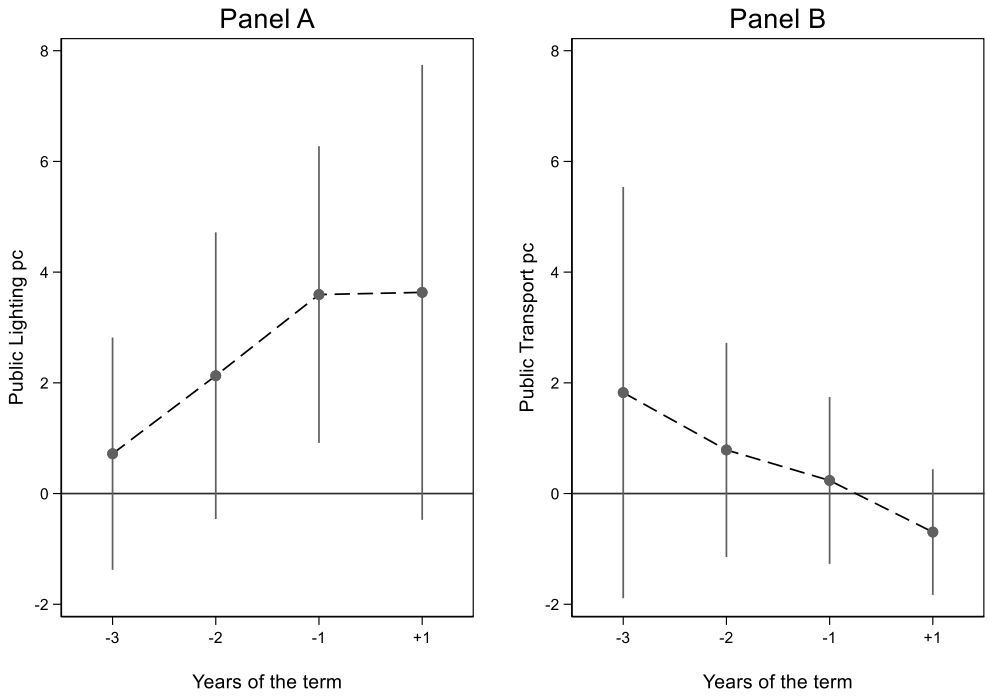

Figure 6 – The political budget cycle in term-limited and no term-limited municipalities.

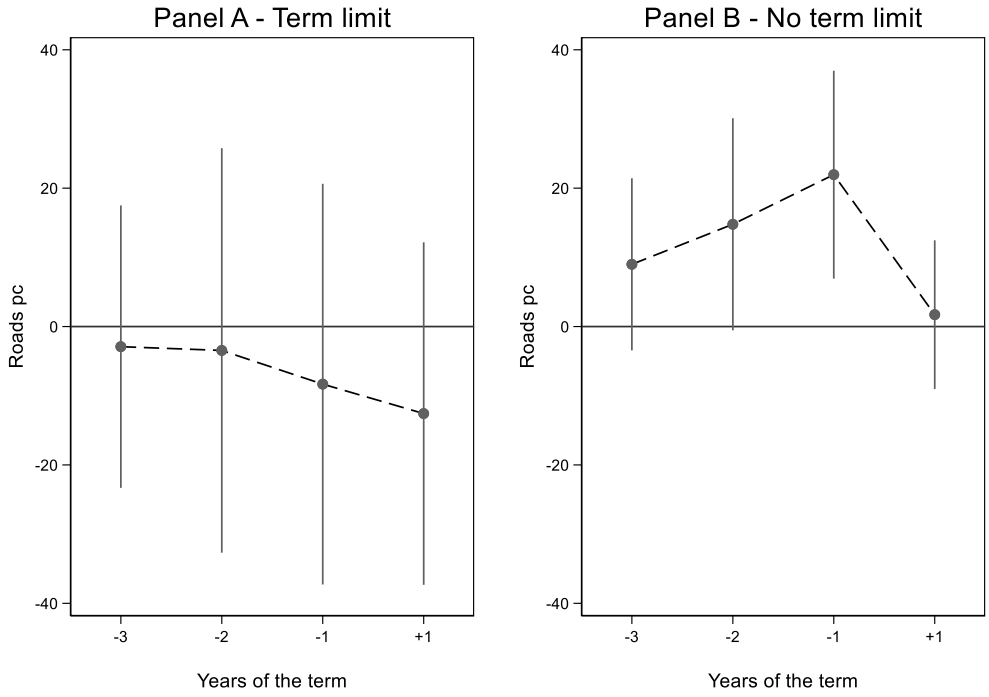

Figure 7 - The political budget cycle in low educated and high educated municipalities.

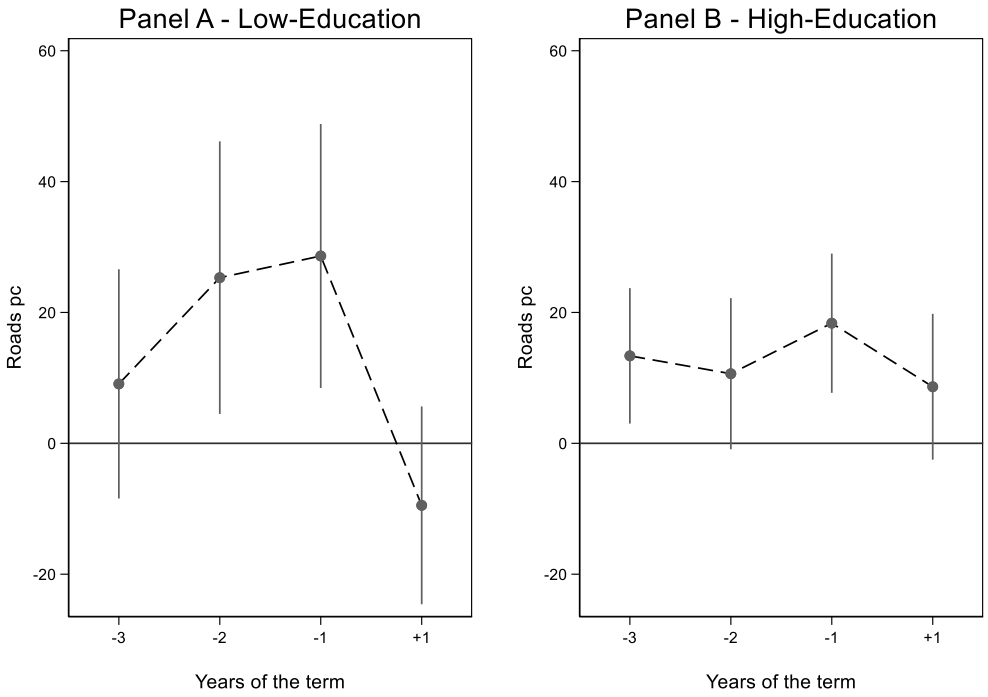

Table 1 - Political budget cycle effect on roads and transport investment per capita.

	(1) roads & transport pc	(2) roads & transport pc	(3) roads & transport pc	(4) roads & transport pc
One year before election	27.117***	26.743***	26.826***	25.091***
	(5.904)	(5.914)	(5.939)	(5.927)
Two years before election	21.060***	20.043***	20.220***	14.734**
	(6.046)	(6.230)	(6.248)	(6.332)
Three years before election	14.857***	13.981**	14.059**	9.266
	(5.390)	(5.557)	(5.577)	(5.686)
One year after election	3.202	2.650	2.900	5.149
	(5.182)	(5.278)	(5.266)	(5.397)
Constant	88.079***	21.227	68.121	198.229*
	(3.970)	(107.256)	(109.397)	(112.807)
Mean of dependent variable in the electoral year	85.10	85.10	85.10	85.10
Observations	39,444	39,444	39,444	39,444
R-squared	0.381	0.381	0.381	0.389
Municipalities FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Municipal controls	NO	YES	YES	YES
Mayor-specific controls	NO	NO	YES	YES
Region*year FE	NO	NO	NO	YES

Robust standard errors in parentheses, clustered at municipal level. Municipal controls: population, age dependency ratio, income per capita, commissioner, domestic stability pact, and density; Mayor-specific controls: age, gender, edu, profession, and margin victory.

*** p<0.01, ** p<0.05, * p<0.1

Table 2 – Predicted political budget cycle effect on roads and transport investment.

	(1) roads & transport pc	(2) roads & transport pc	(3) roads & transport pc	(4) roads & transport pc
One year (predicted) before election	22.644***	22.485***	22.249***	21.581***
	(6.241)	(6.228)	(6.269)	(6.191)
Two years (predicted) before election	14.272**	13.736**	13.646**	9.529
	(6.304)	(6.279)	(6.303)	(6.435)
Three years (predicted) before election	8.795	8.388	8.375	5.586
	(5.853)	(5.836)	(5.846)	(5.927)
One year (predicted) after election	-1.814	-2.083	-2.016	2.167
	(5.334)	(5.326)	(5.324)	(5.437)
Constant	93.287***	24.770	71.350	200.285*
	(3.958)	(107.319)	(109.469)	(112.868)
Mean of dependent variable in the (predicted) electoral year	86.20	86.20	86.20	86.20
Observations	39,444	39,444	39,444	39,444
R-squared	0.380	0.381	0.381	0.389
Municipalities FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Municipal controls	NO	YES	YES	YES
Mayor-specific controls	NO	NO	YES	YES
Region*year FE	NO	NO	NO	YES

Robust standard errors in parentheses, clustered at municipal level. Municipal controls: population, age dependency ratio, income per capita, commissioner, domestic stability pact, and density; Mayor-specific controls: age, gender, edu, profession, and margin victory.

*** p<0.01, ** p<0.05, * p<0.1

Table 3 - Political budget cycle effect on transfers per capita.

	(1) transfers pc	(2) transfers pc	(3) transfers pc	(4) transfers pc
One year before election	7.108	7.108	6.653	6.555
	(4.381)	(4.381)	(4.303)	(4.315)
Two years before election	3.258	3.258	2.448	2.296
	(4.704)	(4.704)	(4.325)	(4.299)
Three years before election	1.822	1.822	1.211	1.108
	(6.684)	(6.684)	(6.200)	(6.195)
One year after election	2.218	2.218	1.624	1.514
	(5.701)	(5.701)	(5.528)	(5.503)
Constant	150.295***	150.295***	475.626***	464.075***
	(3.901)	(3.901)	(91.978)	(92.149)
Mean of dependent variable in the electoral year	129.40	129.40	129.40	129.40
Observations	39,307	39,307	39,307	39,307
R-squared	0.554	0.556	0.556	0.565
Municipalities FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Municipal controls	NO	YES	YES	YES
Mayor-specific controls	NO	NO	YES	YES
Region*year FE	NO	NO	NO	YES

Robust standard errors in parentheses, clustered at municipal level. Municipal controls: population, age dependency ratio, income per capita, commissioner, domestic stability pact, and density; Mayor-specific controls: age, gender, edu, profession, and margin victory.

*** p<0.01, ** p<0.05, * p<0.1

Table 4 - Political budget cycle effect on roads and transport investment share.

	(1) roads & transport share	(2) roads & transport share	(3) roads & transport share	(4) roads & transport share
One year before election	0.029***	0.028***	0.028***	0.027***
	(0.004)	(0.004)	(0.004)	(0.004)
Two years before election	0.014***	0.010**	0.010**	0.011***
	(0.004)	(0.004)	(0.004)	(0.004)
Three years before election	0.016***	0.012***	0.012***	0.013***
	(0.004)	(0.004)	(0.004)	(0.004)
One year after election	0.001	-0.001	-0.001	0.001
	(0.004)	(0.004)	(0.004)	(0.004)
Constant	0.256***	0.223***	0.280***	0.309***
	(0.003)	(0.062)	(0.065)	(0.065)
Mean of dependent variable in the electoral year	0.247	0.247	0.247	0.247
Observations	39,444	39,444	39,444	39,444
R-squared	0.345	0.345	0.345	0.353
Municipalities FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Municipal controls	NO	YES	YES	YES
Mayor-specific controls	NO	NO	YES	YES
Region*year FE	NO	NO	NO	YES

Robust standard errors in parentheses, clustered at municipal level. Municipal controls: population, age dependency ratio, income per capita, commissioner, domestic stability pact, and density; Mayor-specific controls: age, gender, edu, profession, and margin victory.

*** p<0.01, ** p<0.05, * p<0.1

Table 5 – Effect of the roads investment on the probability of having accidents, second stage.

	(1) probability of having accidents	(2) probability of having accidents	(3) probability of having accidents	(4) probability of having accidents
Roads pc	-0.014021	-0.014729	-0.013824	-0.000012
	(0.018923)	(0.019269)	(0.019293)	(0.023772)
Observations	39,444	39,444	39,444	39,444
R-squared	-0.014	-0.014	-0.012	0.002
Hansen J statistic	2.339	2.463	2.456	3.584
Municipalities FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Municipal controls	NO	YES	YES	YES
Mayor-specific controls	NO	NO	YES	YES
Region*year FE	NO	NO	NO	YES

Robust standard errors in parentheses, clustered at municipal level. Municipal controls: population, age dependency ratio, income per capita, commissioner, domestic stability pact, and density; Mayor-specific controls: age, gender, edu, profession, and margin victory.

*** p<0.01, ** p<0.05, * p<0.1

Appendix

Figure A1 – Political budget cycle on road and investment per capita, by dropping one Region at a time (North Italy).

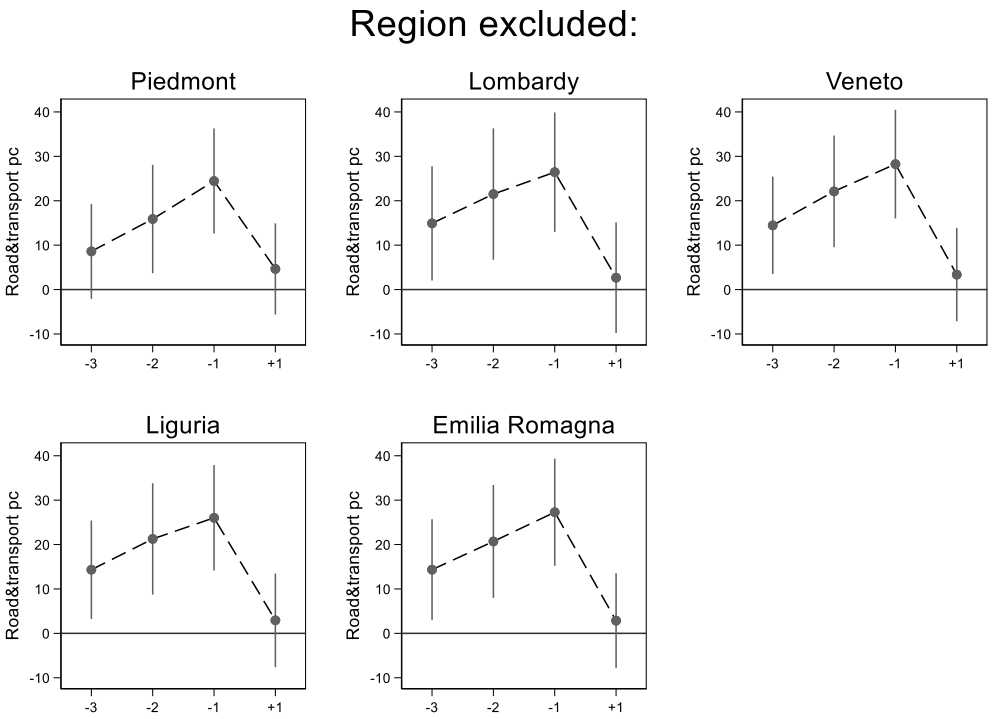

Figure A2 – Political budget cycle on road and investment per capita, by dropping one Region at a time (Centre Italy).

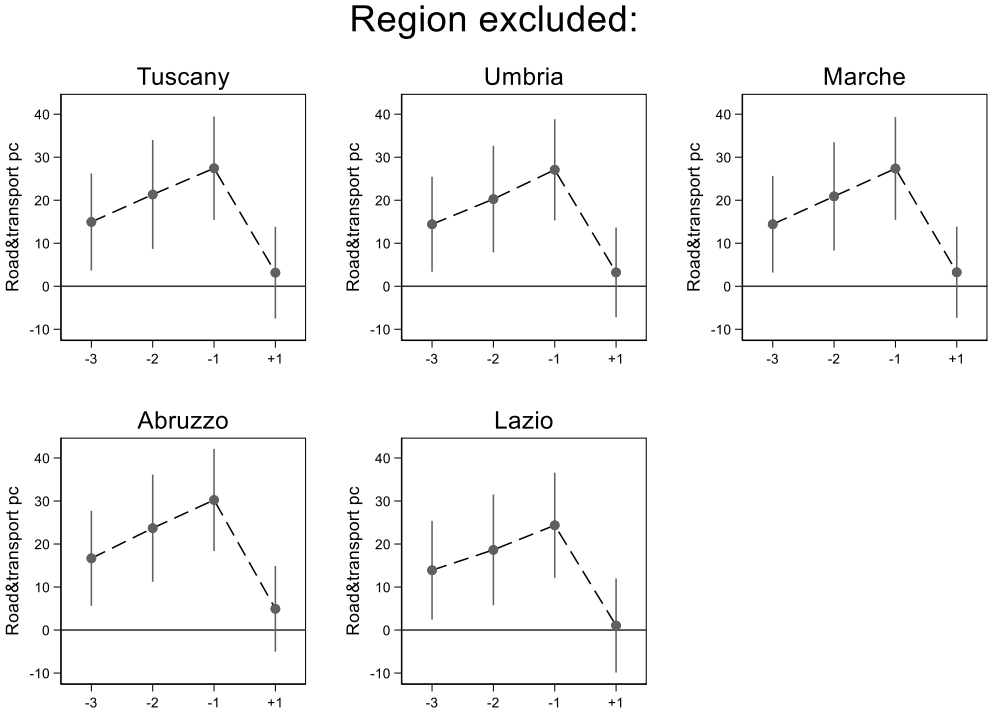

Figure A3 - Political budget cycle on road and investment per capita, by dropping one Region at a time (South Italy).

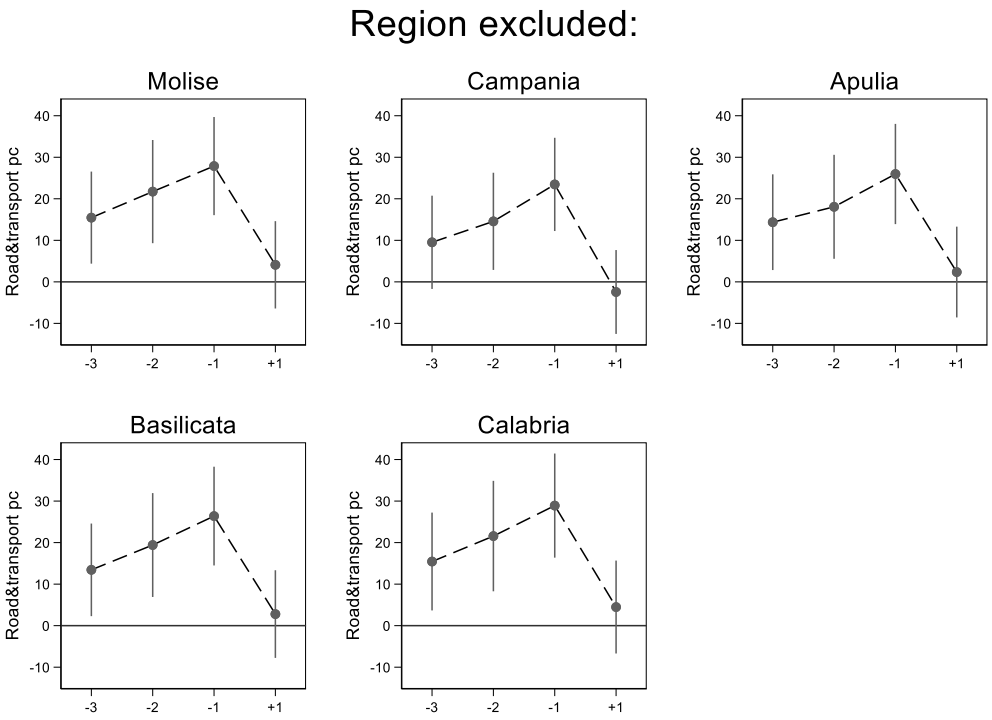

Table A1 – Summary statistics

	(1) N	(2) mean	(3) sd	(4) min	(5) max
Age	39,444	49.74	10.27	18	86
Age dependency ratio	39,444	2.444	0.549	0.449	6.091
Commissioner	39,444	0.0359	0.186	0	1
Domestic stability pact	39,444	0.527	0.499	0	1
Edu	39,444	3.342	0.686	1	4
Electoral year	39,444	0.185	0.388	0	1
Gender	39,444	0.125	0.355	0	13
Income pc	39,444	10,484	2,987	452.0	44,184
Margin of victory (share)	39,444	0.354	0.261	0	1
One year after election	39,444	0.271	0.444	0	1
One year before election	39,444	0.202	0.402	0	1
Population	39,444	7,739	44,642	31	2,872,000,000
Population density	39,444	329.3	681.6	0.728	12,27
Probability of having accidents	39,444	0.504	0.500	0	1
Profession	39,444	3.861	2.227	1	9
Public lighting pc	39,444	9.735	73.87	0	6,057
Public transport pc	39,444	1.226	51.26	0	6,603
Roads & transport pc	39,444	101.2	339.6	0	15,784
Roads & transport share	39,444	0.267	0.262	0	1
Roads pc	39,444	90.26	320.2	0	15,784
Share of educated population	39,444	0.0755	0.0279	0	0.291
Term-limit	39,444	0.313	0.464	0	1
Three years before election	39,444	0.185	0.388	0	1
Transfers pc	39,307	153.30	267.09	0	17,18
Two years before election	39,444	0.191	0.393	0	1

Table A2 – Political budget cycle effect on roads investment per capita.

	(1) roads pc	(2) roads pc	(3) roads pc	(4) roads pc
One year before election	23.334***	22.942***	22.995***	21.338***
	(5.575)	(5.587)	(5.605)	(5.697)
Two years before election	18.269***	17.147***	17.302***	11.972**
	(5.729)	(5.894)	(5.900)	(6.019)
Three years before election	12.430**	11.443**	11.515**	7.016
	(4.959)	(5.084)	(5.091)	(5.250)
One year after election	0.361	-0.264	-0.039	2.006
	(4.737)	(4.817)	(4.801)	(5.029)
Constant	79.637***	43.304	82.939	189.930*
	(3.674)	(106.501)	(108.281)	(112.152)
Mean of dependent variable in the electoral year	77.34	77.34	77.34	77.34
Observations	39,444	39,444	39,444	39,444
R-squared	0.369	0.369	0.369	0.375
Municipalities FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Municipal controls	NO	YES	YES	YES
Mayor-specific controls	NO	NO	YES	YES
Region*year FE	NO	NO	NO	YES

Robust standard errors in parentheses, clustered at municipal level. Municipal controls: population, age dependency ratio, income per capita, commissioner, domestic stability pact, and density; Mayor-specific controls: age, gender, edu, profession, and margin victory.

Table A3 - Political budget cycle effect on public lightning and public transport investment per capita.

	PANEL A				PANEL B			
	(1) public lighting pc	(2) public lighting pc	(3) public lighting pc	(4) public lighting pc	(5) public transport pc	(6) public transport pc	(7) public transport pc	(8) public transport pc
One year before election	3.566***	3.588***	3.595***	3.403***	0.217	0.212	0.237	0.351
	(1.336)	(1.337)	(1.367)	(1.173)	(0.733)	(0.743)	(0.769)	(0.813)
Two years before election	2.054	2.135*	2.129	1.881	0.737	0.762	0.788	0.880
	(1.265)	(1.297)	(1.321)	(1.192)	(0.816)	(0.941)	(0.987)	(1.067)
Three years before election	0.676	0.734	0.719	0.389	1.752	1.804	1.825	1.862
	(1.022)	(1.056)	(1.070)	(0.988)	(1.727)	(1.862)	(1.895)	(1.923)
One year after election	3.551*	3.623*	3.635*	3.929**	-0.710	-0.709	-0.696	-0.785
	(2.073)	(2.090)	(2.096)	(1.845)	(0.479)	(0.564)	(0.579)	(0.650)
Constant	7.533***	-22.782	-13.774	8.112	0.909	0.705	-1.044	0.188
	(1.096)	(20.053)	(22.279)	(20.702)	(0.666)	(8.318)	(9.394)	(10.311)
Mean of dependent variable in the electoral year	6.90	6.90	6.90	6.90	0.85	0.85	0.85	0.85
Observations	39,444	39,444	39,444	39,444	39,444	39,444	39,444	39,444
R-squared	0.261	0.261	0.261	0.274	0.276	0.277	0.277	0.278
Municipalities FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Municipal controls	NO	YES	YES	YES	NO	YES	YES	YES
Mayor-specific controls	NO	NO	YES	YES	NO	NO	YES	YES
Region*year FE	NO	NO	NO	YES	NO	NO	NO	YES

Robust standard errors in parentheses, clustered at municipal level. Municipal controls: population, age dependency ratio, income per capita, commissioner, domestic stability pact, and density; Mayor-specific controls: age, gender, edu, profession, and margin victory.

*** p<0.01, ** p<0.05, * p<0.1

Table A4 – Effect of the roads investment on the probability of having accidents, first stage and reduced form.

	PANEL A				PANEL B			
	(1) roads pc	(2) roads pc	(3) roads pc	(4) roads pc	(1) prob of having accidents	(2) prob of having accidents	(3) prob of having accidents	(4) prob of having accidents
One year before election	23.334***	22.942***	22.995***	21.338***	-0.025	-0.009	0.012	0.160
	(5.575)	(5.587)	(5.605)	(5.697)	(0.571)	(0.572)	(0.571)	(0.585)
Two years before election	18.269***	17.147***	17.302***	11.972**	-0.618	-0.710	-0.694	-0.887
	(5.729)	(5.894)	(5.900)	(6.019)	(0.572)	(0.587)	(0.587)	(0.599)
Three years before election	12.430**	11.443**	11.515**	7.016	0.317	0.209	0.219	-0.004
	(4.959)	(5.084)	(5.091)	(5.250)	(0.576)	(0.588)	(0.588)	(0.604)
One year after election	0.361	-0.264	-0.039	2.006	0.133	0.108	0.105	-0.212
	(4.737)	(4.817)	(4.801)	(5.029)	(0.537)	(0.543)	(0.543)	(0.563)
Constant	79.637***	43.304	82.939	189.930*	50.416***	57.693***	57.765***	60.482***
	(3.674)	(106.501)	(108.281)	(112.152)	(0.372)	(6.710)	(7.216)	(7.318)
Observations	39,444	39,444	39,444	39,444	39,444	39,444	39,444	39,444
R-squared	0.369	0.369	0.369	0.375	0.646	0.647	0.647	0.648
Municipalities FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Municipal controls	NO	YES	YES	YES	NO	YES	YES	YES
Mayor-specific controls	NO	NO	YES	YES	NO	NO	YES	YES
Region*year FE	NO	NO	NO	YES	NO	NO	NO	YES

Robust standard errors in parentheses, clustered at municipal level. Municipal controls: population, age dependency ratio, income per capita, commissioner, domestic stability pact, and density; Mayor-specific controls: age, gender, edu, profession, and margin victory.

*** p<0.01, ** p<0.05, * p<0.1

Table A5 – Political budget cycle effect on roads investment per capita, in term-limited and no term-limited municipalities.

	PANEL A - No Term Limit				PANEL B – Term limit			
	(1) roads pc	(2) roads pc	(3) roads pc	(4) roads pc	(1) roads pc	(2) roads pc	(3) roads pc	(4) roads pc
One year before election	22.943***	22.105***	21.954***	22.859***	23.720*	22.819*	-8.321	-10.871
	(7.489)	(7.558)	(7.664)	(7.569)	(13.238)	(13.357)	(14.768)	(15.325)
Two years before election	17.135**	14.955*	14.781*	12.245	20.426	19.848	-3.450	-12.252
	(7.343)	(7.732)	(7.817)	(7.629)	(13.298)	(13.304)	(14.908)	(15.553)
Three years before election	10.971*	9.192	8.997	6.777	12.021	11.745	-2.905	-6.563
	(6.006)	(6.261)	(6.346)	(6.301)	(9.327)	(9.396)	(10.408)	(11.197)
One year after election	2.630	1.575	1.722	5.764	-6.055	-6.222	-12.577	-11.577
	(5.375)	(5.541)	(5.480)	(5.577)	(12.108)	(12.130)	(12.625)	(13.511)
Constant	82.002***	-85.132	-57.125	53.908	74.075***	84.489	989.353**	1,044.166***
	(4.458)	(168.471)	(166.159)	(172.110)	(8.734)	(172.886)	(385.785)	(394.723)
Mean of dependent variable in the electoral year	76.73	76.73	76.73	76.73	77.52	77.52	77.52	77.52
Observations	26,852	26,852	26,852	26,852	11,718	11,718	11,718	11,718
R-squared	0.404	0.405	0.405	0.410	0.433	0.434	0.434	0.443
Municipalities FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Municipal controls	NO	YES	YES	YES	NO	YES	YES	YES
Mayor-specific controls	NO	NO	YES	YES	NO	NO	YES	YES
Region*year FE	NO	NO	NO	YES	NO	NO	NO	YES

Robust standard errors in parentheses, clustered at municipal level. Municipal controls: population, age dependency ratio, income per capita, commissioner, domestic stability pact, and density; Mayor-specific controls: age, gender, edu, profession, and margin victory.
*** p<0.01, ** p<0.05, * p<0.1

Table A6 – Political budget cycle effect on roads investment per capita, in low educated and no high educated municipalities.

	PANEL A – Low educated				PANEL B – High educated			
	(1) roads pc	(2) roads pc	(3) roads pc	(4) roads pc	(1) roads pc	(2) roads pc	(3) roads pc	(4) roads pc
One year before election	28.373***	27.931***	28.633***	30.162***	18.797***	18.455***	18.359***	13.929**
	(10.126)	(10.142)	(10.291)	(10.374)	(5.418)	(5.420)	(5.427)	(5.843)
Two years before election	25.724**	24.516**	25.319**	21.250*	11.732**	10.874*	10.639*	4.994
	(10.336)	(10.546)	(10.625)	(11.000)	(5.671)	(5.877)	(5.890)	(6.051)
Three years before election	9.639	8.613	9.083	6.168	14.486***	13.569**	13.371**	7.867
	(8.801)	(8.911)	(8.934)	(9.396)	(5.088)	(5.275)	(5.278)	(5.312)
One year after election	-9.265	-9.928	-9.480	-5.291	9.132	8.626	8.648	8.978
	(7.595)	(7.741)	(7.709)	(8.473)	(5.650)	(5.675)	(5.683)	(5.768)
Constant	102.813***	241.685	261.829	428.927*	56.709***	-177.912*	-117.367	-37.421
	(6.283)	(204.765)	(210.140)	(222.207)	(3.979)	(95.575)	(99.154)	(101.411)
Mean of dependent variable in the electoral year	103.30	103.30	103.30	103.30	52.07	52.07	52.07	52.07
Observations	19,722	19,722	19,722	19,722	19,722	19,722	19,722	19,722
R-squared	0.375	0.375	0.376	0.382	0.332	0.333	0.333	0.344
Municipalities FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Municipal controls	NO	YES	YES	YES	NO	YES	YES	YES
Mayor-specific controls	NO	NO	YES	YES	NO	NO	YES	YES
Region*year FE	NO	NO	NO	YES	NO	NO	NO	YES

Robust standard errors in parentheses, clustered at municipal level. Municipal controls: population, age dependency ratio, income per capita, commissioner, domestic stability pact, and density; Mayor-specific controls: age, gender, edu, profession, and margin victory.

*** p<0.01, ** p<0.05, * p<0.1