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The Effects of Social Capital on Government Performance and Turnover: Theory and Evidence from Italian Municipalities*

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Abstract

This paper makes three contributions. First, it presents a theoretical analysis of how *both* the civic preference and information aspects of social capital impact on government performance and turnover, employing a political agency model with both moral hazard and adverse selection. Second, it presents novel measures of both local government performance and on social capital at the Italian municipality level, using administrative data and an online survey respectively. Third, empirical results show that higher social capital improves government performance, especially in the first term of office, but also increases turnover of incumbent mayors, as predicted by the theory. The voting rule predicted by the theory has the feature that the level effect of social capital on the incumbent vote share is negative, but the interaction between social capital and performance is positive. Our empirical results also support this prediction.

Keywords: Social Capital, Voting, Elections, Government Efficiency
JEL Codes: H41, H72, D72

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1 Introduction

It is now widely accepted that social capital, classically defined by Robert Putnam as "connections among individuals — social networks and the norms of reciprocity and trustworthiness that arise from them" (Putnam, 2000) can have an important effect on economic outcomes. For example, social capital has been shown to strongly correlate with economic growth (Helliwell and Putnam, 1995; Knack and Keefer, 1997; Zak and Knack, 2001), trade (Guiso et al., 2008), well-functioning institutions (Putnam, 2000; Knack, 2002), public services outcomes such as educational achievement (Coleman, 1988), and financial markets (Guiso et al., 2004), health (Wilkinson, 1996), longevity (Putnam, 2000), income equality (Wilkinson, 1996; Kawachi et al., 1997), child welfare (Côté and Healy, 2001), economic achievement through increased trust and lower transaction costs (Fukuyama, 1995), and financial development (Guiso et al., 2004), corruption and crime (Halpern, 1999; Putnam, 2000; Uslaner, 2002; Buonanno et al., 2009)

In this paper, we focus on one type of outcome that has received relatively little attention; the effect of social capital on the dual role of elections, which are to provide incentives for incumbents and to select good politicians for office. This paper makes two contributions in understanding the link between social capital and the effects of elections.

First, it presents a theoretical analysis with two new features. The first is we allow for *both* "preference" and "information" aspects of social capital in the model. Second, our setting is an infinite-horizon model of *both* moral hazard and adverse selection, and so can make testable predictions about equilibrium turnover, as well as performance when in office.[1] In both these respects, our theoretical contribution extends existing literature, as explained in more detail in Section 2 below.[2]

Our finding is that *both* the "preference" and "information" channels have similar effects on incentives and selection. Regarding incentives, as measured by performance when in office, we predict that this increases with social capital in the first term of office, and can also increase with higher social capital even in the second term of office.[3]

Regarding selection, we first derive a "reduced-form" relationship between the probability of re-election of the incumbent and social capital and show this to be unambiguously *negative*. While not obvious, this has a clear intuition: higher social capital implies that new

[1] As is well-known, predictions about turnover in two-period models are problematic, as in the second period, the voter is comparing two "lame ducks". ((Besley, 2006))

[2] In brief, key existing papers focus either on the preference channel (Nannicini et al., 2013) or the information channel (Ponzetto and Troiano, 2018), whereas we look at both. Moreover, our model is one of both moral hazard and adverse election, so we can make predictions about the effect of social capital on the re-election of incumbents, not just their performance while in office.

[3] Incumbents can serve a maximum of two terms, as in Italian municipalities.

incumbents will be more disciplined and thus the expected benefit of replacing a term-limited "lame duck" incumbent is higher for the voter. We then derive the "structural" voting rule that generates this increased turnover. It has the subtle feature that the *level* effect of social capital on the vote share is negative, but the effect of the *interaction* between social capital and performance is positive.

Our second contribution is empirical. We bring our predictions to the data using original data on government performance and social capital for Italian municipalities. At the end of 2013, the Italian government produced performance indicators for over 6,000 municipalities by integrating information provided by official sources with new data generated by a questionnaire, in which each local authority was asked detailed information for each service provided. This information was used to construct a performance index which measures how efficiently each municipality uses its financial resources for the provision of essential services.[4] We also use an output index calculated from the same survey, measuring the physical volume of different services provided.

We also use an innovative measure of social capital, which adjusts for the fact that social capital in Italy may not be exogenous. Specifically, a potential problem is that social capital may be higher in municipalities or provinces where governance is better, partly as a result of that better governance. To avoid this endogeneity problem, we leverage the results of an online survey. This survey is described more fully in a companion paper, Sgroi et al. (2020), and shows that the social norms of individuals are strongly determined by the average social norms of the provinces where they or their relatives, especially their mothers and maternal grandmothers, were born. We construct measures of social capital based on this maternal transmission mechanism, which can avoid the endogeneity problem, and employ them as instruments for a more conventional measure of social capital.

Our empirical findings are as follows. First, regarding performance, we find that the performance of incumbent mayors is generally higher in municipalities with higher social capital, and that this effect is stronger when incumbent mayors are not term-limited. We see the same effects for the output index. This is as predicted by our theory, and is to our knowledge, the first study to show that the efficiency with which goods and services are delivered is related to social capital. From the theory, the positive interaction between social capital and the first term implies that the effect of social capital on discipline dominates its effect on selection.

Second, as predicted by the theory, that the unconditional probability of retaining office

[4]The calculation of these indices in based on the gap between standard and actual expenditure for each service. This provides a good reference point to judge the level of expenditure of each municipality against the level of expenditure of other local authorities.

(i.e. not conditional on performance) is robustly lower in municipalities with high social capital. Finally, we estimate the vote share equation and find that also as predicted by the theory, the level effect of social capital on the incumbent vote share is negative, but the interaction effect with performance is positive.

2 Related Literature

First, we contribute to the theoretical literature on social capital and elections, in particular Nannicini et al. (2013) and Ponzetto and Troiano (2018). Our model is quite different from Nannicini et al. (2013) in two major respects. First, in their set-up, there is no adverse selection i.e. politicians do not differ in unobservable type. In fact, all politicians are "bad", that is, rent-seeking. This means that their model does not generate predictions about how the probability of re-election varies with social capital. Indeed, in their model, the incumbent is always re-elected in equilibrium. Second, they assume that social capital influences politics only through the preference channel, i.e. that voters with high social capital have more altruistic or civic preferences. Reflecting this difference in assumptions, the main prediction of their model is also different. They predict that with low social capital, incumbents get higher rents.

Ponzetto and Troiano (2018) study the effect of the information channel. Specifically, low social capital voters do not observe a public investment good set in a given year (education in their model) until after the election in that year. This creates biased incentives for the incumbent; provision of a public consumption good, which *is* observable prior to the election, has a relatively higher electoral return than does the investment good, so politicians under-provide the investment good, and this bias is worse, the greater then proportion of low-social capital voters. Their political agency model is embedded in a growth model, so in the end higher social capital raises the growth rate. A limitation of their model, relative to ours, is that ex ante, all incumbents are identical and policy is chosen before an incumbent-specific productivity shock is drawn. As a result, there is no scope for incumbents to signal their type. If stationarity is assumed, as Ponzetto and Troiano (2018) do, this leads to the conclusion that the probability of the incumbent retaining office in equilibrium is just one half.

So, our theory extends both these papers in two ways. First, we allow voters to differ in *both* the civic preference and information aspects of social capital. Second, we allow for asymmetric information between politicians and voters, which gives rise to testable predictions of how the probability of retaining office varies with social capital measures. As emphasized in the introduction, this is an issue of equal importance to how social capital affects performance once in office.

Second, our main empirical results contribute to the literature on the correlations between social capital and the behaviour of politicians while in office. For example, Nannicini et al. (2013) show that in parliamentary districts of Italy with higher social capital, incumbent representatives have lower absenteeism rates and are less likely to face accusations of criminal wrong-doing. We focus not on the personal conduct of incumbents, but on actual policy achievements when in office. In this respect our results are more similar to Padró i Miquel et al. (2015), who show that that Chinese villages with higher social capital experienced larger increases in public goods after the introduction of elections, and Ponzetto and Troiano (2018), who show that there is a positive relationship at the country level between social capital and spending on education. However, our results are not just about the level or type of public goods, but also about the efficiency with which they are provided. To our knowledge, this is the first paper to show that social capital increases the efficiency by which government spending is transformed into outputs.

Third, a distinctive feature of our paper is that it focuses both theoretically and empirically on the effect of social capital on the effectiveness of elections as a *selection* device, by developing and testing the hypotheses about incumbent turnover and vote share described above. These results relate to the findings of Nannicini et al. (2013), who consider how the probability of re-election of Italian parliamentary representatives varies with personal conduct while in office (absenteeism, accusations of criminal wrong-doing). However, there are three differences. First, the results of Nannicini et al. (2013) concern personal conduct while in office, whereas our results concern the provision of services and taxation, which is arguably of greater significance for society. Second, the empirical relationships Nannicini et al. (2013) test for, are *not* predicted by their theory, which only predicts that the vote share for the incumbent is (weakly) increasing in social capital.[5] Third, our finding that the turnover of incumbents is *increasing* in social capital is the opposite finding to theirs.

Our work also relates to a small literature on the determinants of government efficiency (Asatryan and De Witte, 2015; Coffé and Geys, 2005; Geys, 2006; Geys et al., 2010; Knack, 2002) The closest to our work are Knack (2002) and Coffé and Geys (2005). Both of these relate measures of social capital to measures of the quality of government, for US states and Flemish municipalities respectively. Our work arguably has advantages to both these studies. First, we use a very precise measure of local government performance based on an administrative survey. Geys (2006) simply use municipal deficits as a measure of efficiency, which is not clearly related to the usual definition of government efficiency. Knack (2002)

[5]Specifically, empirical specifications (10) and (11) in their paper have an interaction term between personal conduct measures and social capital which is not implied by their theory; all that the theory predicts is that the level effect of social capital on the dependent variables in (10) and (11) should be positive.

use a measure based on a very large number (35) of criteria, some of which do not relate at all to expenditure and service provision, so their measure is much less precisely targeted than ours. Second, unlike these papers, we have panel data, allowing us to look at the effect of the electoral cycle on efficiency,

Because one of the channels by which social capital works is information, our paper also relates to the literature on how improved information (typically via the mass media) impacts on election outcomes. The closest related paper here is (Besley and Prat, 2006), which shows that in a pure adverse selection setting, better information for voters leads to higher turnover of incumbents. When they introduce moral hazard into their model, in the form of a decision as to how much rent to extract, the effect of information on turnover becomes ambiguous, because a bad incumbent may moderate rent extraction in response to the voter having more information. This kind of response also occurs in our setting. The reason why we obtain an unambiguous result is that our model is an infinite horizon one, and so at the election, the voter, rather than facing the choice between two "lame ducks", can replace the incumbent with a challenger who is motivated, as he himself faces a future election.

Finally, we contribute to the large literature on the measurement of social capital and its correlation with other related variables.[6] Typically, social capital is measured either through the use of survey questions about trust and social norms on cooperation such as the World Value Survey (Knack and Keefer, 1997; Knack, 2002) or by the use of data on behaviours associated with social capital, such as blood donation or electoral turnout (Guiso et al., 2004; Nunn and Wantchekon, 2011; Nannicini et al., 2013), participation in voluntary associations (Putnam et al., 1993) or the payment of low-stake, low-enforcement taxes such as the TV licence (Bracco et al., 2015). Our leading measure of social capital combines these traditional measures and adds to it through a bespoke survey. The results of this survey show that measures of social capital at the individual level are strongly correlated with the social capital of the provinces where individuals or their relatives, especially their mothers and maternal grandmothers, were born. Leveraging this, we are able construct a social capital measure that is more exogenous to the local environment.

3 A Theoretical Framework

3.1 Social Capital, Civic Preferences, and Political Knowledge

Our theoretical approach will model two mechanisms by which social capital can affect government behaviour, civic preferences and political knowledge. Here, to motivate our

[6] Our contribution to measurement is the main focus of our companion paper Sgroi et al. (2020).

approach, we briefly report on evidence from our survey which shows a positive association between the usual measures of social capital and these two mechanisms.[7]

As already remarked, most classic definitions of social capital emphasise two aspects; trust and norms of cooperation. In Table 1 below, we show that trust and norms of cooperation, as measured in a variety of ways in our survey, are correlated with both: (i) willingness to contribute to public goods and (ii) political knowledge. In the survey, we measure preferences for public goods by the individual's contribution to a standard public good game. For political knowledge, we use two indicators, the self reported level of interest in politics and the survey response that reading newspapers is the main source of political information.

We measure trust and norms of co-operation in various ways, using questions similar to those asked in the World Value Survey and the Eurobarometers. First, we ask respondents to self report the level of trust towards family members, friends, neighbours, people with roots from the same town, people residing in the same neighbourhood, town etc. We also include questions on respondents' beliefs in the overall level of trust, honesty and cooperation in people. We also try to assess trust in a less direct way by asking what is the likelihood that a wallet with 200 Euros left on a bus will be returned. Table 1 is quite striking in that it shows that almost all these measures have a significant positive association with our measures of willingness to contribution to public goods and political knowledge.

We take these correlations as indicating that two mechanisms by which social capital might effect voter behavior are via civic preferences and political information. In the model that follows, we show how these two mechanisms determine government performance when in office, and government turnover.

[7]For details on the survey see Section 5.1.2.

Table 1: Correlations between Willingness to Contribute to Public Good, Political Knowledge and Civic Attributes

Correlations	PG Contribution	Interest in Politics	Press Information
Agree: most people are honest	0.108***	0.150***	0.089***
Agree: most people try to help	0.082***	0.112***	0.065**
Agree: most people can be trusted	0.074***	0.113***	0.091***
Trust Family	0.021	0.016	0.102***
Trust Friends	0.067***	0.01	0.081***
Trust Neighbours	0.089***	0.109***	0.098***
Trust Strangers	0.065**	0.185***	0.03
Trust People of his/her own town	0.069***	0.119***	0.087***
Trust Italians	0.049*	0.151***	0.089***
Wallet Missing	0.093***	0.126***	0.079***
Volunteering	0.084***	0.087***	0.042*

Notes: * = $p < 0.1$, **= $p < 0.05$, *** = $p < 0.01$. Data are collected from a survey conducted in April 2019 among 1549 Italian respondents living in Rome, Milan, and Turin. See Sgroi et al. (2020) for more information on the survey. "PG contributions" are the individual contributions toward a public good; the values are between 0 and 20 Euros, "Interest in Politics" is the self reported level of interest in politics and current affairs, [0 indicates no interest in politics and 10 to high interest], "Press Information" is a dummy variable taking value of 1 if the self reported main political information channel is newspaper readership. "Agree" is equal to 1 if the respondent agrees with the statement and 0 otherwise. The "Trust" variable refers to the level of trust in each of the above groups, from 0 no trust to 5 high trust. "Wallet missing" indicates the answer to the following question: "Imagine you have left your wallet with 200 Euros on the bus, from 1 to 10, (1= completely unlikely , 10 =almost certain) how would you evaluate the likelihood that it will be returned? "Volunteering" is a score from 0 to 22 indicating the levels of membership of, monetary contributions to, and activities in voluntary associations.

3.2 Set-Up of the Model

There are an infinite number of periods $t = 1, 2..$ In each period, an incumbent politician provides two consumption goods, A and B, to different groups in the population as described below. Each good is produced via the production function

$$g^i_{t+1} = e_t + T^i_t, \quad i = A, B \tag{1}$$

where g^i_t is the level of the public good i at period t, e_t is the effort level of the incumbent, and T^i_t is tax revenue allocated to the production of good i. The government budget constraint requires that total tax revenue, T_t, is divided between the production of goods A and B i.e. $T_t = T^A_t + T^B_t$.

Note that there is a time-lag in the production of each public good. This captures lags between resources devoted to improvements in public services, and outcomes. In this context, there are several interpretations of e_t, as Italian municipalities provide a variety of services.

For example, if the public good is nursery school education, one can think of e_t as the effort made in recruiting additional workers, finding additional premises, etc. This will lead to an improvement in services, but with a time lag.

There is an election at the end of every period, where the incumbent faces a challenger. Each politician can serve for at most two periods i.e. there is a two-term limit, the rule which applies to most municipalities in Italy.

The are overlapping generations of citizens, each of whom live for two periods. Each generation comprises a continuum of size one, of two equally sized demographic groups. Group i consumes only good i, but may have concerns for the welfare of the other group. Specifically, within a period, every citizen, young or old, in group i has a payoff from the public goods and taxes of the form

$$u(g_t^i) + \tilde{\theta} u(g_t^j) - T_t \tag{2}$$

where the utility from the public good is strictly increasing and concave, and she discounts future payoffs by δ. Our first measure of social capital is $\tilde{\theta}$, which measures concern for the welfare of others, or civic preferences, as in Nannicini et al. (2013). The idea is that even though civic-minded citizens may not personally consume good i - for example, education - they place some weight on the welfare of others who do consume it.

Our second way of modelling social capital is in terms of knowledge about the activities of government. We will capture this by assuming that while all citizens observe taxes T_t at t, each citizen observes e_t *before* the election at time t with probability $0 < \sigma < 1$. The event that e_t is observed also independent across voters at a point in time, and across time.[8] The modelling of the knowledge aspect is very similar to Ponzetto and Troiano (2018).[9]

We will assume that at any election, only the young citizens vote. This is without real loss of generality, as old citizens do not care about next period's fiscal policy. When voting, young citizens evaluate the incumbent on the basis of both policy and non-policy preferences. Specifically, a citizen will vote for the incumbent i iff

$$V^{inc} + v_j + \omega \geq V \tag{3}$$

Here, V^{inc}, V are the continuation policy payoffs for a citizen from electing the incum-

[8] If e_t is not observed before the election at t, it can be eventually backed out in $t+1$ as g_{t+1} is observed in the next period. But, by then the information conveyed by e_t will be useless, as that politician, if he won the election at t, will have to retire at the end of $t+1$ anyway.

[9] In Ponzetto and Troiano (2018), there are two types of voters, informed and uninformed. Our model can also be interpreted in this way i.e. the mathematics of the model is the same if we suppose that a fraction σ of the voters always observe effort, and a fraction $1-\sigma$ do not.

bent and challenger respectively, and v_j, ω are individual and aggregate preference shocks, as in Persson and Tabellini (2002). We assume that v_j, ω are distributed uniformly on $\left[-\frac{1}{2\phi}, \frac{1}{2\phi}\right], \left[-\frac{1}{2\gamma}, \frac{1}{2\gamma}\right]$ respectively. Note that V^{inc} will depend on whether the voter observes effort or not, as explained below.

There is a large pool of politicians, who can be good (g) or bad (b). We write $i_t \in \{g, b\}$ for the type of the incumbent at time t. The ex ante probability of any politician being good is π. All politicians have a cost of effort $c(e_t)$, where $c(0) = 0$, and $c'(e), c''(e) > 0$, $e > 0$. Politicians differ in their preferences. Good politicians have the same payoff from tax and the public good as the voters, but also incur the effort cost. Other than the cost of effort, the bad type cares only about rent from office, $R > 0$; this captures the salary and any other pecuniary or non-pecuniary benefits from office.

The order of events within a period is as follows. First, the incumbent chooses e_t, g_t^A, g_t^B, T_t. Then, all voters observe T_t and observe e_t with probability σ.[10] Then, if the incumbent is in his first term of office, the voter votes for the incumbent or a challenger. If the incumbent wins the election, he serves for another period. If he loses, he is replaced by a challenger. If the incumbent is in his second term of office, he is replaced by a challenger randomly drawn from the distribution.

3.3 Discussion

The key feature of our model is that all voters are characterized by a pair $(\tilde{\theta}, \sigma)$ measuring the preference and knowledge aspects of social capital respectively. Apart from the modelling of social capital, this is quite a standard political agency model with both moral hazard and adverse selection. It has been constructed to match the Italian institutional setting and data. For example, we assume two-term limits for politicians, and the incumbent chooses a variable e_t that corresponds to the performance index discussed in Section 5.2. However, several features of the model, which appear at first sight to be complications, deserve comment.

First, following Besley (2004), we assume an infinite horizon, rather than two periods, to avoid the unrealistic feature of two-period models that in the election at the end of the first period, the voter has to choose between two "lame duck" candidates each of whom can only serve one more term. Instead, our set-up allows the voters to choose between the term-limited incumbent and a challenger who can serve two terms.[11]

[10] Before the election at t, voters also observe g_{t-1}, but this has no bearing on their voting decision as it conveys no information about the type of the current incumbent in his first term.

[11] An overlapping generations structure is sufficient for this choice, as at any election, young citizens will look forward by one period. Our results can also extended - at the cost of considerably more algebra - to the case of infinitely lived voters. These are available on request.

We introduce probabilistic voting for a number of reasons. First, it is more realistic; it allows voters to trade off policy payoffs against other considerations when voting. Second, and more importantly, probabilistic voting provides the mechanism by which the civic preference parameter affects electoral incentives. As explained in more detail below, a voter with a higher θ will value high effort more, and thus have a stronger preference for re-electing an incumbent who she believes is good. This stronger policy preference is weighed against the non-policy preference in a smooth way by probabilistic voting. A third reason is that without probabilistic voting, the re-election probability for the incumbent, and other outcomes, will generally depend in an arbitrary way on how we break indifference ties for uninformed voters.[12]

3.4 Equilibrium

An equilibrium of the model is a series of actions and voting decisions such that voters use the Bayes' rule and both voters and politicians optimize. We will focus on equilibria in which the actions of politicians are time invariant, depending only on the state of the world, the type of the politician, and the term that the politician is serving.

The Good Incumbent

At time t, a good incumbent politician wants to maximize voter welfare, minus the cost of effort. The former is the simple average of the two payoffs in (2) i.e.

$$\theta(u(g_t^A) + u(g_t^B)) - T_t, \quad \theta = \frac{\delta(1+\tilde{\theta})}{2} \tag{4}$$

Moreover, combining (1) and the government budget constraint, we see that

$$T_t = g_t^A + g_t^B - e_t \tag{5}$$

[12]For example, without probabilistic voting, and assuming that voters have no non-policy preference between the incumbent and challenger, we can suppose that half of the uninformed voters will vote for the incumbent. Then, the share of votes for the incumbent would be $(1-\sigma)0.5 + \sigma I_{[e=e^*]}$, where $I_{[e=e^*]}$ is an indicator variable that is 1 if and only if $e = e^*$. So, whatever σ, the probability of winning the election will be 1 if $e = e^*$, and zero otherwise. Alternatively, if we follow Besley (2006), Chapter 3.4.2 and suppose that if indifferent, uninformed voters always vote for the incumbent, the share of votes for the incumbent would be $(1-\sigma) + \sigma I_{[e=e^*]}$. Now, if $\sigma < 0,5$, there is no electoral penalty for low effort, but if $\sigma > 0.5$, the probability of winning the election will be 1 if $e = e^*$, and zero otherwise.

Then, combining (4), (5), we see that in period t, the good incumbent will always choose $e_t, g^A_{t+1}, g^B_{t+1}$ to maximize

$$\theta(u(g^A_t) + u(g^B_t)) - (g^A_{t+1} + g^B_{t+1} - e_t) - c(e_t)$$

This implies a choice of public good and effort of $g^A_{t+1} = g^B_{t+1} = g^*, e_{t+1} = e^*$ where

$$\theta u'(g^*) = 1,\ c'(e^*) = 1$$

So, the level of each public good is determined independently of the cost of effort; a lower cost of effort will simply reduce the tax, which is of marginal benefit of unity to the voters. Also, note that as both goods are provided at the same level, total tax revenue is split equally between the two goods. From now on, we concentrate on equilibria where bad incumbents also set $T_t = T^*$, where $T^* \equiv 2g^* - e^*$ is the tax set by the good incumbent, and split the tax between the two goods equally. As tax revenue does not affect the payoff of the bad politician directly, and bad incumbents have an incentive to imitate good ones whenever it is costless to do so, this is without real loss of generality.

Voters

The analysis of voter behaviour is straightforward but somewhat lengthy, and the details are in the Appendix. Here, we just present the relevant outcome for the incumbent i.e. the probability of re-election, conditional on effort. As a preliminary, we define u_0, the baseline level of voter utility from an incumbent who makes zero effort, and Δu, the voter's utility gain from the incumbent who makes efficient effort. As assumed above, both of these hypothetical incumbents set the efficient tax and divide it equally between the two goods. These are, respectively:

$$u_0(\theta) \equiv 2\theta u(T^*(\theta)/2) - T^*(\theta),\ \Delta u(\theta) \equiv 2\theta(u(e^* + T^*(\theta)/2) - u(T^*(\theta)/2)) \tag{6}$$

Note that as long as u is not too concave, the utility increment Δu will be increasing in θ, the preference measure of social capital. We will make this assumption in what follows; it amounts to assuming that voters with higher social capital in the preference dimension care more about the level of effort made by their elected representative, and as such, seems intuitive. In what follows, we suppress the dependence of $u_0, \Delta u$ on θ unless necessary.

Then, it is easily computed (see the Appendix) that the probability of the incumbent

winning, conditional on a choice of e is

$$p(e) = \frac{1}{2} + \gamma\left(u_0 + \pi\Delta u - V\right) + \gamma\sigma\Delta u(\Pr(i = g\,|e\,) - \pi), \tag{7}$$

Here, as above, V is the the per period continuation value to the voter from appointing a new incumbent.[13]

This is a key equation. The first term of one-half reflects the fact that ignoring policy preferences, any voter is equally likely to prefer the incumbent or the challenger. The second term is proportional to the net benefit of retaining the incumbent *if* the voter believes that the incumbent is good with probability π. If such an incumbent is retained, the payoff in the following period is $u_0 + \pi\Delta u$, but if replaced, the payoff is V. Generally, with forward-looking voters, $V > u_0 + \pi\Delta u$, because if the incumbent is replaced by a new challenger, the latter faces electoral discipline, which benefits the voter.[14] As we shall see, this creates a channel where changes in the social capital parameters σ, θ affect V and thus the probability of re-election for a *fixed* effort level e.

Finally, in the third term, $\Pr(i = g\,|e)$, is the informed voter's posterior belief that the incumbent is good, conditional on observing effort level e. So, the "reward" offered by the voter for high effort by the incumbent depends on both the quality of voter information (i.e. σ) and the strength of voter civic preferences (i.e. Δu). This is intuitive; a voter will reward the incumbent for effort only if she cares about effort, *and* she observes the outcome of the effort.[15]

Equilibrium

To complete the description of equilibrium, we need to consider the bad incumbent. If a bad incumbent is term-limited, he clearly sets $e_t = 0$. If a bad politician is non-term limited, he has two options that dominate all the others. The first is to pool with the good type by setting $e_t = e^*$. The second is to set $e_t = 0$, and accept the electoral consequences as described by (7). It is a standard exercise to characterise the conditions under which either of these two options is chosen. In fact, it turns out that there are a range of paramater values where the bad incumbent must randomise between the two options.

Generally, let λ be the probability that the bad incumbent pools; this measures the discipline effect of elections. Also, Define $A = \frac{c(e^*)}{\delta R\gamma}$, and a composite measure of social

[13] Clearly, V is endogenous; an explicit formula for V is is presented and discussed below.

[14] In a two-period model, by contrast, both challenger and incumbent are "lame ducks" and so $v \equiv u_0 + \pi\Delta u$, which closes down this channel.

[15] Note that γ measures the sensitivity of voting decisions to policy payoffs. We assume that γ is small enough so that $0 < p(e) < 1$.

capital, $s \equiv \sigma\Delta u(\theta)$. We then have the following characterisation of equilibrium, proved in the Appendix;

Proposition 1 *There exists an equilibrium where (i) if* $s \leq A$, *only good incumbents choose* $e_t = e^*$ *and bad incumbents choose* $e_t = 0$; *(ii) if* $s \geq \frac{A}{\pi}$, *all incumbents choose* $e_t = e^*$; *(ii) if* $A \leq s \leq \frac{A}{\pi}$, *the bad politician chooses* $e_t = e^*$ *with probability*

$$\lambda = \frac{\pi}{1-\pi}\left(\frac{\sigma\Delta u(\theta)}{A} - 1\right), \tag{8}$$

and $e_t = 0$ *otherwise*; *(iii) incumbents who set* $e_t = e$ *are re-elected with probability* $p(e)$, *as defined in (7). Consequently, electoral discipline* λ *is increasing in both measures of social capital* σ, θ.

We see that there are three possible regimes, depending on the two social capital measures. Without further parameter restrictions all three regimes can occur. Across all regimes, both measures of social capital unambiguously improve electoral discipline. It is important to understand how such very different measures of social capital can have such similar effects. The intuition comes from inspection of the term on the conditional probability in (7) i.e. $\sigma\Delta u$. This tells us that voters are responsive to the level of effort firstly only when they observe it (which occurs with probability σ), and conditional on that event, when high effort is important to them in payoff terms, as measured by Δu.

3.5 Empirical Predictions

Our main interest in the theory is to develop empirical predictions about performance of the incumbent over the two terms of office, the voting rule used by the voters, and the probability of retaining office at the end of the first term. It is convenient to begin with the probability of retaining office for the incumbent, not conditional on performance, denoted p.

Specifically, p is the expected value of $p(e)$ across both equilibrium effort levels, e^* and 0, and so is:

$$p \equiv (1-\pi)(1-\lambda)p(0) + (\pi + (1-\pi)\lambda)p(e^*) \tag{9}$$

To proceed, we can substitute out $p(e^*), p(0)$ using (7). This gives

$$p = \frac{1}{2} + \gamma\left(u_0 + \pi\Delta u - V\right) \tag{10}$$

Note that the term in $Pr(i = g\,|e\,)$ in (7) disappears, as p is the unconditional probability of re-election i.e. not conditional on effort, e. This still leaves the undefined term V, which is the expected payoff in the next period to a voter of a new incumbent. In turn, V is simply the expected payoff generated by a new incumbent in his first term of office:

$$V = u_0 + \pi\Delta u + (1-\pi)\lambda\Delta u \tag{11}$$

This comprises a baseline payoff $u_0 + \pi\Delta u$, which would be the payoff if the bad incumbent does not pool, plus a second term which reflects the fact that electoral incentives discipline bad incumbents by inducing some of them to pool in their first term of office i.e. $\lambda > 0$.

Then, combining (7), (11), (9), we get

$$p = \frac{1}{2} - \gamma(1-\pi)\lambda\Delta u(\theta) \tag{12}$$

This shows p as a function of both social capital parameters and λ, which also depends on these parameters. The second term in (12) again measures the discipline effect. It is then straightforward to combine (12) with the characterization of λ in Proposition 1 to prove the following:

Proposition 2 *If $s \leq A$, p is is independent of σ, θ. If $s \geq \frac{A}{\pi}$, p is strictly decreasing in θ, and independent of σ. If $A \leq s \leq \frac{A}{\pi}$, then p is strictly decreasing in both θ, σ.*

So, looking across all three regimes, and recalling that $s = \sigma\Delta u(\theta)$, we see that the probability of re-election p is decreasing in both the preference and knowledge measures of social capital. The intuition for this result is simply that both of these measures improve discipline in equilibrium, which other things equal, makes it more attractive for a voter to replace the "lame duck" incumbent with a new, disciplined challenger. We call this the *lame duck effect* in what follows.

It is important to note that Proposition 2 gives us a *reduced-form* relationship between p and the social capital parameters. We now investigate further by analysing the "structural" voting rule that generates the reduced-form relationship. This voting rule will also be testable. It is easy to compute (see Appendix) that the share of the vote for the incumbent as a function of effort can be written in the form of a level, plus an interaction effect in effort:

$$x(e) = \frac{1}{2} - \phi\Delta u((1-\pi)\lambda + \pi\sigma) + \phi\sigma\Delta u(\theta)\,\Pr(i = g\,|e\,) \tag{13}$$

Moreover, in equilibrium, there are only two levels of performance, e^* and 0, with $\Pr(i = g\,|e^*\,) > \Pr(i = g\,|0\,)$. So, from inspection of from (13), we can state the following:

Proposition 3 *The interaction between the preference and knowledge measures of social capital, σ, θ and effort e has a positive effect on the incumbent vote share. Holding the interaction effect fixed, the level effect of social capital measures σ, θ on the incumbent vote share is always strictly negative.*

The intuition is clear from (13). The interaction effect is clearly positive, because voters reward the incumbent more for higher effort, (a) the more they are informed about policy, and (b) the greater the probability they observe effort. As for the negative level effect of social capital, this is due to the lame duck effect as defined above.

We now turn to predictions about performance in the first and second period of office. As already observed, the model has been specified so that the theoretical equivalent of our empirical performance measure is the difference between g and T, i.e. e. Expected effort in the first period of office is

$$e_1 = (\pi + (1-\pi)\lambda)e^* \tag{14}$$

Clearly, e_1 is increasing in λ and thus both measures of social capital. Expected effort in second period of office is e^* if the incumbent is good, conditional on winning the election, and zero otherwise:

$$e_2 = \Pr(i = g \,|\text{win})e^* \tag{15}$$

Here, $\Pr(i = g \,|\text{win})$ is the probability of being good conditional on winning. By Bayes' rule;

$$\Pr(i = g \,|\text{win}) = \frac{p(e^*)\pi}{p} = \left(1 + \frac{\gamma\pi}{p}\frac{(1-\pi)(1-\lambda)}{\pi + (1-\pi)\lambda}\sigma\Delta u(\theta)\right)\pi \tag{16}$$

where at the second step, we have substituted out $p(e^*)$ using (7), (12). Using this expression, we can establish conditions under which e_2 is increasing in our social capital measures. These are given in Proposition 4 below, which summarizes our results on performance in both periods.

Proposition 4. *Expected performance in the first period of office is increasing in both measures of social capital, θ and σ. If $s \leq A$, expected performance in the second period of office is increasing in both measures of social capital, θ and σ.If $s \geq \frac{A}{\pi}$, second-period performance is independent of σ but still increasing in θ. If $A < s < \frac{A}{\pi}$, then second-period performance is strictly increasing in $z = \sigma, \theta$ if*

$$-\frac{z}{p}\frac{\partial p}{\partial z} > \frac{s}{\frac{A}{\pi} - s} \tag{17}$$

The intuition is as follows. The results for first-period performance are entirely straightforward; both measures of social capital increase discipline and thus performance. The case of second-period performance is more subtle. From (16), when (say) σ changes, there will be a direct positive effect on e_2 via $p(e^*)$, capturing the fact that better voter information will raise the probability of re-election of the high-effort incumbent. There is also an indirect effect in the same direction via the fact that an increase in σ generally reduces p. Against this needs to be set the fact that an increase in σ increases λ, and an increase in λ reduces $p(e^*)$, as it reduces the probability that a high-effort incumbent is good. So, to ensure that the last effect does not dominate, the elasticity condition (17) is required.

Finally, looking ahead to the empirics, we might ask whether first period effort e_1 is greater than second-period effort e_2, and whether this difference is increasing in social capital. Generally, the sign of $e_1 - e_2$ is ambiguous, because from (14), e_1 is higher than baseline effort πe^* due to the discipline effect, λ, whereas from (15), e_2 is higher than same baseline due to the selection effect i.e. $Pr(i = g \,|\text{win}) > \pi$. The same is true of the interaction between $e_1 - e_2$ and social capital. Here, if we find a positive interaction effect on performance, this tells us that the effect of social capital on boosting discipline, is greater than any effect on selection.[16]

4 The Institutional Setting

We test our theory using a dataset on Italian municipalities. Italy provides a good setting to test the predictions of our model for a number of reasons. First, there are striking cultural differences across Italian regions and provinces due to the lasting effects of centuries of foreign domination by different powers. These differences are part of everyday life and include the use of language and dialects, food, traditions and common habits. Second, there is evidence of a large variation in the performance of sub-national governments, as explained in more detail in Section 5.2 below.

Third, Italian municipalities, *comuni*, enjoy a relative high level of fiscal autonomy both in term of tax setting as well as in spending decisions; they are ruled by a city council (*consiglio comunale*) and a directly elected mayor (*sindaco*),[17] who appoints the members of the executive committee (*giunta comunale*), to which he or she delegates tasks. Municipal

[16] We can be more specific about conditions under which each occurs. If $s \leq A$ or $s \geq \frac{A}{\pi}$, λ is fixed, so only the election channel is at work, and so the effect of social capital on $e_1 - e_2$ is negative. If $A < s < \frac{A}{\pi}$, then the discipline effect can dominate if p is not too responsive to the social capital parameter.

[17] Mayors are elected through a simple plurality rule in *small* municipalities (below 15,000 inhabitants) and through a runoff system in *large* municipalities (above the 15,000-inhabitants).

legislatures last for five years and mayors are subject to a two-term limit.[18] Municipal governments have power over land management and environment (water, sewage, public hygiene), local transport, local police, culture and recreation, education (nursery schools, training programmes) and also have discretionary powers on how much fiscal revenue to raise.

On average, around than 80% of fiscal revenues come from own taxes, or shared taxes and fees, with more than 30% coming from a property tax, and the remaining 20% from intergovernmental grants from upper tiers of government. The property tax is most salient source of fiscal revenue, and each municipality can decide the tax rate within statutory limits sets centrally (see for example Bracco, Porcelli and Redoano, 2019b). Resident home-owners are generally exempted orface a lower tax rate than owners of second (rented or holiday) homes or businesses. Municipalities may also decide to apply a surtax on the personal income tax rate between 0 and 0.8%.

5 Measuring Social Capital and Local Government Performance

5.1 Measuring Social Capital

Social capital, both in Italy and elsewhere, has been measured in two main ways (Guiso et al., 2008; Cartocci, 2007; Bracco et al., 2015; Nannicini et al., 2013). First, there are direct survey-based measures, which ask questions about social networks, trust, norms of reciprocity etc. Second, there are measures based on observable behaviours that are expressions of these networks and norms e.g. rates of blood donation, turnout in various elections and referenda, TV licence payments, membership of voluntary organisations, etc.

Our first measure of social capital, which we call our *standard measure*, is of the second kind, as there are simply no survey-based measures available at the municipal level for Italy, or indeed, as far as we are aware, for any other country. It is based on electoral turnout data and TV licence payment data, which are the only data available at the municipal level in Italy, and are described in more detail in Section 5.1.1 below.[19]

Our standard measure has the drawback that it is potentially endogenous to the quality of local institutions, as social capital indicators are the outcome of strategic interactions between citizens and local institutions (Ashworth and de Mesquita, 2014). For example, it

[18] From 2015 mayors of villages with fewer than 3,000 can serve up to three consecutive terms.

[19] Other data such as newspaper readership and blood donations are only available at a more aggregate (provincial) level.

is possible that behaviours such as voter turnout, blood donation and TV licence payments depend in part the quality of local institutions. As a result, voters in low social capital municipalities may behave and vote differently than voters in high social capital municipalities either because they have different individual characteristics (preferences, information) or because they are responding to different institutional environments. For our purposes, it is important to distinguish these, because in the theory, social capital is defined by the preferences and information of *individual citizens*. To address this issue, we employ three strategies to measure social capital: our standard measure and two adjusted measures based on data from a bespoke survey (Sgroi et al. (2020)).

5.1.1 A Standard Measure of Social Capital

We construct a standard social capital index as the first principal component from the only two social capital measures available in Italy at municipal level: (i) the share of households paying the TV licence in each municipality in 2013 and; (ii) turnout in the 2011 Italian referendum. Anyone owning a TV set is required by law to purchase a TV licence. The cost of the license is set nationally, and is not trivial; in 2013 it amounted to €113.50 per year. The enforcement of the license payment is not rigorous, and so payment is an indication of pro-social behaviour. In 2013 sample year, about two thirds of households paid for a TV licence, while almost every household owned a TV set.

The other measure on which our index is based is the turnout to the 2011 referendum. A nationwide popular referendum was held in Italy on 12 June and 13 June 2011, on four questions; two concerning the repeal of recent laws regarding the privatisation of water services, one on a return to nuclear energy which had been phased out after the 1987 referendum, and finally one on criminal procedure, specifically a provision exempting the Prime Minister and the Ministers from appearing in court. As referenda do not result in electing a government, voters' incentives to turn out are not distorted by patronage or individual benefit, and the turnout rate can be understood as a measure of citizens' pro-social behavior.[20]

5.1.2 Adjusted Measures of Social Capital

In order to construct alternative measures of social capital, which are plausibly exogenous to the quality of local governments, we employ data collected from an original online survey

[20]One could argue that a possible bias in turnout could have arisen because the then prime minister, Mr Berlusconi, declared he would not have voted and this was regarded as an implicit invitation to boycott the referendum in order not to reach the quorum (in Italy 50 percent plus 1 of turnout is necessary to validate the results). However turnout in 2011 was higher than it had been for any referendum since 1995. Note also that Table 2 shows a very high correlation between 2011 and 1974 referenda turnout.

Table 2: Measures of social capital: Correlation at regional level

	2011 Ref.	Blood	News	1974 Ref.	Tv Lic.
2011 Referendum turnout	1				
Blood Donations	0.51	1			
Newspaper copies	0.66	0.54	1		
1974 Referendum turnout	0.78	0.74	0.75	1	
TV licence	0.55	0.57	0.33	0.59	1

Notes: data aggregated at regional level. Original data available at municipal level for 2011 referendum and TV licence, provincial level otherwise. Sources: referenda turnout from Interior Ministry; TV Licence from RAI TV Subscription office; Blood donation and newspaper readership from Nannicini et al. (2013).

that includes various experimental features. The survey was conducted in April 2019 in three of Italy's largest cities: Rome, Milan and Turin.[21] In the survey, we interviewed 500 residents in each of the three cities and collected detailed information on their geographical origin as well as the geographical origin of their parents and grandparents. More information on the design of the survey and the results of the analysis are in Sgroi et al. (2020).

Selecting respondents sharing a common place of residence but with diverse origins allows us to separate the effect of culture (as exogenous social capital) which we can derive from their background, from the economic and institutional environment in their place of residence. A similar "epidemiological" approach has been employed in the literature on culture and economics, and has been used to study a variety of issues, including female labour force participation, fertility, labor market regulation, redistribution, growth, and financial development (see Fernández and Fogli (2009) and Fernández (2007)) but as far as we are aware, not in the context of public finance and political economy.

A key result from Sgroi et al. (2020) is that individuals' cultural identity remains strongly connected to the cultural traits of the place of origin of their relatives, in particular their mother (and maternal grandmother), irrespective of their place of residence. For example, one finding is that an individual who lives in Milan and whose mother is from Sicily contributes less on average in a public good game than to another individual who lives in Milan but whose forebears are from the north of Italy.

Using the survey results and internal migration patterns, we can isolate the cultural component of social capital from the institutional component. More formally, we define an

[21] The three cities were chosen for their size and also because of their reputation for drawing internal migrants from across Italy. Subjects were recruited through the Qualtrics Italian panel of subjects and selected to ensure a demographic spread that eliminates bias and resembles the wider population. The experiment was registered in advance in the AEA RCT Registry (see Bracco et al. (2019a)).

adjusted index of social capital for province p in region r as follows:

$$SC^p = n^p_{p,r} SC_p + n^p_{-p,r} SC_r + n^p_{-r} \overline{SC}^r_{-r}, \quad \text{where} \quad \overline{SC}^r_{-r} = \frac{\sum_{j \neq r} N^r_j \tilde{SC}_j}{\sum_{j \neq r} N^r_j} \tag{18}$$

Here p refers either to one of the the 110 provinces or one of the 25 largest cities in Italy; from now on, for convenience, we refer to such an entity as a province.[22] Then, n^p_{pr} is the share of residents born in province p, $n^p_{-p,r}$ is the share of residents born in region r but in provinces other than p, and n^p_{-r} is the share of residents born in regions other than r. These shares are reported in Table N.1 in the Online Appendix for each of the 110 provinces and for the country's 25 largest cities in 2011. Finally, N^r_j is the stock of migrants living in region r who are originally from region j. Table N.2 in the Online Appendix reports these region-by-region migration stocks N^r_j, collected in the same year.

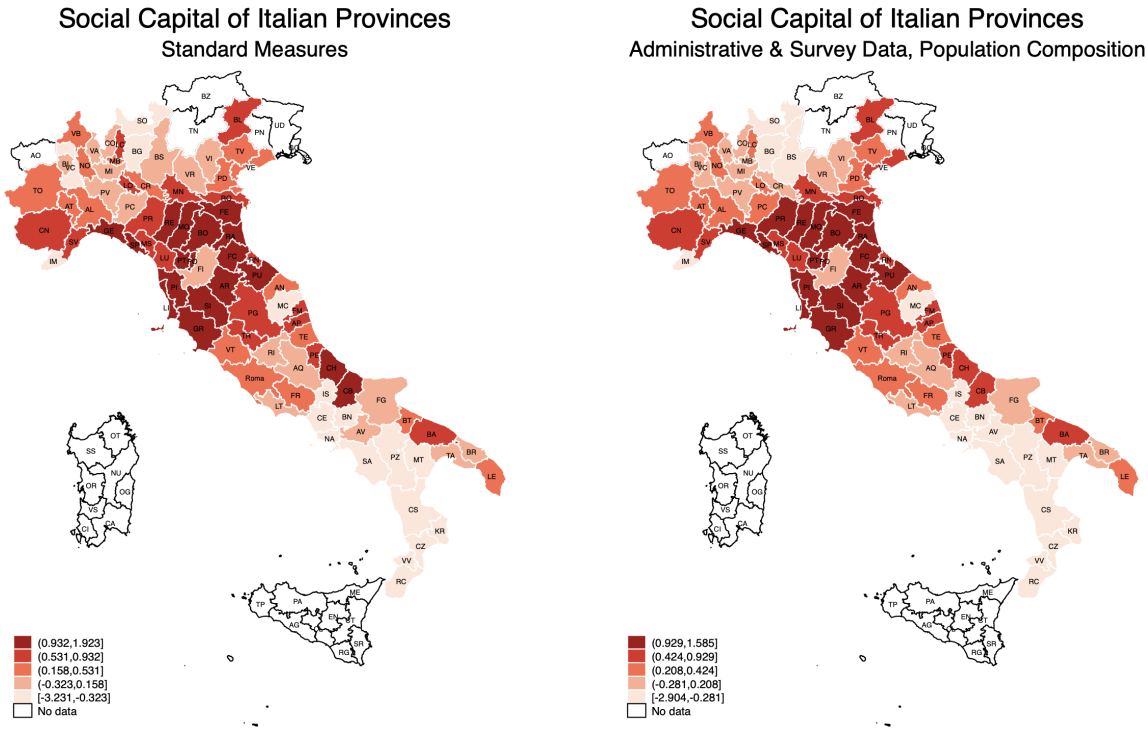
As for the "SC" variables, SC_p, SC_r are the standard levels of social capital at the province and region level respectively. Also, $\tilde{SC}_j$ is a measure of social capital in region j taken from our bespoke survey. It is the survey equivalent of the standard index; that is, it is based on the first principal component of responses to questions on blood donation, TV licence payments and turnout at referenda, aggregated at the level of the region of the respondents' mothers. Specifically, we use the survey responses to the questions "Do you donate blood?","Do you pay the TV licence?","Do you usually vote at referenda?" and we average the responses by the region of respondents' mothers. See Sgroi et al. (2020) for details.

Given all these variable definitions, the interpretation of (18) is the following. The adjusted indicator of social capital allocates a different level of social capital to each of three shares of the local provincial population. Those born in the province of residence are assumed to be the individuals with the strongest ties to the locality, and are therefore allocated the standard level of social capital of that province. Those born in a province different from that of residence, yet within the same region, are allocated the level of social capital of the region, excluding the province. This construction reflects the fact that we do not have data on the exact province of origin of inward migrants from within the region. Finally, those born in a different region are given a level of social capital $\overline{SC}^r_{-r}$, which is the weighted average of the survey-based social capital indices across all other regions (excluding their own region of residence), with the weights being the bilateral stock of immigrants from each of these other regions. So, effectively, the third term assigns to the share of the province's population that from outside the region, the social capital of the region of origin of the mother of the

[22] The cities are Torino, Genova, Milano, Brescia, Verona, Venezia, Padova, Trieste, Parma, Reggio-Emilia, Modena, Bologna, Ravenna, Firenze, Livorno, Prato, Perugia, Roma, Napoli, Bari, Taranto, Reggio Calabria, Palermo, Messina and Catania.

resident.

Figure 1: Social Capital, Standard and Adjusted Indexes (by Mother's Region of Birth)



Notes: Provinces are colored according to their level of standard and adjusted social capital, expressed in term of quintiles. Darker colours indicate higher level of social capital. Special autonomy regions (Valle d'Aosta, Trentino-Alto Adige, Friuli-Venezia Giulia, Sicily and Sardinia) have been excluded in the computation of social capital.

The map on the left of Figure 1 provides a graphical illustration of the distribution of social capital aggregated at the provincial level using the standard measure of social capital described in Section 5.1.1; the map on the right of Figure 1 shows the distribution of social capital for the adjusted social capital index. The two maps look similar since they differ only in the third component, however we note a dilution of social capital in those areas with high levels of internal immigration.

5.2 Local Government Performance

Since 2011 the Italian government has been conducting a comprehensive analysis of expenditures and output of municipalities, partially calculate so-called "Standard Expenditure Needs" (SEN) of municipalities to inform the design of the grant system to municipalities. Information provided by official sources (balance sheets, National Institute of Statistics, Ministry of Education, Land Registry Office, etc.) was integrated with new data from ad-hoc questionnaires to local authorities on each service provided by municipalities, enquiring

about outputs, inputs, methods of management and organisational decisions. From this data, a simple system of performance indices was created, providing basic information on how each municipality uses its resources for the provision of the essential services.

This paper uses two indexes from this exercise. First, we use an output gap indicator scaled between 1 (worst) and 10 (best) based on the difference between the actual level of services provided by a municipality and the standard level of services.[23] Second, we use the performance indicator, which is the difference between the output indicator and an expenditure gap indicator. The latter is based on the difference between actual and standard expenditures and scaled in reverse order between 1 and 10 (lower score for higher levels of expenditure gap). By construction, the performance index is higher for a municipality that can provide a given level of output at lower expenditure i.e. that is more efficient (see Porcelli et al., 2016, for details).

The first set of Opencivitas performance indices use 2010 data collected by the Ministry of Finance in 2011 and 2012. There have been subsequently three further waves using data from 2013, 2015 and 2016 (collected by the Italian Ministry of Finance respectively in 2016, 2017 and 2018). The computation of each wave of this index has been done to allow cross-wave comparisons.[24] Since 2015, these data have been published online on the website Opencivitas (www.opencivitas.it).

To illustrate, we show in Figure 2 the average province-level values of the output and efficiency indices obtained for 2016. From these we can observe an obvious North-South gradient, but there is also variability within broad regions.

6 Empirical Results

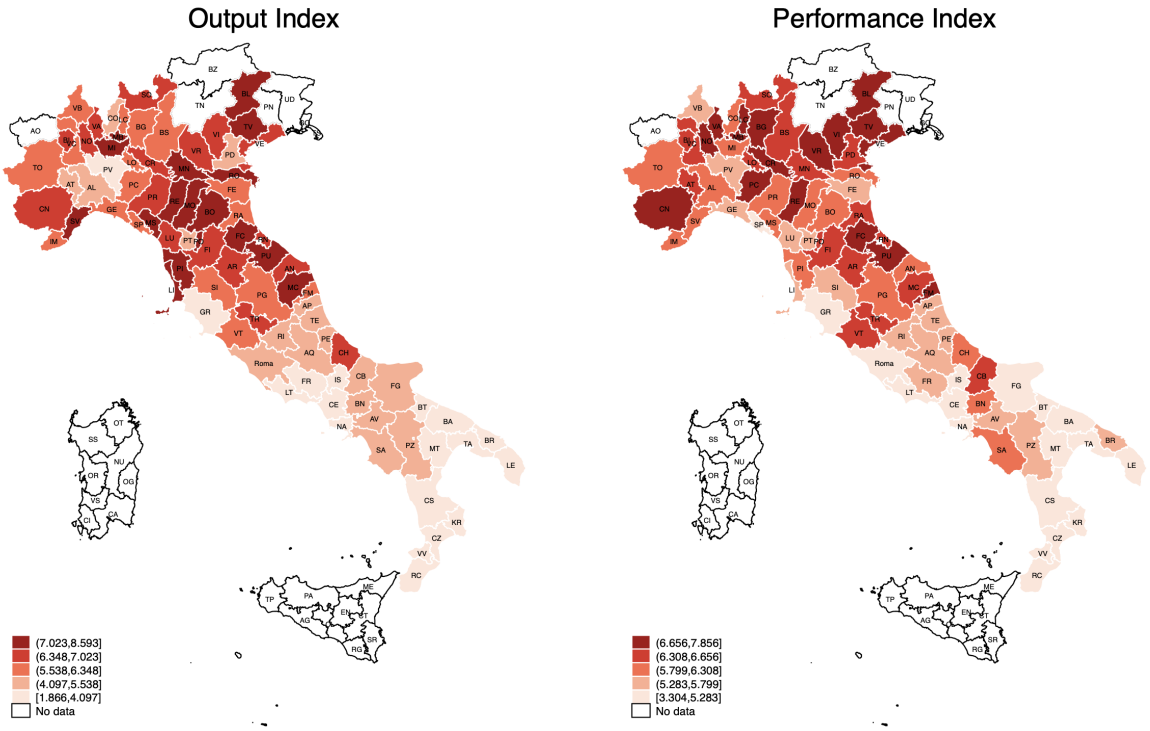
6.1 Data Description and Variable Definitions

Three main testable predictions emerge from the theory. The first is that municipal performance and output depend on two key factors, the degree of social capital and the presence of

[23] The standard level of services corresponds to the simple average of the level of services provided by municipalities in the same population bracket (local authorities have been divided into ten population brackets from those below 500 inhabitants to those above 100,000 inhabitants). The historical level of services is a composite indicator of the outputs produced in the essential municipal functions: number of users of the social care service, number of users of the ancillary education services, number of fines and controls carried out by local police officers, tons of urban waste recycled, number of authorisations and inspections for planning activities in the environmental and land management sector. Weights correspond to the level of expenditure employed in each service.

[24] We use the 2010 index for years between 2008 and 2011; the average between the 2010 and 2013 index for year 2012; the 2013 index for year 2013; the average between 2013 and 2015 index for year 2014; the 2015 index for year 2015; the 2016 index for all subsequent years.

Figure 2: Municipal Output and Performance index: Quintiles of Averages at the Province Level



Notes: Provinces are colored according to their level of the output and performance indices, expressed in term of quintiles. Darker colours indicate a higher level of the index. Data for Special autonomy regions (Valle d'Aosta, Trentino-Alto Adige, Friuli-Venezia Giulia, Sicily and Sardinia) are not available since standard expenditure needs are computed only for municipalities in normal regions.

electoral incentives, i.e. the possibility for the incumbent mayor to run in the next election (Proposition 4). The second one is that the probability of incumbent re-election is negatively affected by the level of social capital in that municipality (Proposition 2). The last one is that the incumbent's vote share is decreasing in social capital, but that the effect of her performance on vote share is increasing in social capital i.e. the interaction is positive (Proposition 3).

We test these predictions using a panel for over 6700 municipalities (85% of Italian municipalities, since municipalities in special-autonomy regions have been excluded) for the period 2008–2016, the period for which the performance and output indices are available. We measure our first outcome variables, municipal performance and output, using the Opencivitas performance and output indexes described in the previous Section.[25] We measure our second outcome variable, the probability of incumbent re-election, as a dummy variable that takes

[25]Note that the social capital indexes are not time-varying, but the performance and output indexes are time-varying and intermediate years are interpolated.

value one if the incumbent mayor is re-elected, and zero otherwise. We measure the third outcome variable as the ratio of votes for the incumbent over the total number of votes.

Our key explanatory variable for all three testable predictions is a measure of the level of social capital, SC, in that municipality. In our baseline regressions we will employ the standard social capital index discussed in Section 5.1.1; due to endogeneity concerns, we will also instrument it with the adjusted social capital index developed in Section 5.1.2. Note that to ease the interpretation and the comparison of the results all social capital indices have been standardised to have mean zero and standard deviation of one.

To control for the main characteristics of *comuni* we also use municipal financial, census, and election data. In particular, we have the following *municipal controls*: per capita property tax burden, per capita grants from upper-tier governments, average per capita taxable income, population, proportion of children (less than 14 years old) and elderly (over 65 years old), and regional indicator variables. These variables are collected from the Statistical Atlas of Municipalities, yearly issued by the Italian National Statistical Institute (ISTAT) and the Ministry of Economy and Finance (MoF) and all monetary values are deflated using ISTAT 2001 monetary revaluation index.

We also employ *political controls*. First, to take into account a mayor's political preferences, we construct three indicator variables, *Left*,*Right*, *Independent* dummies, each taking the value of one if the mayor is supported by a left-wing coalition, right-wing coalition or she is an independent respectively, and zero otherwise. As performance may be affected by the electoral cycle, we include a control variable, *electoral cycle*, calculated as the number of years since the previous election. We also include a term limit dummy, TL, which takes a value of one when the mayor cannot run for re-election because of the term limit, which is two terms for municipalities with more than 3,000 inhabitants and three for municipalities with less than 3,000 inhabitants. We also account for the fact that electoral rules are simpler for small municipalities (first past the post for municipality with less than 15,000 inhabitants) by using a dummy *SmallMunicipality* for these cases. In selected specifications we also include the *Lagged Margin of Victory* variable which is the difference in vote share between the winner and the runner-up in the previous elections.

Our last set of controls are related to *mayor characteristics*: age (linear and quadratic), gender, education, and the mayor's previous occupations, via four dummy variables: low skilled and not relevant to the current position, low skilled and relevant, high skilled and not relevant and high skilled and relevant.[26] These should help to control for the selection

[26]To give an example, a mayor previously working as lawyer or pubic manager would be classified as high skilled/high relevant, on the contrary an unskilled manual worker would be classified as high skilled/low relevant.

effect. In Table 4 we report the summary statistics for all our variables.

6.2 Social Capital and Municipal Performance

We start by testing the predictions in Proposition 4. These are first, that that municipal performance in the first term of office unambiguously increases with social capital, and second that the interaction between social capital and the term limit is positive or negative depending on whether the selection or discipline effect of elections dominates. We estimate the following equation:

$$Perf_{it} = \alpha SC_i + \beta TL_{it} + \gamma(SC_i \times TL_{it}) + \delta' X_{it} + \phi' Z_{it} + u_{it} \tag{19}$$

The dependent variable is municipal performance ($Perf$), measured by the Opencivitas performance (1-10) score, and the regressors of interest are the social capital indicators (SC) and the term-limit dummy (TL).

The main coefficients of interest are α and γ; the theory predicts that $\alpha > 0$. Also, as already noted, a positive γ would indicate that the positive effect of social capital on selection is stronger than the effect on discipline and *vice versa*.

Throughout, we also use a common set of municipal controls X_{it}, as described in 6.1. Moreover, Z_{it} are a set of additional regressors relating to the political characteristics of the municipality and the personal characteristics if the mayor. Finally we also allow for regional and year fixed effects and their interaction throughout. We include the interactions between years and regional dummies to control for the effect on performance of those unobservable factors affecting regions differentially in a given year, such as bilateral immigration flows. Standard errors are clustered at the municipal level.

The results are reported in Table 5. In the first column we regress the Opencivitas index of municipal performance on the standard social capital index and the municipal controls. The second and third columns add the TL dummy and its interaction with $Perf$ without and with the interaction with the municipal controls (X). In the fourth column we augment the specification of column 3 with the full set of controls (the vectors X and Z) and their interaction with the TL dummy.

However as discussed in Section 5.1, traditional measures of social capital may be endogenous because they are the outcomes of the interactions between individuals and local institutions. To address this concern, we instrument the standard social capital index in two ways. First, in column 5, we instrument the standard social capital index and its interaction with TL by the adjusted social capital index introduced in Section 5.1.2 and its interaction with TL respectively.

Second, as discussed in section 5.1, $\tilde{SC}_j$ is constructed from answers of respondents to questions about the payment of the TV license and voting in referenda and these may be subject to measurement error because of e.g. unwillingness to admit to anti-social behaviour, etc. To address this concern, we replace $\tilde{SC}_j$ with SC_j in $\overline{SC}^r_{-r}$. This addresses the measurement problem in that SC_j are calculated from administrative data on the payment of TV licenses and referendum turnout. We will call this measure the *population adjusted* index. Then, in column 6, we instrument the standard social capital index and its interaction with TL by the population adjusted index and its interaction.

From the inspection of Table 5 we can clearly see that the effect of social capital on performance is always positive and strongly significant in all our specifications. The estimated coefficients α in columns 1 to 3 are in the range of 0.19-0.22, both without and with controls. From these estimates, we can compute that a one standard deviation increase in social capital increases the performance of non-term-limited mayors on average by about 4 percent; also, moving from the lowest to the median level of social capital increases performance by about 20 percent.

The interaction between the TL and SC is negative but not significant in column 2 and becomes significant and negative from column 3 onward. This suggests that the discipline effect of elections prevails over the selection effect. In particular, if the mayor is term limited, the positive effect of a one standard deviation increase in social capital on performance is reduced by about 1.6 percent. Similarly, moving from the municipality with the lowest social capital to the one with the the median level reduces the positive effect of social capital on performance on term-limited mayors by about 8 percent.

The results when SC and its interaction with TL are instrumented are reported in columns 5 and 6. The F test statistics for the first stage regressions are very large, as expected. We also report the Durbin-Wu-Hausman endogeneity test; under the null hypothesis that the endogenous regressors can actually be treated as exogenous, the test statistic is distributed as chi-squared. We can clearly reject the hypothesis that the standard measure of SC is exogenous.

In columns 5 and 6, coefficients on SC and $SC \times TL$ are approximately three times larger than in the OLS specification. The results suggest that an increase in one standard deviation in the the social capital indicator increases municipal performance of 8.3 percent if the local government is term-limited and of 14 percent if the mayor can run again.

Turning to the effect of the other controls, the fact that a municipality has high income *per capita* and receives a high intergovernmental grant is associated with low performance, a possible reason being that the availability of financial resources creates a perverse disincentive to spend resources efficiently. This result also indicates that social capital is capturing

something else beyond availability of resources. As for the political variables, column 4 indicates that municipalities ruled by traditional coalitions, rather than civic lists, are associated with higher performance. *Small Municipality*, the dummy for the municipalities with population less that 3000, which have a three-term limit, is positive but only significant in the the last two columns. The *First past the post* dummy, identifying the change in electoral system at the 15,000 inhabitant threshold, is consistently negative and significant. Regarding mayors' characteristics, we control for education, i.e. whether or not they have an university degree, gender, age (linear and quadratic), and the mayor's previous occupation. The only personal characteristic which seems to play a significant role in affecting performance is gender. Female mayors are associated with higher performance; a female mayor' s performance is about 2 percent higher than that of a male counterpart.

As a further exercise, we re-estimate model (19) replacing the Opencivitas performance index with the output index. The results for this exercise are in Table 7; the format of the table is the same as in Table 5. We see that as in the case of performance, the level of social capital has a positive effect on output, significant at the 1% level. The first four columns of Table 7 have a coefficient on SC of about 0.28, both with and without controls. However when SC is instrumented, the size of this coefficient increases by a factor of five and is still significant at 1%. In contrast to the case of performance, the interaction between the social capital indicator and the non-term-limit dummy is now never significant.

Finally, as a robustness check we re-estimate model (19) using two different sub-samples. Results for this exercise are reported in Table N.3 in the Appendix. First, given that the survey employed to construct the adjusted social capital was conducted in Milan, Rome and Turin, we exclude data from these three municipalities to estimate model (19), columns 1-3. Second, since data on internal migration are based on 2011 Census, exclude data from earlier years, columns 4-6. The set of controls is the same as in the previous regressions. Overall the results confirm the findings reported in Table 5.

6.3 Social Capital and the Incumbent Re-Election Probability

Proposition 2 above predicts that, unconditional on performance, high social capital is associated with a lower re-election probability because of the lame duck effect i.e. social capital has a positive effect on discipline, making it more attractive for voters to replace the term-limited incumbent with a disciplined challenger. We can easily test this, as all municipalities had at least one election during our sample period. Information on the distribution of elections across geographical areas and by social capital for any given year is provided in Table

Table 3: Distribution of Elections by year, Social Capital and Geographical Location.

Year	N.Elections	Share High SC	North	Centre	South
2007	756	0.43	0.41	0.13	0.47
2008	393	0.46	0.36	0.16	0.48
2009	3999	0.49	0.69	0.15	0.16
2010	437	0.54	0.34	0.08	0.57
2011	1152	0.54	0.47	0.15	0.38
2012	708	0.45	0.43	0.14	0.43
2013	520	0.50	0.43	0.14	0.43
2014	3819	0.49	0.69	0.15	0.16
2015	508	0.41	0.34	0.10	0.55
2016	1,162	0.45	0.48	0.15	0.36

Note:a municipality is defined as HSC if its level of standard social capital is above the median level.

3. This Table shows that the share of high social capital municipalities holding elections does not differ much by year.

We estimate the following equation:

$$RE_{i,e} = \alpha SC_i + \beta' X_{i,e} + \delta' Z_{i,e} + u_{i,e} \tag{20}$$

where e is an election year (specific to each municipality), and $RE_{i,e}$ is a dummy taking value of one if the incumbent is re-elected in that year in municipality i and zero otherwise. The key coefficient in (20) is α: from Proposition 2, we expect this to be negative.

We propose two alternatives for this exercise. In the first one, RE is defined at the *candidate* level; $RE = 1$ if the incumbent mayor is re-elected at the next election and zero otherwise. We consider both the set of elections where the incumbent could run in the following period i.e. she was not term limited and less than 70 years old (columns 1 to 4 of Table 7) and the set of elections where the incumbent actually did run, column 5.

The second alternative, reported in column 6 of Table 7, is where RE is defined at the *party* level i.e. where $RE = 1$ if a candidate from the incumbent party coalition is re-elected and zero otherwise. In this case, we use the full set of elections. This specification takes into account a typical feature of the Italian municipal system, where it is often the deputy mayor, or a member of the local government from the same party, that runs for the post if the mayor is term limited. We estimate a linear probability model, and standard errors are clustered at provincial level.[27]

As controls we employ the basic set of municipal controls (X) and also the the set of political controls and mayoral characteristics (Z). In addition, to take into account the

[27]Probit regressions produce very similar results and are available upon request.

extent of electoral competition in each municipality, we also include the incumbent margin of victory (i.e. the difference in the vote share between the winner and the runner up) at the previous election. Regional and year fixed effects are included in all regressions.

The results are given in Table 7 below. Specifications 1 and 2 are estimated using the standard measure of social capital, and in specifications 3 to 6, SC is instrumented by the adjusted social capital index as in Tables 5 and 7. The results show a negative effect of social capital on the incumbent re-election probability that is robust across all specifications. The magnitude of the estimated α is in the order of -0.02 when estimated without controls, to -0.046 when instrumented if we use the full set of incumbents who can run in the next election. In the specification of column 4, a one standard deviation increase in social capital is associated with a 6.9 percent decrease in the probability of incumbent re-election. Moving from the lowest level of social capital to the median level decreases the probability of being re-elected for the incumbent mayor by fully 33 percent. Overall, these results are as predicted by the the theory.

Regarding the other controls, we observe the following. The first past the post system, in place for municipalities with population under 15,000 residents, is associated with a decrease in the likelihood to of re-election. The party of the incumbent does seem to play a role in affecting re-election; there is a positive effect of traditional left or right coalitions compared to civic list or populist parties. The previous occupation of the mayor does (marginally) matter for high skilled and experienced mayors but age does not. Being a female incumbent is negatively associated with re-election, despite the fact that, according to Table 5, women perform generally better than men. In column 5 we restrict the sample to those elections where the mayor runs again. We see similar results as in the previous columns, but the coefficients are about three times larger. In column 6 we use the party-based definition of incumbent with very similar results; here an increase of one standard deviation of social capital is associated with a reduction of 6.6 percent in the probability of re-election.

6.4 Social Capital, Performance, and the Incumbent Vote Share

We now turn to test the empirical prediction in Proposition 3, which is that incumbent vote share is negatively associated with the *level* of social capital, but that the positive effect of performance on the vote share is increasing in social capital i.e. the *interaction effect* is positive. We estimate the following equation:

$$VoteShare_{i,e} = \alpha SC_i + \beta(SC_i \times \Delta Perf_{i,e}) + \gamma \Delta Perf_{i,e} + \delta' X_{i,e} + \phi' Z_{i,e} + u_{i,e} \qquad (21)$$

The main coefficients of interest are α and β; the theory predicts that α will be negative, and the interaction coefficient β will be positive.

Here, as before, e is an election year, specific to each municipality. The analysis is restricted to the set of elections where the incumbent mayor re-runs for election. $VoteShare$ is the log of the number of votes cast for the incumbent as a share of the total number of votes cast. The social capital index SC is treated in two ways. First we employ the standard index, both on its own and interacted with our measure of performance. Second, we explore an alternative approach by constructing a dummy, HSC, taking the value of one if a municipality is in the top half of the social capital distribution and zero in the bottom half, measuring social capital by the standard social capital index. This second approach provides a robustness check and also facilitates the interpretation of the results.

We find that voters are more responsive to *changes* in performance the around the time of the election than the level. So, we enter performance in difference form, $\Delta Perf$, defined as the log of the difference between the municipal performance index in the year before an election compared to the year before that. We also control for our set of municipality characteristics X, and for incumbent characteristics and municipal political variables, Z, as in previous regressions. All regressions include also regional dummies and election years. Standard errors are clustered by region.

Table 8 reports the output for the estimation of equation (21). Columns 1 and 4 present the results for the basic specifications for the two social capital measures, without additional controls. The estimated level effect of social capital on incumbent vote share is negative and highly significant in both columns; this is consistent with the theory and in line with the results in Section 6.3, i.e. that in municipalities with high social capital, the probability of incumbent re-election is negatively related to social capital. The interaction term between social capital and $\Delta Perf$ is positive and highly significant, again as predicted.

Columns 2 and 4 augment the baseline specification with a full set of municipal and mayor controls; both the level and the interaction effects remain very significant and with the expected signs but the level effect is are reduced by approximately one half. Note also that the effect of $\Delta Perf$ on the incumbent vote share is not significantly different from zero in most of the specifications. So low social capital municipalities appear to be not very responsive to performance.

To give an idea of the magnitude of the impact of social capital on the incumbent vote share, we use the results displayed in column 2; an increase of one standard deviation in the social capital index is associated with 1.1 percent decrease in incumbent vote share. Similarly column 5 indicates that being in a high social capital municipality lowers the incumbent vote share by about 2.4 percent. To give an idea of the magnitude of the effect of performance

change on the popularity of the incumbent, from column 5, a doubling in rate of change in performance in the year prior to an election is associated with about 2.4 percent increase in the incumbent's vote share in high social capital municipalities. There is no significant response to performance in low social capital municipalities.

In columns 3 and 6 we instrument the SC and the interaction between SC and $\Delta Perf$ with the corresponding adjusted social capital index or high social capital dummy based on the adjusted index. Specifically, in column 3, the instruments are the adjusted social capital index and its interaction with $\Delta Perf$. In column 6, the instruments are the adjusted high social capital dummy defined using the adjusted social capital index and its interaction with $\Delta Perf$. In these cases, the magnitude of the interaction effect increases and it remains highly significant, but the level effect of social capital loses significance. However, the Hausman test reported at the bottom of the table indicates that the OLS is the best specification for both cases.

Turning to the effect of the additional controls on incumbent vote share, most of the controls are not consistently significant in all the specifications. The negative effect of coefficient of a female incumbent is again observed, as in the estimates of the unconditional re-election probability.

7 Conclusion

This paper has made three contributions. First, we have presented a theoretical analysis of how *both* the civic preference and information aspects of social capital impact on government performance and turnover, employing a political agency model with both moral hazard and adverse selection. Second, we have presented novel measures of both local government performance and on social capital at the Italian municipality level, using administrative data and an online survey respectively. Third, our empirical results have shown that higher social capital improves government performance, especially in the first term of office, but also increases turnover of incumbent mayors, as predicted by the theory. The voting rule predicted by the theory has the feature that the level effect of social capital on the incumbent vote share is negative, but the interaction between social capital and performance is positive, and we have found empirical support for this. Our paper is one of the first, we believe, to show a link between social capital and the technical efficiency of government. It is also the first to show that unconditionally, social capital is linked to higher turnover.

References

Asatryan, Zareh and Kristof De Witte, "Direct democracy and local government efficiency," *European Journal of Political Economy*, 2015, *39*, 58–66.

Ashworth, Scott and Ethan Bueno de Mesquita, "Is voter competence good for voters?: Information, rationality, and democratic performance," *American Political Science Review*, 2014, *108* (3), 565–587.

Besley, Timothy, "Paying politicians: theory and evidence," *Journal of the European Economic Association*, 2004, *2* (2-3), 193–215.

_ , *Principled agents?: The political economy of good government*, Oxford University Press on Demand, 2006.

_ **and Andrea Prat**, "Handcuffs for the grabbing hand? Media capture and government accountability," *American economic review*, 2006, *96* (3), 720–736.

Bracco, E., M. De Paola, and C.P. Green, "Long lasting differences in civic capital: Evidence from a unique immigration event in Italy," *Journal of Economic Behavior & Organization*, 2015, *120* (C), 160–173.

Bracco, Emanuele, Federica Liberini, Ben Lockwood, Francesco Porcelli, Michela Redoano, and Daniel Sgroi, "Social Capital, Electoral Behaviour and Government Performance in Italy: the Role of Culture and Family Origin," *AEA RCT Registry*, 2019.

_ **, Francesco Porcelli, and Michela Redoano**, "Political competition, tax salience and accountability. Theory and evidence from Italy," *European Journal of Political Economy*, 2019, *58* (C), 138–163.

Buonanno, Paolo, Daniel Montolio, and Paolo Vanin, "Does Social Capital Reduce Crime?," *The Journal of Law Economics*, 2009, *52* (1), 145–170.

Cartocci, R., *Mappe del tesoro: atlante del capitale sociale in Italia* Contemporanea (Bologna, Italy), Il mulino, 2007.

Coffé, Hilde and Benny Geys, "Institutional performance and social capital: An application to the local government level," *Journal of urban affairs*, 2005, *27* (5), 485–501.

Coleman, James S., "Social Capital in the Creation of Human Capital," *American Journal of Sociology*, 1988, *94*, S95–S120.

Côté, Sylvain and Tom Healy, *The Well-Being of Nations: The Role of Human and Social Capital. Education and Skills.*, ERIC, 2001.

Fernández, Raquel, "Women, Work, and Culture," *Journal of the European Economic Association*, January 2007, *5* (2-3), 305–332.

_ **and Alessandra Fogli**, "Culture: An Empirical Investigation of Beliefs, Work, and Fertility," *American Economic Journal: Macroeconomics*, January 2009, *1* (1), 146–77.

Fukuyama, F., *Trust: the social virtues and the creation of prosperity* Free press paperback, Free Press, 1995.

Geys, Benny, "Looking across borders: A test of spatial policy interdependence using local government efficiency ratings," *Journal of urban economics*, 2006, *60* (3), 443–462.

_ **, Friedrich Heinemann, and Alexander Kalb**, "Voter involvement, fiscal autonomy and public sector efficiency: Evidence from German municipalities," *European journal of political economy*, 2010, *26* (2), 265–278.

Guiso, Luigi, Paola Sapienza, and Luigi Zingales, "The Role of Social Capital in Financial Development," *American Economic Review*, June 2004, *94* (3), 526–556.

_ **,** _ **, and** _ , "Long Term Persistence," NBER Working Papers 14278, National Bureau of Economic Research, Inc August 2008.

Halpern, "Social capital: the new golden goose. ," NBER Working Papers, Faculty of Social and Political Sciences, Cambridge University 1999.

Helliwell, John and Robert Putnam, "Economic Growth and Social Capital in Italy," *Eastern Economic Journal*, 1995, *21* (3), 295–307.

Kawachi, I, B P Kennedy, K Lochner, and D Prothrow-Stith, "Social capital, income inequality, and mortality.," *American Journal of Public Health*, 1997, *87* (9), 1491–1498. PMID: 9314802.

Knack, Stephen, "Social Capital and the Quality of Government: Evidence from the States," *American Journal of Political Science*, 2002, *46* (4), 772–785.

_ **and Philip Keefer**, "Does Social Capital Have an Economic Payoff? A Cross-Country Investigation," *The Quarterly Journal of Economics*, 1997, *112* (4), 1251–1288.

Nannicini, Tommaso, Andrea Stella, Guido Tabellini, and Ugo Troiano, "Social capital and political accountability," *American Economic Journal: Economic Policy*, 2013, *5* (2), 222–50.

Nunn, Nathan and Leonard Wantchekon, "The Slave Trade and the Origins of Mistrust in Africa," *American Economic Review*, December 2011, *101* (7), 3221–52.

Padró i Miquel, Gerard, Nancy Qian, Yiqing Xu, and Yang Yao, "Making democracy work: Culture, social capital and elections in China," *Social Capital and Elections in China (April 2015). NBER Working Paper*, 2015, (w21058).

Persson, Torsten and Guido Enrico Tabellini, *Political economics: explaining economic policy*, MIT press, 2002.

Ponzetto, Giacomo and Ugo Troiano, "Social capital, government expenditures and growth," Technical Report, National Bureau of Economic Research 2018.

Porcelli, Francesco, Francesco Vidoli, Roberto Dispotico, and Danilo Ballanti, "A Simple Four Quadrants Model to Monitor the Performance of Local Governments," Technical Report 2016.

Putnam, Robert D., *Bowling Alone: The Collapse and Revival of American Community*, New York: Simon & Schuster, 2000.

_ , Robert Leonardi, and Raffaella Nanetti, *Making Democracy Work: Civic Traditions in Modern Italy*, Princeton: Princeton University Press, 1993.

Sgroi, Daniel, Michela Redoano, Federica Liberini, Ben Lockwood, Emanuele Bracco, and Francesco Porcelli, "Cultural Identity and Social Capital in Italy," *Warwick Economics Research Papers 1283*, 2020.

Uslaner, Eric M., *Frontmatter*, Cambridge University Press, 2002.

Wilkinson, R.G., *Unhealthy Societies: The Afflictions of Inequality* Studies in culture and communication, Routledge, 1996.

Zak, Paul J. and Stephen Knack, "Trust and Growth," *The Economic Journal*, 2001, *111* (470), 295–321.

Table 4: SUMMARY STATISTICS

Variables	Mean	Std. Dev.	N
Opencivitas Performance Index	5.893	1.886	49618
Opencivitas Output Index	5.485	2.759	49618
Municipal Characteristics			
Population	7.724	45.438	49618
Share children	0.129	0.027	49618
Share elderly	0.224	0.058	49618
Income (thousand of Euros pc, deflated)	14.110	3.018	49618
Grants, per capita (deflated)	160.668	237.966	49618
Property tax, per capita (deflated)	132.985	156.3741	49618
Municipal Political Variables			
Relection (person) (dummy)	0.539	0.498	34181
Relection (party) (dummy)	0.688	0.462	29690
Term limit (dummy)	0.376	0.484	49142
Small Municipality (population < 3k, dummy)	0.550	0.497	49618
Municipal Majority Coalition: Left-wing (dummy)	0.097	0.297	49142
Municipal Majority Coalition: Right-wing (dummy)	0.092	0.289	49142
Margin of Victory (MV)	21.637	18.522	43497
First past the post (population < 15k inhabs, dummy)	0.096	0.294	49618
Electoral Cycle	1.943	1.331	49142
Mayor Characteristics			
Incumbent: Female (dummy)	0.117	0.321	49618
Incumbent: Age	50.256	10.364	49142
Incumbent: College degree (dummy)	0.453	0.497	44587
Incumbent: High school Graduate (dummy)	0.449	0.497	42647
Job Skill/relevance: low:low (dummy)	0.194	0.396	42119
Job Skill/relevance: low:high (dummy)	0.037	0.188	42119
Job Skill/relevance: high:low (dummy)	0.317	0.465	42119
Job Skill/relevance: high:high (dummy)	0.341	0.474	42119

Notes: Performance index and output index are collected from the website Opencivitas.it; Social capital measures are collected from multiple sources (Ministry of Interior, the Italian national public broadcasting, and authors' survey); Municipal Characteristics are provided by the Italian National Institute of Statistics and the Ministry of Economy and Finance; Municipal Political variables and Mayors Characteristics are collected from the official electoral archives of the Ministry of the Interior. The margin of Victory is computed considering the last round of the election. The electoral cycle counts the number of years from the ballot. High job skill identifies mayors whose occupation requires a university degree; instead, high relevance identifies mayors whose profession is related to public administration independently on the specialization. Deflated refers to base year 2001.

Table 5: MUNICIPAL PERFORMANCE EQUATION

Dep. Var.: Municipal Performance	(1)	(2)	(3)	(4)	(5)	(6)
SC	0.1986***	0.2068***	0.2206***	0.2212***	0.8355***	0.8065***
	[0.021]	[0.022]	[0.023]	[0.025]	[0.069]	[0.067]
SC X Term Limit		-0.0229	-0.0898***	-0.0950***	-0.3480**	-0.3210**
		[0.026]	[0.032]	[0.034]	[0.146]	[0.139]
Term Limit		0.0023	-0.0143	0.0185		0.0781*
0.0802*						
		[0.024]	[0.060]	[0.063]	[0.045]	[0.044]
Income	-0.0699***	-0.0700***	-0.0775***	-0.0740***	-0.1177***	-0.1158***
	[0.009]	[0.009]	[0.010]	[0.011]	[0.007]	[0.007]
Grants	-0.0009***	-0.0008***	-0.0008***	-0.0007***	-0.0006***	-0.0006***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Majority Coalition Left				0.1564**	0.0142	0.0177
				[0.077]	[0.037]	[0.036]
Majority Coalition Right				0.0329	0.1264***	0.1243***
				[0.061]	[0.030]	[0.030]
Small				0.0103	0.1213***	0.1332***
				[0.047]	[0.029]	[0.029]
First past the post				-0.2329***	-0.1018***	-0.1041***
				[0.078]	[0.036]	[0.036]
Incumbent Female				0.1214***	0.0983***	0.0989***
				[0.046]	[0.027]	[0.027]
Incumbent Age				0.0134	0.0108	0.0110
				[0.014]	[0.008]	[0.008]
Incumbent Degree				0.0575	0.0230	0.0242
				[0.060]	[0.035]	[0.035]
Incumbent Highly Experienced and Skilled				0.0083	-0.0009	-0.0013
				[0.046]	[0.026]	[0.026]
X Controls	NO	NO	NO	YES	YES	YES
Z x Term Limit	NO	NO	YES	YES	YES	YES
Method	OLS	OLS	OLS	OLS	IV	IV
Instruments					Adj.	Pop. Adj.
First Stage F-statistics for SC					981.93	1009.84
p-values					[0.00]	[0.00]
First Stage F-statistics for SC X Term Limit					285.27	294.03
p-values					[0.00]	[0.00]
Durbin-Wu-Hausman test					138.80	132.03
p-values					[0.00]	[0.00]
Observations	49,618	49,142	49,141	43,880	37,846	37,846
R-squared	0.213	0.212	0.215	0.217	0.189	0.193

Notes: standard errors clustered at municipal level in brackets, * = $p < 0.1$, **= $p < 0.05$, *** = $p < 0.01$. Dependent variable is the Opencivitas Performance Indicators. Regional dummies, year dummies and municipal controls (X) are included in all regressions. X includes *per capita municipal* income, *per capita municipal* grants from upper levels of governments, population, share of population above 65 years old and below 15 years old. Social capital is the standardized standard social capital index, in columns 5 and 6 social capital is instrumented with the adjusted and population adjusted social capital index. Z controls include: plurality rule elections for municipalities with less than 15,000 inhabitants, no term limit dummy for municipalities with less than 3,000 inhabitants, majority coalition Right (Left) coalition dummies, mayor's age and aged squared, gender, education (university or high school degree), occupation prior to mandate (high skill/low skill and experience relevant/non relevant to mandate).

Table 6: MUNICIPAL OUTPUT EQUATION

Dep. Var.: Municipal Output	(1)	(2)	(3)	(4)	(5)	(6)
SC	0.2751***	0.2897***	0.2924***	0.2880***	1.5352***	1.5138***
	[0.028]	[0.030]	[0.032]	[0.034]	[0.1030]	[0.1003]
SC X Term Limit		-0.0422	-0.0246	-0.0128	-0.2959	-0.2689
		[0.036]	[0.043]	[0.046]	[0.217]	[0.208]
Term Limit		0.0403	-0.0404	-0.0409	0.0252	0.0275
		[0.036]	[0.088]	[0.093]	[0.068]	[0.068]
Income	0.0894***	0.0896***	0.0831***	0.0899***	-0.0145	-0.0133
	[0.013]	[0.013]	[0.014]	[0.015]	[0.011]	[0.011]
Grants	0.0004***	0.0004***	0.0004***	0.0004***	0.0009***	0.0009***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Majority Coalition Left				0.4002***	0.1837***	0.1856***
				[0.107]	[0.055]	[0.055]
Majority Coalition Right				0.1151	0.3469***	0.3456***
				[0.088]	[0.047]	[0.047]
Small				0.0768	0.4535***	0.4685***
				[0.067]	[0.044]	[0.043]
First past the post				-0.3440***	-0.1859***	-0.1871***
				[0.108]	[0.054]	[0.054]
Incumbent Female				0.1521**	0.1127***	0.1129***
				[0.066]	[0.042]	[0.042]
Incumbent Age				-0.0048	-0.0170	-0.0169
				[0.019]	[0.012]	[0.012]
Incumbent Degree				0.0424	0.0340	0.0347
				[0.085]	[0.054]	[0.054]
Incumbent Highly Experienced and Skilled				0.0122	0.0210	0.0209
				[0.064]	[0.040]	[0.040]
X Controls	NO	NO	NO	YES	YES	YES
Z x Term Limit	NO	NO	YES	YES	YES	YES
Method	OLS	OLS	OLS	OLS	IV	IV
Instruments					Adj.	Pop. Adj.
First Stage F-statistics for SC					981.33	1009.84
p-values					[0.00]	[0.00]
First Stage F-statistics SC X Term Limit					285.27	294.06
p-values					[0.00]	[0.00]
Durbin-Wu-Hausman test					314.25	317.471
p values					[0.00]	[0.00]
Observations	49,618	49,142	49,141	43,880	37,846	37,846
R-squared	0.213	0.213	0.215	0.210	0.106	0.109

Notes: standard errors clustered at municipal level in brackets, * = $p < 0.1$, **= $p < 0.05$, *** = $p < 0.01$. Dependent variable is the Opencivitas Output Indicator. Regional dummies, year dummies and municipal controls (Z) are included in all regressions. X includes *per capita municipal* income, *per capita* municipal grants from upper levels of governments, population, share of population above 65 years old and below 15 years old. Social capital is the standardized standard social capital index, in columns 5 and 6 social capital is instrumented with the adjusted and population adjusted social capital index. Z controls include: plurality rule elections for municipalities with less than 15,000 inhabitants, no term limit dummy for municipalities with less than 3,000 inhabitants, majority coalition Right (Left) coalition dummies, mayor's age and aged squared, gender, education (university or high school degree), occupation prior to mandate (high skill/low skill and experience relevant/non relevant to mandate).

Table 7: INCUMBENT RE-ELECTION EQUATION

Dep. Var.:	(1)	(2)	(3)	(4)	(5)	(6)
Incumbent Reelection	Inc. Person	Inc. Person	Inc. Person	Inc. Person	In. Person	Inc. Party
SC	-0.0199***	-0.0136**	-0.0464**	-0.0458**	-0.1473***	-0.0626**
	[0.006]	[0.006]	[0.019]	[0.019]	[0.054]	[0.025]
Municipal Income	-0.0074***	-0.0020	-0.0001	-0.0001	0.0058	0.0134*
	[0.002]	[0.002]	[0.003]	[0.003]	[0.011]	[0.007]
Municipal Grants	0.0000	-0.0000	-0.0001***	-0.0001***	0.0001	0.0000
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
First past the post		-0.0475***	-0.0553***	-0.0552***	-0.1411***	-0.2190***
		[0.013]	[0.015]	[0.015]	[0.045]	[0.025]
Small Municipality		0.1427***	0.1362***	0.1363***	0.3848***	0.0710***
		[0.010]	[0.013]	[0.013]	[0.030]	[0.024]
Majority Coalition Right		0.1015***	0.0961***	0.0961***	0.0592	0.1258***
		[0.017]	[0.019]	[0.019]	[0.054]	[0.038]
Majority Coalition Left		0.0606***	0.0676***	0.0674***	0.1739***	0.2621***
		[0.013]	[0.016]	[0.016]	[0.055]	[0.028]
Incumbent Female		-0.0386***	-0.0400***	-0.0401***	-0.1321***	-0.0386*
		[0.012]	[0.013]	[0.013]	[0.047]	[0.021]
Incumbent Age		0.0071	0.0043	0.0043	0.0102	0.0151**
		[0.004]	[0.005]	[0.005]	[0.011]	[0.007]
Incumbent University Degree		-0.0121	-0.0118	-0.0119	-0.0466	-0.0424***
		[0.009]	[0.009]	[0.009]	[0.032]	[0.016]
Incumbent Highly Experienced and Low Skilled		-0.0666***	-0.0640**	-0.0640**	-0.0047	-0.0029
		[0.024]	[0.026]	[0.026]	[0.054]	[0.041]
Incumbent Low Experienced and Highly Skilled		0.0149	0.0154	0.0154	0.0048	-0.0130
		[0.011]	[0.011]	[0.011]	[0.041]	[0.017]
Incumbent Highly Experienced and Skilled		0.0248**	0.0218*	0.0219*	-0.0012	-0.0208
		[0.011]	[0.012]	[0.012]	[0.039]	[0.019]
X Controls	No	YES	YES	YES	YES	YES
Sample	Inc. can run	Inc. can run	Inc. can run	Inc. can run	Inc. does run	All elections
Method	LPM	LPM	IV	IV	IV	IV
Instruments			Pop. Adj.	Adj.	Pop. Adj.	Adj.
First Stage F Statistics			55.25	128.55	17.85	34.41
p values			[0.00]	[0.00]	[0.00]	[0.00]
Durbin-Wu-Hausman test			2.786	2.544	16.51	5.57
p values			[0.09]	[0.11]	[0.19]	[0.01]
Observations	5,118	4,768	4,059	4,059	1,912	7,966
R-squared	0.016	0.381	0.380	0.380	0.460	0.109

Notes: standard errors clustered at provincial level in brackets, * = $p < 0.1$, **= $p < 0.05$, *** = $p < 0.01$. Dependent variable is a dummy equal to one if the incumbent is re-elected and zero otherwise. Regional dummies, year dummies and municipal controls (X) are included in all regressions. X includes *per capita municipal* income, *per capita municipal* grants from upper levels of governments, population, share of population above 65 years old and below 15 years old. Social capital is the (standardized) standard social capital index, in columns (3) to (6) social capital is instrumented with the adjusted/population adjusted social capital indexes. Z controls include: plurality rule elections for municipalities with less than 15,000 inhabitants, no term limit dummy for municipalities with less than 3,000 inhabitants, majority coalition Right (Left) coalition dummies, mayor's age and aged squared, gender, education (university or high school degree), occupation prior to mandate (high skill/low skill and experience relevant/non relevant to mandate).

Table 8: THE EFFECT OF SOCIAL CAPITAL ON INCUMBENT VOTE SHARE

Dep Var	(1)	(2)	(3)	(4)	(5)	(6)
Incumbent vote share	Social Capital Index			High Social Capital Dummy		
SC	-0.0247***	-0.0111***	-0.0112			
	[0.002]	[0.002]	[0.023]			
SC $\times\Delta Perf.$	0.0042***	0.0066***	0.0191***			
	[0.001]	[0.000]	[0.006]			
HSC				-0.0587***	-0.0246***	-0.1916
				[0.014]	[0.009]	[0.142]
HSC $\times\Delta Perf.$				0.0166**	0.0236***	0.0791***
				[0.008]	[0.007]	[0.014]
$\Delta Perf.$	-0.0063	-0.0037	-0.0026	-0.0135	-0.0154	-0.0475***
	[0.004]	[0.004]	[0.004]	[0.014]	[0.012]	[0.014]
Municipal Grants	0.0000***	0.0000***	0.0000	0.0000**	0.0000*	0.0000**
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Property Tax	-0.0000	-0.0000	-0.0000	-0.0000	0.0000	-0.0001**
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Incumbent Coalition Left		0.0569***	-0.0599***		0.0586	0.0726***
		[0.016]	[0.018]		[0.051]	[0.024]
Incumbent Coalition Right		0.0333***	-0.0874***		0.0349	0.0419***
		[0.010]	[0.019]		[0.039]	[0.009]
Incumbent Female		-0.0513***	-0.0212***		-0.0499**	-0.0412***
		[0.007]	[0.005]		[0.020]	[0.001]
Incumbent Age		-0.0008	-0.0015		-0.0007	-0.0005
		[0.003]	[0.003]		[0.004]	[0.002]
Incumbent Degree		-0.0242***	-0.0254*		-0.0247	-0.0214***
		[0.004]	[0.014]		[0.026]	[0.008]
Incumbent High Experienced and Low Skilled		-0.0217	-0.0187		-0.0201	-0.0191
		[0.031]	[0.026]		[0.033]	[0.037]
Incumbent Low Experienced and Highly Skilled		-0.0036	-0.0037		-0.0020	0.0004
		[0.008]	[0.004]		[0.014]	[0.009]
Incumbent Highly Experienced and Skilled		-0.0127**	-0.0081		-0.0108	0.0021
		[0.006]	[0.006]		[0.010]	[0.013]
X Controls	YES	YES	YES	YES	YES	YES
Z Controls	NO	YES	YES	NO	YES	YES
Method	OLS	OLS	IV	OLS	OLS	IV
Instrument			Adj.			Adj.
First stage for HSC/SC			47.91			12.16
p values			[0.00]			[0.00]
First stage for HSC/SC $\times\Delta Perf.$			66.78			80.26
p values			[0.00]			[0.00]
Durbin Wu Hausman test			0.97			3.81
p values			[0.613]			[0.149]
Observations	2,242	2,100	1,788	2,485	2,100	1,788
R-squared	0.086	0.020	0.053	0.088	0.022	0.102

Notes: standard errors clustered at regional level in brackets, * = $p < 0.1$, **= $p < 0.05$, *** = $p < 0.01$. Dependent variable is the (log of) share of incumbent votes over total votes. Regional dummies, year dummies and municipal controls (X) are included in all regressions. X includes *per capita municipal* income, *per capita municipal* grants from upper levels of governments, population, share of population above 65 years old and below 15 years old. Z controls include: plurality rule elections for municipalities with less than 15,000 inhabitants, no term limit dummy for municipalities with less than 3,000 inhabitants, majority coalition Right (Left) coalition dummies, mayor's age and aged squared, gender, education (university or high school degree), occupation prior to mandate (high skill/low skill and experience relevant/non relevant to mandate). Social capital is the (standardized) standard social capital index, in columns (3) and (6) social capital is instrumented with the adjusted SC index.

Appendix

A. Proofs of Propositions and Further Results

Analysis of Voter Behaviour and Derivation of equations (7),(12),(13). Assume first that the voter does not observe effort. Then, at the end of the first period of office, even though she observes $T_t = T^*$, the voter has no new information about the type of the incumbent, so she expects him to make an effort e^* with probability π. So, the continuation value of re-electing the incumbent is just

$$V^{inc} = u_0 + \pi\Delta u, \tag{A.1}$$

where $u_0, \Delta u$ are defined in (A.2) above. So, from (3), (A.1), the uninformed voter will vote for the incumbent if and only if

$$u_0 + \pi\Delta u - V + v_i + \omega \geq 0. \tag{A.2}$$

By a similar argument, the continuation value of re-electing the incumbent for an informed voter is:

$$V^{inc}(e) = u_0 + \Pr(i = g\,|e\,)\Delta u \tag{A.3}$$

where e is the level of effort set by the incumbent, and $\Pr(i = g\,|e\,)$ is the posterior probability that the incumbent is good, conditional on e. So, comparing (6), (A.3), the key difference is that when the voter is informed, this continuation value $V^{inc}(e)$ possibly depends on e, because e can convey information to the voter about the type of the incumbent. So, the informed voter will vote for the incumbent iff

$$u_0 + \Pr(i = g\,|e\,)\Delta u - V + v_i + w \geq 0, \tag{A.4}$$

Now, let Δ be the expected difference in policy payoffs from retaining the incumbent versus not retaining him for both types of voter i.e $\Delta = u_0 + \pi\Delta u - V, u_0 + \Pr(i = g\ )\Delta u - V$. As there are a continuum of voters, and v_i is uniform on $\left[-\frac{1}{2}, \frac{1}{2}\right]$, then conditional on $\omega + \Delta$, the fraction of voters who vote for the incumbent is given by

$$\Pr\left(v_i \geq -(\omega + \Delta)\right) = \frac{1}{2} + (\omega + \Delta) \tag{A.5}$$

So, the share of the vote conditional on ω, Δ is

$$x(\omega) = \sigma\left(\frac{1}{2} + (\omega + \Delta(e))\right) + (1 - \sigma)\left(\frac{1}{2} + (\omega + \Delta)\right) \tag{A.6}$$

So, taking the expectation of $x(\omega)$ across ω, using $E\omega = 0$, the share of the vote for the incumbent is

$$\begin{aligned} x = &\ \frac{1}{2} + \Delta,\ \Delta = \sigma\Delta(e) + (1 - \sigma)\Delta \\ &= (u_0 + \pi\Delta u - V) + \sigma\Delta u(\Pr(i = g\,|e\,) - \pi) \end{aligned}$$

where in the second line, we use (A.2), (A.4). This gives (13) as required.

To derive (7), note that conditional on ω, the incumbent will win if he sets $e_t = e^*$ iff the overall share of the vote exceeds 50%. Using (13), this requires

$$\sigma\left(\frac{1}{2} + \frac{\omega + \Delta(e)}{\quad}\right) + (1 - \sigma)\left(\frac{1}{2} + \frac{\omega + \Delta}{\quad}\right) \geq \frac{1}{2} \Rightarrow \omega \geq -\Delta$$

So, given that ω is uniform on $\left[-\frac{1}{2\gamma}, \frac{1}{2\gamma}\right]$, the probability that the incumbent wins in this event is

$$p(e) \equiv \Pr\left(\omega \geq -\Delta\right) = \frac{1}{2} + \gamma\left(\sigma\Delta(e) + (1-\sigma)\Delta\right) \tag{A.7}$$

Then, substituting (A.2), (A.4) in (A.7) gives us (7) as required.

Proof of Proposition 1. The bad incumbent gets the following payoffs from pooling and separating respectively:

$$-c(e^*) + p(e^*)\delta R,\ 0 + p(0)\delta R \tag{A.8}$$

where $p(e^*), p(0)$ are defined in (7) above. So, he will pool if and only if the first term in (A.8) is larger than the second. This requires, using (7), that the incumbent is willing to pool if

$$\gamma\sigma\Delta u(\Pr(i = g\,|e^*) - \Pr(i = g\,|0)) \geq \frac{c(e^*)}{\delta R} \equiv A \tag{A.9}$$

Here, the left-hand side is the increase in the re-election probability from making high effort. In particular, if (A.9) holds with equality, the bad incumbent will be willing to randomize.

Now, as the good type always chooses e^*, a choice of $e = 0$ reveals the incumbent to be bad, and so $\Pr(i = g\,|0) = 0$. Moreover, from Bayes' rule,

$$\Pr(i = g\,|e^*) = \frac{\pi}{\pi + (1-\pi)\lambda} \tag{A.10}$$

where λ is the probability that the bad incumbent pools. So, using (A.10), the pooling condition becomes

$$\gamma\sigma\Delta u\frac{\pi}{\pi + (1-\pi)\lambda} \geq A \tag{A.11}$$

If $s \geq A$, the bad incumbent has a strong incentive to pool, so (A.11) holds at $\lambda = 1$. If $s \leq \frac{A}{\pi}$, the incentives to pool are so weak that so (A.11) does not hold even at $\lambda = 0$ and so the incumbent always separates. If $s \in [A, \frac{A}{\pi}]$, the bad incumbent must randomize with a probability λ than makes him just indifferent between the two options i.e. λ must solve (A.11) holding at equality. This gives

$$\lambda = \frac{\pi}{1-\pi}\left(\frac{s}{\frac{A}{\pi}} - 1\right) \tag{A.12}$$

as required. □

Proof of Proposition 2. First assume $\sigma\Delta u(\theta) \leq A$, so that $\lambda = 0$. Then, (12) gives $p = 0.5$. Now assume $A \leq \sigma\Delta u(\theta) \leq \frac{A}{\pi}$ so that $\lambda \in [0, 1]$. Then, using (8) to substiute out λ in (12), after simplification, we obtain

$$p = \frac{1}{2} - \gamma\pi\Delta u(\theta)\left(\frac{\sigma\Delta u(\theta)}{A} - 1\right) \tag{A.13}$$

By inspection of (A.13), p is strictly decreasing in σ, θ. Finally, assume $\sigma\Delta u(\theta)\pi \geq A$ so that $\lambda = 1$. Then, (12) becomes

$$p = \frac{1}{2} - \gamma(1-\pi)\Delta u(\theta) \tag{A.14}$$

By inspection of (A.14), p is decreasing in θ. □

Proof of Proposition 4. From (16) and Proposition 1 if $s \leq A$, then $\lambda = 0$. Consequently, by inspection of (16), (15), e_2 is increasing in σ, θ, both directly and via the fact that an increase in s

reduces p. If $s \geq \frac{A}{\pi}$, $\lambda = 1$, from (16), e_2 is independent of σ but increasing in θ, as in this case, p is still decreasing in θ from Proposition 1. Finally, if $A < s < \frac{A}{\pi}$, then, using (A.12), after some simplification, we can show that

$$\frac{(1-\pi)(1-\lambda)}{\pi + (1-\pi)\lambda} s = \frac{A}{\pi} - s \tag{A.15}$$

Then, combining (A.15) and (16), we obtain

$$\Pr(i = g \,|\text{win}) = \pi \left(1 + \frac{\gamma}{p}\left(A - \pi\sigma\Delta u(\theta)\right)\right) \tag{A.16}$$

Differentiating (A.16) with respect to σ, and remembering that p depends on σ, it can be shown that if the elasticity of p with respect to s is high enough i.e.

$$-\frac{\sigma}{p}\frac{\partial p}{\partial \sigma} > \frac{s}{\frac{A}{\pi} - s} \tag{A.17}$$

then e_2 is increasing in σ. An exactly similar condition holds for θ. □

Online Appendix

Table N.1: **Resident population: place of birth and place of usual residence**

	Share of residents born residence province	Share of residents born different province of residence region	Share of residents born other regions		Share of residents born residence province	Share of residents born different province of residence region	Share of residents born other regions
Provinces							
Agrigento	0.854	0.118	0.028	Messina	0.899	0.052	0.049
Alessandria	0.643	0.053	0.304	Milano	0.596	0.114	0.289
Ancona	0.796	0.070	0.133	Modena	0.704	0.087	0.209
Arezzo	0.750	0.085	0.165	Monza e della Brianza	0.518	0.257	0.225
Ascoli Piceno	0.807	0.060	0.133	Napoli	0.923	0.051	0.026
Asti	0.570	0.224	0.206	Novara	0.565	0.080	0.355
Avellino	0.809	0.147	0.044	Nuoro	0.836	0.119	0.045
Bari	0.915	0.042	0.043	Ogliastra	0.828	0.118	0.055
Barletta-Andria-Trani	0.853	0.111	0.036	Olbia-Tempio	0.621	0.268	0.111
Belluno	0.817	0.068	0.114	Oristano	0.780	0.160	0.060
Benevento	0.827	0.127	0.046	Padova	0.784	0.129	0.087
Bergamo	0.813	0.096	0.091	Palermo	0.924	0.045	0.030
Biella	0.603	0.166	0.231	Parma	0.724	0.068	0.208
Bologna	0.671	0.105	0.224	Pavia	0.607	0.148	0.245
Bolzano	0.891	0.023	0.086	Perugia	0.832	0.014	0.154
Brescia	0.839	0.067	0.094	Pesaro e Urbino	0.764	0.048	0.188
Brindisi	0.867	0.094	0.039	Pescara	0.677	0.188	0.135
Cagliari	0.827	0.115	0.058	Piacenza	0.737	0.037	0.226
Caltanissetta	0.838	0.135	0.027	Pisa	0.663	0.146	0.191
Campobasso	0.822	0.022	0.156	Pistoia	0.609	0.203	0.188
Carbonia-Iglesias	0.831	0.113	0.056	Pordenone	0.699	0.060	0.240
Caserta	0.761	0.173	0.066	Potenza	0.863	0.025	0.112
Catania	0.896	0.073	0.031	Prato	0.524	0.247	0.229
Catanzaro	0.894	0.049	0.057	Ragusa	0.897	0.072	0.031
Chieti	0.803	0.071	0.126	Ravenna	0.677	0.162	0.161
Como	0.601	0.205	0.193	Reggio Calabria	0.919	0.024	0.057
Cosenza	0.906	0.026	0.069	Reggio Emilia	0.674	0.111	0.215
Cremona	0.696	0.188	0.115	Rieti	0.655	0.197	0.148
Crotone	0.808	0.135	0.057	Rimini	0.656	0.104	0.241
Cuneo	0.780	0.104	0.117	Roma	0.729	0.042	0.230
Enna	0.809	0.165	0.026	Rovigo	0.778	0.097	0.126
Fermo	0.696	0.212	0.092	Salerno	0.859	0.093	0.049
Ferrara	0.770	0.073	0.156	Sassari	0.867	0.078	0.055
Firenze	0.715	0.106	0.179	Savona	0.602	0.086	0.312
Foggia	0.920	0.020	0.060	Siena	0.714	0.086	0.201
Forlì-Cesena	0.765	0.086	0.149	Siracusa	0.803	0.154	0.043
Frosinone	0.839	0.080	0.081	Sondrio	0.862	0.078	0.059
Genova	0.735	0.023	0.243	Taranto	0.845	0.093	0.062
Gorizia	0.661	0.172	0.167	Teramo	0.788	0.050	0.162
Grosseto	0.690	0.105	0.205	Terni	0.754	0.072	0.173
Imperia	0.615	0.048	0.337	Torino	0.658	0.053	0.290
Isernia	0.770	0.035	0.195	Trapani	0.902	0.063	0.035
L'Aquila	0.814	0.042	0.144	Trento	0.833	0.024	0.143
La Spezia	0.671	0.044	0.285	Treviso	0.777	0.122	0.101
Latina	0.666	0.156	0.178	Trieste	0.793	0.052	0.155
Lecce	0.912	0.040	0.048	Udine	0.794	0.066	0.140
Lecco	0.631	0.243	0.126	Valle d'Aosta	0.683		0.317
Livorno	0.664	0.156	0.180	Varese	0.622	0.122	0.256
Lodi	0.586	0.246	0.167	Venezia	0.766	0.124	0.110
Lucca	0.776	0.102	0.122	Verbano-Cusio-Ossola	0.702	0.067	0.231
Macerata	0.783	0.116	0.101	Vercelli	0.571	0.189	0.240
Mantova	0.710	0.083	0.207	Verona	0.829	0.041	0.130
Massa-Carrara	0.717	0.091	0.192	Vibo Valentia	0.850	0.098	0.051
Matera	0.815	0.036	0.149	Vicenza	0.837	0.085	0.078
Medio Campidano	0.744	0.216	0.040	Viterbo	0.648	0.176	0.175
Municipalities (largest cities only							
Bari	0.897	0.050	0.053	Parma	0.707	0.064	0.229
Bologna	0.639	0.091	0.271	Perugia	0.813	0.014	0.174
Brescia	0.796	0.052	0.152	Prato	0.532	0.230	0.238
Catania	0.889	0.081	0.030	Ravenna	0.627	0.167	0.206
Firenze	0.695	0.098	0.207	Reggio Calabria	0.916	0.018	0.066
Genova	0.725	0.021	0.255	Reggio Emilia	0.705	0.059	0.236
Livorno	0.710	0.131	0.159	Roma	0.712	0.040	0.249
Messina	0.911	0.032	0.057	Taranto	0.864	0.058	0.078
Milano	0.587	0.092	0.321	Torino	0.596	0.063	0.341
Modena	0.702	0.069	0.228	Trieste	0.786	0.050	0.164
Napoli	0.940	0.029	0.031	Venezia	0.816	0.073	0.111
Padova	0.714	0.122	0.164	Verona	0.784	0.044	0.172
Palermo	0.915	0.054	0.031				

Table N.2: **Matrix of bilateral regional migration stocks**

Region of Residence:	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]
Region of Birth:																				
Piemonte [1]	0.737	0.105	0.048	0.011	0.004	0.005	0.006	0.007	0.006	0.004	0.004	0.004	0.004	0.005	0.002	0.004	0.004	0.006	0.004	0.008
Valle d'Aosta [2]	0.001	0.683	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Liguria [3]	0.013	0.011	0.726	0.004	0.002	0.002	0.003	0.004	0.009	0.002	0.002	0.003	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.004
Lombardia [4]	0.031	0.027	0.031	0.797	0.018	0.017	0.014	0.028	0.012	0.008	0.012	0.008	0.008	0.006	0.004	0.006	0.005	0.008	0.006	0.009
Trentino Alto Adige [5]	0.001	0.002	0.002	0.002	0.885	0.006	0.003	0.002	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001
Veneto [6]	0.031	0.022	0.009	0.024	0.033	0.897	0.058	0.015	0.006	0.003	0.004	0.006	0.003	0.002	0.001	0.002	0.001	0.001	0.002	0.003
Friuli-Venezia Giulia [7]	0.003	0.003	0.003	0.003	0.003	0.013	0.829	0.002	0.002	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.000	0.000	0.001	0.001
Emilia-Romagna [8]	0.008	0.008	0.017	0.014	0.006	0.008	0.005	0.798	0.011	0.005	0.016	0.008	0.006	0.003	0.002	0.002	0.002	0.002	0.002	0.003
Toscana [9]	0.004	0.007	0.026	0.005	0.002	0.003	0.003	0.008	0.819	0.019	0.004	0.009	0.003	0.002	0.001	0.001	0.002	0.002	0.002	0.003
Umbria [10]	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.002	0.008	0.841	0.006	0.012	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.001
Marche [11]	0.002	0.002	0.003	0.003	0.001	0.001	0.002	0.010	0.004	0.012	0.865	0.012	0.021	0.002	0.000	0.001	0.001	0.000	0.000	0.001
Lazio [12]	0.005	0.007	0.007	0.006	0.005	0.005	0.009	0.007	0.014	0.042	0.014	0.795	0.027	0.020	0.008	0.003	0.005	0.005	0.003	0.008
Abruzzo [13]	0.003	0.004	0.005	0.003	0.001	0.002	0.002	0.005	0.004	0.005	0.011	0.018	0.860	0.032	0.001	0.002	0.001	0.001	0.000	0.001
Molise [14]	0.001	0.001	0.001	0.001	0.000	0.000	0.001	0.002	0.001	0.001	0.002	0.005	0.011	0.833	0.002	0.002	0.001	0.000	0.000	0.000
Campania [15]	0.027	0.013	0.022	0.026	0.010	0.011	0.022	0.038	0.039	0.025	0.020	0.048	0.018	0.053	0.961	0.009	0.034	0.011	0.004	0.006
Puglia [16]	0.035	0.010	0.014	0.030	0.008	0.010	0.015	0.025	0.013	0.009	0.020	0.018	0.019	0.031	0.004	0.952	0.052	0.005	0.003	0.003
Basilicata [17]	0.010	0.002	0.004	0.006	0.001	0.001	0.002	0.005	0.006	0.002	0.002	0.004	0.002	0.002	0.004	0.006	0.875	0.006	0.000	0.000
Calabria [18]	0.032	0.061	0.032	0.022	0.007	0.005	0.006	0.014	0.012	0.008	0.004	0.019	0.004	0.003	0.003	0.003	0.011	0.939	0.005	0.002
Sicilia [19]	0.042	0.017	0.033	0.032	0.009	0.011	0.017	0.022	0.025	0.009	0.008	0.018	0.006	0.004	0.003	0.004	0.003	0.011	0.966	0.006
Sardegna [20]	0.011	0.012	0.013	0.007	0.003	0.003	0.004	0.005	0.007	0.004	0.003	0.008	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.940

Table N.3: MUNICIPAL PERFORMANCE EQUATION: RESTRICTED SAMPLES

Dep. Var.: Municipal Performance	(1)	(2)	(3)	(4)	(5)	(6)
SC	0.2215***	0.8353***	0.8064***	0.2028***	0.8411***	0.8111***
	[0.025]	[0.069]	[0.067]	[0.027]	[0.075]	[0.072]
SC X Term Limit	-0.0953***	-0.3476**	-0.3206**	-0.0592	-0.3512**	-0.3205**
	[0.034]	[0.146]	[0.139]	[0.039]	[0.159]	[0.152]
Term Limit	0.0207	0.0811*	0.0832*	0.0348	0.0798*	0.0823*
	[0.063]	[0.045]	[0.044]	[0.066]	[0.045]	[0.045]
Income	-0.0740***	-0.1176***	-0.1158***	-0.0652***	-0.1193***	-0.1173***
	[0.011]	[0.007]	[0.007]	[0.012]	[0.008]	[0.008]
Grants	-0.0007***	-0.0006***	-0.0006***	-0.0008**	-0.0006***	-0.0006***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Majority Coalition Left	0.1546**	0.0129	0.0165	0.1677*	0.0326	0.0359
	[0.077]	[0.037]	[0.036]	[0.087]	[0.040]	[0.040]
Majority Coalition Right	0.0316	0.1254***	0.1233***	0.0343	0.1438***	0.1415***
	[0.061]	[0.030]	[0.030]	[0.069]	[0.033]	[0.033]
Small	0.0103	0.1211***	0.1332***	0.0199	0.1235***	0.1247***
	[0.047]	[0.029]	[0.029]	[0.051]	[0.031]	[0.031]
First past the post	-0.2331***	-0.1022***	-0.1045***	-0.1607*	-0.0702*	-0.0723*
	[0.078]	[0.036]	[0.036]	[0.086]	[0.039]	[0.039]
Incumbent Female	0.1219***	0.0989***	0.0994***	0.1091**	0.0955***	0.0961***
	[0.046]	[0.027]	[0.027]	[0.048]	[0.029]	[0.028]
Incumbent Age	0.0133	0.0107	0.0109	0.0123	0.0114	0.0117
	[0.014]	[0.008]	[0.008]	[0.014]	[0.009]	[0.008]
Incumbent Degree	0.0562	0.0210	0.0222	0.0586	0.0186	0.0174
	[0.060]	[0.035]	[0.035]	[0.065]	[0.038]	[0.038]
In. High Exper. and Skills	0.0094	0.0006	0.0003	-0.0104	-0.0044	-0.0046
	[0.046]	[0.026]	[0.026]	[0.049]	[0.028]	[0.028]
X Controls	YES	YES	YES	YES	YES	YES
Z x Term Limit	YES	YES	YES	YES	YES	YES
Method	OLS	IV	IV	OLS	IV	IV
Instruments		Adj.	Pop. Adj.		Adj.	Pop. Adj.
First Stage F-statistics		1253.50	1131.21		985.11	1000.30
p-values		[0.00]	[0.00]		[0.00]	[0.00]
First Stage F-statistics		671.73	349.43		297.44	304.88
p-values		[0.00]	[0.00]		[0.00]	[0.00]
Durbin-Wu-Hausman test		117.16	109.60		112.922	105.364
p values		[0.00]	[0.00]		[0.00]	[0.00]
Observations	43,860	37,826	37,826	31,809	32,672	32,672
R-squared	0.216	0.189	0.193	0.196	0.178	0.182
Sample	Excl. MI, TO, RO	Excl. MI, TO, RO	Excl. MI, TO, RO	Post 2011	Post 2011	Post 2011

Notes: standard errors clustered at municipal level in brackets, * = $p < 0.1$, **= $p < 0.05$, *** = $p < 0.01$. Dependent variable is the Opencivitas Performance Indicators. Regional dummies, year dummies and municipal controls (Z) are included in all regressions. Z includes *per capita municipal* income, *per capita municipal* grants from upper levels of governments, population, share of population above 65 years old and below 15 years old. Social capital is the (standardized) standard social capital index, in columns (2)and (5) social capital is instrumented with the population adjusted SC index in columns (3)and (6) with the adjusted social capital index. X controls include: plurality rule elections for municipalities with less than 15,000 inhabitants, no term limit dummy for municipalities with less than 3,000 inhabitants, majority coalition Right (Left) coalition dummies, mayor's age and aged squared, gender, education (university or high school degree), occupation prior to mandate (high skill/low skill and experience relevant/non relevant to mandate).