Persistent electoral success with endogenous rents: Can politicians extract rents and still stay in power?

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Abstract

In the class of standard political agency models, most of them fail to account for the fact that incumbent politicians tend to stay in power for long periods of time, without having to trade-off rents for holding office. This paper examines under which conditions this frequent scenario occurs by altering certain typical assumptions of political agency models. It observes local party politics and presents rents endogenously where their existence is conditional on wasteful spending. The paper attempts to test the theory using United States gubernatorial and state legislature elections from 1992 to 2008. It finds that for positive economic shocks a patient incumbent anticipating more future rents may stay in power for a long period of time and keep extracting rents with respect to the given constraints. For negative shocks the rent-extracting decision will depend on the magnitude of the shock. The paper finds the cut-off level of wasteful spending the politicians need to respect in order to maintain power.

1 Introduction

Politicians in power have strong incentives to misuse that power for their own personal gain. However, political accountability in front of voters (principals) prevents the politicians (agents) from fully expropriating the public budget, even though due to lack of transparency and an informational advantage politicians often do get away with allocating a fraction of public funds to their private benefit. These activities, whether done at a local level or a grand scale national level, are widely known as corruption[1], or in the terminology of political agency models – rent-extraction.

The understanding of rent-extraction can be altered from the classical Tullock (1967)[45] and Krueger (1974)[31] definition to include excess payments (bribes) extracted through public

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[1]Rose-Ackerman (1978)[39] defines it as use of public office for private gains, while Shleifer and Vishny (1993)[40] define it as sale of government property for personal gain through which officials collect bribes.

good expenditures on various pork-barrel and white elephant projects obtained by an incumbent politician. For example, while building a road or a bridge a politician can conceal his rent-extraction by presenting one price to the public while charging a different (lower) price to the contractor, thus taking the difference for himself. Ferraz and Finan (2011)[24] recognize such corruptive activities as frauds in public procurement, diversion of public funds (expenditures without proof of purchase) and over-invoicing (buying goods above market price), which tend to be more easily and frequently done on a local rather than a national level.

Numerous research efforts have been made to uncover the effects of corruptive activities on economic and political performance, but not many have focused on why corrupt politicians tend to win elections for continuous mandates. Helland and Sorensen (2012)[28] made a good attempt to providing an answer by finding that in homogenous electorates such as those of Argentina, Croatia, Greece, or Italy corrupt rulers don't seem to be punished in general elections despite their well-known rent-extraction. Institutionally stronger countries like the United States aren't immune to this kind of behavior either; Goel and Nelson (1998)[27], Glaeser and Saks (2006)[26], Alt and Lassen (2008)[3], Bueno de Mesquita and Smith (2011)[19] and many others cite a multitude of evidence on local US corruption.

The focus of this paper is to uncover how is it possible that despite their persistent corruptive activities, incumbent politicians, particularly at a local level of governance, manage to stay in power for long periods of time. By altering certain typical assumptions of standard political agency models the paper finds that persistent electoral success is possible where incumbent politicians can simultaneously extract a fraction of the public budget. Politicians in a democratic system will never risk openly extracting the entire budget nor will they openly engage in corruption, but will always attempt to hide their rent-extraction within specific types of public spending, making rents endogenous. According to Mauro (1998)[33] different types of government expenditures provide different opportunities for corruption, where large public infrastructure projects or high-technology goods provided by specialized oligopolies (defense spending) are more suspect to collecting bribes and rents than individualized social transfers or, for example, education spending.

An unavoidable consequence of hidden rents is higher public good spending and higher taxation, thus increasing the overall size of government. The vast empirical evidence on the increasing size of governments in the past fifty years (see Maddison, 2001[32], or Tanzi and Schuknecht, 2000[43]) verifies this intuition, although the paper disregards the possible effects of intrinsic voter preferences towards more redistribution, or other factors recognized by Higgs (1987)[29], and focuses solely on rent-extraction and the moral hazard problem as a partial explanation for growth in government size. By tying rents with re-election probabilities the paper attempts to show that rents in the form of political income from holding office will ultimately lead to higher than voter optimal overall taxation and public spending. This harmful relationship between higher spending and corruption was implied by Buchanan (1975)[17] and Acemoglu and Verdier

(2000)[1], and empirically tested in Goel and Nelson (1998)[27] and Dzhumashev (2014)[22].

The paper makes three assumptions that alter the political environment of standard political agency models. The first is single candidate type in order to focus only on the moral hazard problem, the second is modeling party politics in local elections to eliminate the term limit effect and introduce reputation and patient agents, and third are endogenous rents, determined within the public good expenditure function, presenting a proportion of budgetary funds allocated towards wasteful spending. The paper overlooks the aspects of political competition between the in-office and the opposition party in order to focus only on the dynamics of electoral control.

The main prediction is that during times of negative economic shocks an incumbent party will increase the amount of wasteful spending in order to capture more rents now, knowing it is facing less rents in future periods. Depending on the magnitude of the shock its strategy will resemble that of the classical term limit constraint. During times of positive shocks it will reduce current rent-extraction as it anticipates better future rent-extracting opportunities. A positive shock rewards a patient incumbent with re-election. Since political parties are by assumption always more patient than individual politicians, thus extending their actions beyond the two-period term limit, it is possible for them to seize the opportunity of persistent positive shocks to achieve continuous electoral success. Empirically the paper finds that politicians will increase spending in times of economic downturns, however only spending on potentially wasteful public goods will sway their re-election chances. The paper also finds the level of the threshold above which further rent-extraction isn't feasible.

After defining the political agency theoretical context and the model's main assumptions, the paper specifies voter and political strategies and decision rules, upon which the equilibrium levels of public good spending, rent-extraction, and the state of the economy are determined. It tests the underlying theory in the empirical section and closes with a discussion of potential future research ideas in uncovering the trade-off between rent-extraction and re-election.

2 Political agency models: Theoretical context and altered assumptions

Political agency models, surveyed in Besley (2006)[9], describe a general setting in which a rational agent's maximization problem is to capture political rents. The voters are unable to observe the budgetary allocation process directly, creating the problem of electoral accountability of politicians (the monitoring problem). Uncertainty and asymmetric information give further incentives to politicians to misrepresent themselves and pursue their own interests. Due to such behavior of agents there exists a trade-off between voter utility (policies appealing to voters) and rent-extraction (policies appealing to politicians in power) (Brennan and Buchanan, 1980[15]; Besley, 2006[9]; Persson and Tabellini, 2000[37]). The central issue is whether or not electoral

competition and the discipline effect of the voters will induce the politicians to announce voter optimal policies or rent-maximizing policies.

The models are often characterized by a two period setting in which a politician's term ends in the second period (the standard term limit assumption in Besley and Case, 1995a[10], 1995b[11]; Alt, Bueno de Mesquita and Rose, 2011[2]; Ferraz and Finan, 2011[24]). In order to stay in office and reach the second period an incumbent politician should limit his rent-extraction in $t = 1$ since retrospective voters will reward congruent behavior. The re-election incentive should improve the discipline of politicians. However, in the second and final period ($t = 2$), a moral hazard problem arises since bad politicians are free to divert the entire budget towards their private means. In classical moral hazard models (Barro, 1973[7]; Ferejohn, 1986[23]) the homogenous voter observes the politician's action but with a noise. The politician observes this noise before making his action (or level of effort), which depends on the re-election rule chosen by the voters to limit the incumbent's incentives for rent-extraction. Similarly Persson, Roland and Tabelini (1997)[36] emphasize the source of power of the politician as his ability to choose a preferred policy, while the voters need to adjust their voting rule so as to leave the politician enough rents. In many of these assumptions if the level of the noise (shock) isn't big enough, neither will the politician's effort and he will defect towards diverting the entire budget towards rents. The focus of such models is on the discipline effect.

In expanding the moral hazard problem newer models introduced adverse selection (Austen-Smith and Banks, 1989[4]; Banks and Sundaram, 1993[6]; Besley and Case, 1995a[10]; Rogoff, 1990[38]; Persson and Tabellini, 2000[37]; Besley and Smart, 2007[13]) concerning how good politicians should distinguish themselves from bad ones, where the first period behavior of bad politicians implies 'mimicking' the behavior of good politicians and sacrificing first period rents in order to remain in office and expropriate the entire budget for rents in $t = 2$. The probability of a politician doing so depends on his time preference for money (discount factor). The selection effect is added to the discipline effect where candidate types determine the competency of politicians in providing public goods, or whether or not they are likely to extract more rents. The candidate's choice of policy will determine his type and send a signal to voters on re-election.

A deficiency of standard political agency models is their inability to explain political agents holding office beyond the two period setting. Even thought the term limit assumption is certainly realistic, in many cases actors on the political market in a democracy aren't constrained by this rule and actually do find themselves governing their town or municipality for longstanding mandates. In order to control for this type of behavior, which in itself often implies a fraction of the public budget being extorted for private benefit, we need to allow for altered assumptions of standard political agency models.

The first one is of a single candidate type, implying that politicians are non-benevolent rent-seekers driven by self-preservation. This means that voters don't face adverse selection but only the moral hazard, discipline problem. Politicians seek to maximize their private benefit from

holding office by implementing their preferred policies. While providing the general public goods for the satisfaction of voter preferences and thus generating favorable public outcomes, they have a strong incentive to divert some of the budgetary allocation towards wasteful spending from which they aim to extract rents. This finding goes back to Buchanan and Tullock's (1962)[16] and Brennan and Buchanan's (1980)[15] definition of politicians as self-interested utility maximizers or the more recent Bueno de Mesquita et al (2005)[18] who assume that

> "*...all political leaders, regardless of their institutional setting, have a common utility function that emphasizes first holding onto (or gaining) office and second maximizing their personal income while in office*"(Bueno de Mesquita et al, 2005[18, pg.21]).

Political selection models (Besley, 2004[8]; Caselli and Morelli, 2004[20]) imply a similar finding where the selection of politicians is adverse and always produces bad politicians. The assumption is that opportunity costs of working in the market sector are too high for high-ability individuals so there will always be a negative selection of candidates into politics. Even if high-ability citizens were allowed to enter office in order capitalize on their pre-political experience, such as predicted by Mattozzi and Merlo (2008)[34], there are still incentives for these individuals to enter the political market in order to obtain private benefits, meaning they will still engage into a trade-off with the voters over the optimal policies.

The second assumption is to go beyond the term-limited two period setting by modeling political parties rather than individual politicians. This assumption goes in line with the work of Snyder and Ting (2002)[42] where political parties are shown to be better in aggregating within-party preferences over optimal policies and appealing to voters in a multidimensional policy space. The multidimensional setting is more realistic since all budgetary decisions are made on a local level where state and local authorities assign public projects and distribute federal spending. The governor or mayor aren't the only ones making the allocation decisions; they are made within-party lines since the benefits from being in power are shared with other members of the executive branch and party legislators. Parties care of their reputation and future re-election probabilities and have mechanisms to discipline 'lame duck' individual office-holders who have an incentive to ignore the party's long run credibility. More importantly, a political party isn't constrained by any constitutional boundary of how long it can stay in office. It can hold office persistently while only changing its politicians.

This enables modeling an infinitely repeated game as done by Ferejohn (1986)[23], Banks and Sundaram (1993)[6] or Smart and Sturm (2013)[41]. An infinitely repeated game implies introduction of reputation and constant interaction between politicians and voters, and it also implies a more patient incumbent in office who carries a long term decision-making horizon (as a party usually does). Reputation matters not only for parties but also for individual politicians, particularly if they have ambitions of running for higher office. For example, Ferraz and Finan

(2011)[24] find that politicians who run for higher office tend to steal less than those which are term limited and don't face the same ambitions.

The final assumption is determining rents within the public good expenditure function. As opposed to the *Leviathan* scenario in Brennan and Buchanan (1980)[15] where all budget revenues can end up as rents, incumbents need to take into consideration other constitutional budgetary obligations, namely social transfers and public sector wages. An additional constraint in a well-functioning democracy is budget transparency which significantly diminishes the scope for misuse of public funds. Endogenous rents imply that they cannot be extracted directly from tax revenues and cannot be independent of the public good expenditure function; instead they must be hidden within budgetary expenditures that provide the easiest rent-extracting opportunities — such as public investments on infrastructure projects or defense spending as assumed by Mauro, 1998[33].

3 Model

The model is defined as a repeated game with an infinite horizon between the voters and incumbent political parties. In each period an incumbent party has to make budgetary decisions on the allocation of social transfers (f), public sector wages (w) and public good expenditures (g), after which it receives a payoff defined as rents $r \in [0, \widehat{r}]$. By removing rents directly from the budget constraint and inserting them within the public good expenditure function, and by accounting for other budgetary expenditures, the paper broadens the classical budget constraint often given in political agency models such as in Besley and Smart (2007)[13], Persson and Tabellini (2000)[37] or Brennan and Buchanan (1980)[15]. The problem with the oversimplified assumptions of such models are quasi-linear preferences which make the public good function independent of rents, implying that the preferred level of public goods is only an increasing function of its cost shock.

An incumbent party faces the following budget constraint in each period:

$$(1 + \beta_{t-1})\, \tau \overline{y} = g\,(\theta', r) + T + V \tag{1}$$

Where $T = \sum_{i=1}^{n} f^i$ are aggregate transfers to the public (social and unemployment benefits, pensions etc.) while $V = \sum_{i=1}^{n} w^i$ are aggregate public sector wage expenditures of the government. The term on the left is total revenue (tax rate τ, times aggregate income $\overline{y}$) multiplied by the effect of a previous period economic shock β_{t-1}. Taxation is proportional to the level of income and there is a balanced budget every time (no budget deficits or public debts).

Economic shock β is specified as a random stochastic shock, uniformly distributed on $\left[-\frac{1}{2\phi}, \frac{1}{2\phi}\right]$, where a positive shock (with probability p) implies higher future government revenues, while a negative shock implies the opposite. It presents the crucial signal an incumbent party receives upon which it bases its budgetary allocation decisions as well as its rent-extraction[2]. Many

[2]Positive shocks encourage politicians to stay in office in the next period and acquire higher expected rents.

political agency papers use a similar random noise variable that depicts either a productivity parameter transferring resources into public goods (Persson et al, 1997[36]), a public good cost shock (Persson and Tabellini, 2000[37], and Besley and Smart, 2007[13]) or any exogenous occurrence that will determine the effort of a politician (Ferejohn, 1986[23]). Politicians observe β with certainty each period before they make their decision, while voters observe β with a probability $q \in [0, 1]$.

The first term on the right of equation (1) ($g = \sum_{i=1}^{n} g_i$) are total public good expenditures which depend on the realization of rents (r) and actual costs of all public goods (θ'). A single public good g_i expenditure function is defined as:

$$g_i\left(\theta_i', r_i\right) = \theta_i G_i = \left(\theta_i' + r_i\right) G_i \tag{2}$$

$$\text{where } r_i = \theta_i - \theta_i' = \lambda g_i \tag{3}$$

Expenditure for a single public good equals its total unit costs (θ_i) as presented to the public (through official sources and the media) times the total quantity of the good ($G_i = 1$). The term θ_i' represents the actual cost of a public good which is known only to the politician and is never observed by the public. By concealing the true costs of a good from the public, politicians can create rents (r_i) as a bribe collected from the difference between total and actual costs of a good. The way a rent per single public good (bribe) is defined in (3) implies that an incumbent party assigns a fixed weight (λ) from every public good it produces to rent-extraction[3]. The factor $\lambda \in [0, 1]$ can be interpreted as political preferences towards budget misappropriation (corruption) and wasteful spending[4]. It is an exogenous, cultural shock, drawn by nature specifically for each politician. The political and institutional environment in which the incumbent operates along with its intrinsic preferences towards rents will determine the total amount of wasteful spending (similar to Bueno de Mesquita et al, 2005[18]).

It can be inferred from (3) that rents depend on how much a single public good actually costs; $r_i = \frac{\lambda}{1-\lambda}\theta_i'$, for $0 \leq \lambda < 1/2$. Since λ is always fixed for a single agent, implying that the relative difference between individual total and actual costs ($\theta_i - \theta_i'$) will always be the same for every public good provided, higher rents can only be achieved by diverting more budget funds towards public good expenditures (g).

[3]Imagine a political party demanding a commission for any procurement it allows. This commission (a percentage of costs of a good that goes directly into the politicians' pockets) stays the same in relative terms for any project, but increases in absolute terms as more government revenue is allocated to public good expenditures each period. So $\lambda = 0, 2$ then 20% of spending on a single public good is allocated towards rents.

[4]In stable democracies λ is likely to be low, as political preferences towards corruption and budget misappropriation are relatively smaller, but not nonexistent.

3.1 Aggregate rents

Not all public good expenditures are subject to rent-extraction. Rents (bribes) can only be collected from white elephant projects and various pork-barrel spending the incumbent party creates. This implies that rents and public goods are characterized by a quasi-linear preference relation where rent-extraction begins after a certain point, once the initially desired level of public goods and services are provided. Accordingly, equation (2) can be rewritten into an aggregate public good expenditure function:

$$g = \sum_{i=1}^{n} g_i = (1-\lambda) \sum_{j=1}^{m} G_j + \lambda \; H\left(\theta', r\right) \tag{4}$$

for all $i \in N$, and for all $j \in M$, where $i \neq j$,

$$\text{with } \frac{\partial g}{\partial \theta'} < 0, \quad \frac{\partial g}{\partial r} > 0, \quad \frac{\partial g}{\partial \lambda} > 0$$

Where G_j is some initially desired and provided number of public goods (for which the total amount of public good expenditures is $\underline{g}$), while $H(\cdot)$ is a quasi-convex function depicting the total amount of wasteful spending upon which rents are created. Public good expenditures are an increasing function of total rent-extraction and the propensity to extract rents (which differs from one party to another), and a decreasing function of actual costs. It is easy to see from (4) that higher spending allocated towards public good expenditures (as a budget item) is the only way to increase rent-extraction via more wasteful spending, with λ kept fixed. The size of wasteful spending within the public good expenditure function depends on the given value of λ[5].

Aggregate rents are drawn from a cumulative distribution function $F\left(r|g\right)$. They are defined between the minimum required amount of public good spending (denoted as $\underline{g}$) which imply zero wasteful spending and hence zero rents ($\underline{r} = 0$) and the maximum possible amount of public good spending, where the entire budget is diverted towards public goods ($\widehat{g} = \tau \overline{y}$) and a certain fixed number of white elephant projects, for which rents are maximized at $r = \widehat{r}$:

$$E\left(r\right) = \int_{\underline{g}}^{\widehat{g}} r dF\left(r|g, \lambda\right) \tag{5}$$

3.2 Re-election threshold and the state of the economy

In each period an incumbent party chooses an initial policy through which it collects a certain amount of taxes and subsequently allocates a certain amount of budgetary funds towards public goods, wages and transfers. Even though it seeks to maximize its rents by setting higher taxes and diverting more spending to pork-barrel and white elephant projects, it also has a desire to

[5]Similar to the single public good expenditures function (2), a value of for example $\lambda = 0,2$ would imply 20% of public good spending going towards white elephant projects and 80% towards voter preferred public goods.

remain in office and thus needs to keep its constitutional commitment to public sector wages and social transfers.

Voters expect the incumbent party to determine some intrinsically optimal level of spending and taxes, $\psi^v(g^v, \tau^v)$, which is different from the optimal level desired by politicians[6]. The voters adapt their optimal desired levels with respect to the observed β shock. An incumbent party will always have an incentive to determine a combination of taxes and spending higher than the voter optimum, partially in order to satisfy various special interest groups necessary for its re-election[7] and partially to maximize its rents:

$$\widehat{\psi}(\widehat{g}, \widehat{\tau}|\beta) > \psi^v(g^v, \tau^v|\beta) \tag{6}$$

Voter dissatisfaction with higher spending and taxes is purely due to wasteful spending, corresponding partially to Peltzman's (1992)[35] voters as fiscal conservatives, where despite the voters' negative reaction to higher spending, politicians can still get away with higher budgets every period.

Due to the existence of uncertainty and the consequential problem of political accountability, voters cannot prevent the incumbents from determining higher than optimal taxes and spending, but can punish them ex-post. Voters will punish any behavior of incumbents that sets the level of taxes and spending above some control level $\overline{\psi}(\overline{g}, \overline{\tau})$, which is higher (and thus worse off) than the voter optimum, but still lower than the maximum level desired by the incumbent party:

$$\widehat{\psi}(\widehat{g}, \widehat{\tau}) > \overline{\psi}(\overline{g}, \overline{\tau}) > \psi^v(g^v, \tau^v) \tag{7}$$

The control level of $\overline{\psi}$ represents the voter re-election threshold above which the incumbent party will be voted out of office. According to Ferejohn (1986)[23] or Persson et al (1997)[36] this threshold is a level of the politician's effort determined by voters, which shouldn't be set too high to encourage rent-extraction, nor too low to encourage shirking. Instead of observing size of effort, this paper models the re-election rule as a set of voter determined boundaries of public policy. The role of voting is to achieve a higher level of discipline and hence lower rent-extraction.

According to the assumptions of the re-election threshold the probability of winning for the incumbent can be determined as:

$$p_I = \begin{cases} 1, & \text{if } \psi^v \leq \psi \leq \overline{\psi}, \\ 0, & \text{if } \psi > \overline{\psi}. \end{cases} \tag{8}$$

[6]Persson et al (1997)[36], among others, recognize the conflicting interests over the composition of government spending between voters and politicians. Their choice variable encapsulates this assumption.

[7]The paper doesn't model transfers to special interests, but works on the findings of other political agency papers such as for example Coate and Morris, 1995[21] where because of special interest groups, the level of spending by politicians will always be higher than the optimum desired by the voters.

Office oriented parties will avoid losing the election, and will aim to respect the voter re-election threshold for a sufficiently favorable shock β, even though this will generate for them a lower than maximum amount of rents. The intuition is that in order to get re-elected politicians need to sacrifice some of their own utility from higher rents by committing to a credible (constitutionally bound) promise of ensuring wages for public sector workers as well as transfers to various social groups. Any level of spending and taxes that will break up the delicate balance of budgetary expenditures will result in losing voter support from those affected. For example if public sector wages would cease to grow at their predetermined level, this would result in discontent from public sector workers, creating a distorted picture of the government to the median undecided voters leading to a lack of political support for the incumbent. This distorted signal of the government's in-office performance defines the *state of the economy* (σ). The state of the economy doesn't necessary imply economic performance, but rather signals sent in-between voters on the perception of economic performance. The voters decide on the re-election of the politician based on the realization of the state of the economy shock, where $\sigma = f(\psi)$.

4 Voter and political utilities

4.1 Voter utility

Voters make decisions based on signals of political behavior and actions of politicians. They evaluate whether a party deserves to remain in office depending on how it sets taxes and distributes public spending and how this can shape the state of the economy and its in-office performance. They are unable to prevent rent-extraction but can punish the incumbent ex-post, implying that the re-election threshold is ex-post optimal. Their punishment threats are perceived to be credible by the politicians. They cannot observe any rents, nor the actual costs of public goods, but can observe the shock β with probability q, and update their threshold accordingly.

There is one median, undecided voter group[8] consistent of voters homogenous in their preferences over the re-election threshold. The voter expected utility function is dependent on the realization of the state of the economy shock (σ) and the political decisions on taxes and spending:

$$E\sum_{t=0}^{\infty}\delta^{t}u\left(\sigma_{t}|\psi_{t}\right) \tag{9}$$

where $0<\delta<1$ is the discount factor, while $u\left(\sigma_{t}|\psi_{t}\right)$ is a concave utility function monotonically increasing in σ_t. The voters' perception on the state of the economy and the signal of political

[8]One can easily assume a large number of groups, however in each case the median, undecided group will be crucial for political re-election. The median group is the one with the highest density and most swing voters (as in Persson and Tabellini, 2000[37]).

performance they receive is defined as:

$$\sigma_t = \varepsilon[1 - f(\psi_t)]^2 + q\beta_t \tag{10}$$

Where β_t is the election year shock while ε is a nonnegative constant depicting the institutional environment which cannot be affected by the politician in the short run, but only in the long run. It is obvious from (10) that the policy variable ψ_t will determine the voters' perception of the state of the economy, and hence their re-election choice. If β_t is observable with a positive probability ($q = 1$) then voters will rationally update their preferences over the re-election threshold:

$$\begin{cases} \text{if } q = 0, & \overline{\psi} \text{ unchanged} \\ \text{if } q = 1, & \overline{\psi}_{t+1} = E[\psi_t | \beta_t] \end{cases} \tag{11}$$

The shock β_t can be either positive $\left(\overline{\beta} > 0 \dots p\right)$ or negative $\left(\underline{\beta} < 0 \dots 1 - p\right)$:

$$E[\beta_t] = p\overline{\beta} + (1 - p)\underline{\beta} \tag{12}$$

Which implies that if $q = 1$:

$$\text{For} \quad \begin{matrix} qp \\ q(1-p) \end{matrix} \quad \begin{cases} \overline{\beta} > 0, \ \cdots & \overline{\overline{\psi^*}} < \overline{\psi} \\ \underline{\beta} < 0, \ \cdots & \overline{\overline{\psi^*}} > \overline{\psi} \end{cases} \tag{13}$$

For positive shocks voters desire lower taxes and lower public good spending and hence update their desired level of $\overline{\psi}$ downwards to the new level of $\overline{\overline{\psi^*}}$, while negative shocks will imply the opposite[9]. If $q = 0$, then the preferences on the threshold don't get updated. This implies the following relationship between β and ψ:

$$\frac{\partial \psi_t}{\partial \beta_t} < 0, \frac{\partial \psi_{t+1}}{\partial \beta_t} > 0 \tag{14}$$

Which is true for both positive and negative β_t. The intuition is the following. For positive economic shocks (good times) voters demand a lower cut-off $\overline{\psi}$, driven mostly by lower taxes. However, higher economic activity in the current period will increase budget revenues in the next period and hence raise ψ_{t+1}, mainly through higher spending, g. For a negative economic shock (bad times) voters demand more spending in the current period to offset the shock, however due to its negative effects there will be less budget revenues available in the future period.

Another way to look at the threshold is to determine the desired optimal values of ψ that satisfy an aggregate voter utility function within a set of plausible outcomes in which the upper

[9]The intuition is that in times of crises (which would be an example of a negative shock) the majority of voters expect more intervention from the government, as shown by Higgs (1987)[29] on the US case. In addition, Goel and Nelson (1998)[27] find that corruption increases in times of economic downturns.

boundary of the set would be the control level $\overline{\psi}$. The re-election threshold would be defined within a positive, increasing set of different choices on budgetary redistribution $\Omega \in \left[\underline{\psi}, \overline{\psi}\right]$. Voter optimal provision of taxes and spending, $\psi^v\left(g^v, \tau^v\right)$ is necessarily equal to $\underline{\psi}$[10]. Any level of public good provision within these boundaries would send a signal of positive in-office performance and consequentially a good state of the economy, $\sigma \in \left\{\overline{\sigma}\left(\underline{\psi}\right), \underline{\sigma}\left(\overline{\psi}\right)\right\}$

4.2 Incumbent utility and strategy

An incumbent party is a rational utility maximizer seeking to win elections in every period in order to have an option of extracting rents. Since the position of holding office is primary attractive because of possible rent-extracting opportunities, the optimal strategy of the incumbent party is to keep this position as long as they are able to maximize the flow of rents in the current period and expected rents from future periods. In order to stay in power it needs to choose a combination of $\psi^* \in \Omega$ according to the re-election constraints in (6) and (7). The incumbent's utility is a combination of ego rents from holding office and rents that can be extracted once in office. In $t = 0$ this utility is achieved with certainty (since it is already in office), while in every subsequent period it depends on the probability of winning office. The previous period β_{t-1} shock determines the scope for current period rents, meaning that every current period β_t will determine higher or lower expected future rents[11]:

$$U_I^0 = R_0 + (1 + \beta_{t-1}) \int_{\underline{g}}^{\widehat{g}} r_0 \; dF\left(r|g, \lambda\right) \ldots \; t = 0 \tag{15}$$

$$EU_I^1 = \left(R_1 + (1 + \beta_{t-1}) \int_{\underline{g}}^{\widehat{g}} r_1 \; dF\left(r|g, \lambda\right)\right) p_I\left(\psi_{t-1}\right) \ldots \; t = 1 \tag{16}$$

$$\ldots$$

$$EU_I^n = \left(R_n + (1 + \beta_{t-1}) \int_{\underline{g}}^{\widehat{g}} r_n \; dF\left(r|g, \lambda\right)\right) p_I\left(\psi_{t-1}\right) \ldots \; t = n \tag{17}$$

In every period $t = 1, \ldots, n$ the incumbent decides on a new combination of taxes, spending, and consequently rents from an affordable set of white elephant projects. An incumbent's ex ante utility (expected utility at the start of term $t = 0$) is:

$$EU_I = E[U_I^0\left(r|g, \lambda\right)] + p_I\left(\psi_0\right)\left(1 + \beta_0\right) \sum_{t=1}^{n} \delta^t E[U_I^t\left(r|g, \lambda\right)] + \left(1 - p_I\left(\psi_0\right)\right) E[U_C^t] \tag{18}$$

[10] According to (7) $\widehat{\psi}(\widehat{g}, \widehat{\tau}) > \overline{\psi}(\overline{g}, \overline{\tau}) > \psi^v(g^v, \tau^v)$, politicians always have an incentive to set taxes and spending higher than the voter optimal distribution. Even if they behave completely congruent, they would aim to satisfy the ψ^v threshold but never go below it, as this would jeopardize both theirs and the voters' utilities.

[11] It is important to include β directly into the incumbent utility function since it accounts for the fact that in each period, for positive economic shocks, there will be more rents available, not less. It in a way offsets the discount factor.

The first term denotes expected utility in the actual period $t = 0$ as defined in (15); the utility it will receive at the end of the first term in office, when total rents are realized. The second term is the sum of all future discounted expected utilities when in office[12], from period $t = 1$ onwards, if it wins re-election with probability $p_I(\psi_0)$ depended on satisfying the re-election threshold in period $t = 0$. The incumbent's future rents will depend on β_0 in the current period $t = 0$ as it will signal how big expected rents might be in all subsequent periods starting from $t = 1$. The final term denotes the probability of losing the election if the party doesn't respect the re-election threshold (8) and the utility it will get if the challenger, the opposition party, is now in office. This utility for the incumbent might even be negative once the opposition party is in office, as too much rent-extraction may be subject to additional punishment (such as a corruption trial).

The incumbent plays the same infinite horizon game each period. A cooperative strategy implies adapting to voter expectations and respecting the re-election threshold every period in order to remain in office. Any defection from this strategy, even though it will ensure higher immediate rents, will induce a (credible) punishment from the voters in terms of electoral loss, and will disable the incumbent from extracting further rents. The game can be thought of as a tit-for-tat game where any deviation from a cooperative strategy is met with immediate punishment from the voters (a trigger strategy). Even though the agent does change after the voters imply a punishment strategy, from the voters' perspective they repeatedly play a tit-for-tat game where they punish the agent's defection and reward cooperation.

The incumbent party compares the defection and cooperation strategies starting from its first term in office, $t = 0$. It plays a cooperative strategy if and only if the expected utility from the cooperative strategy is higher than the expected utility from the defection strategy:

$$E[U_I^0(\overline{r}|\overline{g},\lambda)] + (1+\beta_0)\sum_{t=1}^{n}\delta^t p_I(\psi_{t-1})\,E[U_I^t(\overline{r}|\overline{g},\lambda)] \geq E[U_I^0(\widehat{r}|\widehat{g},\lambda)] + E[U_C^t] \tag{19}$$

The term on the right of the equation presents expected utility from taking maximum rents ($\widehat{r}, \forall r \in \widehat{g} = \tau\overline{y}$) and the utility the party gets from a challenger in power, achieved with certainty for a defection strategy. When it defects it does so to maximize rent-extraction but is faced with no immediate future payoffs in terms of rents. Utility in $t = 0$ will either be cooperative (with $(\overline{r},\overline{g})$) or defective (with $(\widehat{r},\widehat{g})$), and will depend on the level of β_{t-1} observed in the previous period, before holding office (as in equation 15). However, the incumbent's decision is based on anticipating what future rents will be. It observes β_0 in the current period, and bases its decision of current period rent-extraction on anticipated future rents. It chooses its strategy with respect to β_0 and defects only when the β shock is sufficiently low so that it might find itself in a better position now with maximum rents than with future lower rents.

Proposition 1. *An incumbent party will form its strategy on rent-extraction and consequently*

[12]For simplicity ego rents are normalized to zero in all future periods.

its chances of re-election based on the realization of the current period shock β_0. For any

$$\beta_0 \geq \frac{E[U_I^0(\widehat{r}|\widehat{g},\lambda)] + E[U_C^t] - E[U_I^0(\overline{r}|\overline{g},\lambda)]}{\sum_{t=1}^{n} \delta^t p_I(\psi_{t-1}) E[U_I^t(\overline{r}|\overline{g},\lambda)]} - 1 = \beta^* \tag{20}$$

the incumbent plays a cooperative strategy and chooses its level of rent-extraction and public good expenditures with respect to the voter re-election threshold, while for any

$$\beta_0 < \frac{E[U_I^0(\widehat{r}|\widehat{g},\lambda)] + E[U_C^t] - E[U_I^0(\overline{r}|\overline{g},\lambda)]}{\sum_{t=1}^{n} \delta^t p_I(\psi_{t-1}) E[U_I^t(\overline{r}|\overline{g},\lambda)]} - 1 = \beta^* \tag{21}$$

the incumbent defects and by extracting too much rents is voted out of office. These sets of strategies solved for β_0 are a unique subgame-perfect Nash equilibrium of the incumbent party's repeated game.

Proof: See Appendix A.

A political party is by definition much more patient that an individual politician, which is why their discount factor is always higher, i.e. sufficiently closer to 1. A patient incumbent ($\delta \to 1$) has a lower cut-off value of β^* for which it chooses defection, meaning that even for negative economic shocks it is willing to cooperate, while an impatient one ($\delta \to 0$) requires a much higher economic shock every period to stay in power and not steal.

4.3 Analysis

The intuition is as follows. During a positive shock $\left(\overline{\beta} > 0 \text{ iff } \beta_0 \geq \beta^*\right)$, politicians anticipate more rents tomorrow (via higher expected revenues, according to (1)), however their current spending and taxes will be lower $\left(\psi \leq \overline{\psi}\right)$ in order to stay in power and seize higher next period rents. Positive shocks imply that patient incumbents adjust current rent-extraction for higher expected rent-extraction. The voters also expect lower current taxes and less public good spending as they adjust to a lower cut-off $\overline{\overline{\psi^*}}$ for a positive growth shock (as specified under (13)), but they also expect higher future tax revenues (and higher next period $\overline{\psi}$), since better economic opportunities will raise revenues in $t+1$.

During a negative shock $\left(\underline{\beta} < 0 \text{ iff } \beta_0 < \beta^*\right)$, politicians anticipate less rents tomorrow (lower revenues and hence lower spending) but their current spending and taxes will be higher since they choose to take more rents now. If the incumbent party wants to stay in office it needs to limit its rent-extraction even further in order to get re-elected (more spending towards redistribution programs, or programs that are aimed at a short-run boost to the economy, imply less scope for wasteful spending[13], according to equations 1 and 4). The incumbent party in this case

[13]Even though 'bridges to nowhere' tend to be an often used short-run stimulus mechanism.

decides it will be too costly for them (in terms of lower rents) to maintain the current threshold. When this occurs, the situation is similar to reaching a term limit in the standard political agency framework when incumbents extract maximum rents in this period knowing they will be removed from office with certainty in the next one.

For $\beta_0 < \beta^*$, an incumbent party deviates with probability $P = \frac{1}{2} - \phi\beta^*$[14]. However, not every low economic shock affects the politicians the same way. Sometimes they still find it more favourable to stay in future office and extract rents (for a low enough cut-off level of β^*). Since the voters rationally adjust their threshold, during negative shocks a politician has more leeway to increase spending and taxes ($\uparrow g, \uparrow \tau$) as a policy response (or even $\uparrow g, \downarrow \tau$, where $\Delta g > \Delta\tau$).

However, if $\Delta\beta_0 > \Delta g \gtreqless \Delta\tau$, meaning that if the negative shock is larger than it is feasible to change government spending or taxes, then regardless of what the incumbent does it will lose office. Its only feasible strategy is to defect, i.e. take $\widehat{g}$ and $\widehat{r}$ now and lose office. This further implies that for the defection strategy to occur, two conditions must be met:

1. $\beta_0 < \beta^*$ (as stated under Proposition 1)
2. $\Delta\beta_0 > \Delta g \gtreqless \Delta\tau$, i.e. $\phi \leq 1$

Where the first condition is necessary and the second is sufficient. This implies that politicians will go above the voter re-election threshold if they observe strong negative shocks (the smaller the value of parameter ϕ, the wider the distribution of the β shock). For every negative shock the politicians will increase taxes and spending, which the voters observe and expect, but they will only go above the voter threshold for $\phi \leq 1$, i.e. when the negative shock is too large to make it profitable for them to stay in office. If they are able to fix the shock with their policy response then it would be obvious ex post that β_0 wasn't lower than their cut-off value of β^*.

5 Equilibrium

The equilibrium analyzed is a stationary equilibrium depicting the necessary conditions for the incumbent to remain in office and keep extracting rents with respect to the given constraints. The incumbent's allocation strategies in each period can be summarized in Figure 1 below.

The first graph on the lower left depicts the quasi-linear relationship between rents and public good production (as described in (4)). For a level of public good expenditures less than or equal to $\underline{g}$ rents are zero. Any increase of public good expenditures above $\underline{g}$ substantially increases rents, as here is where the wasteful spending kicks in (λ is realized – it determines the slope of

[14]The probability of defection is calculated based on Proposition 1; $P[\beta_0 < \beta^*] = 1 - \frac{\beta^* + \frac{1}{2\phi}}{\frac{1}{\phi}}$, for $\beta \sim \left[-\frac{1}{2\phi}, \frac{1}{2\phi}\right]$. The intuition is that if the cut-off level of the shock is larger, it will take a higher value for which β must be satisfied in order to make it profitable for an incumbent to cooperate.

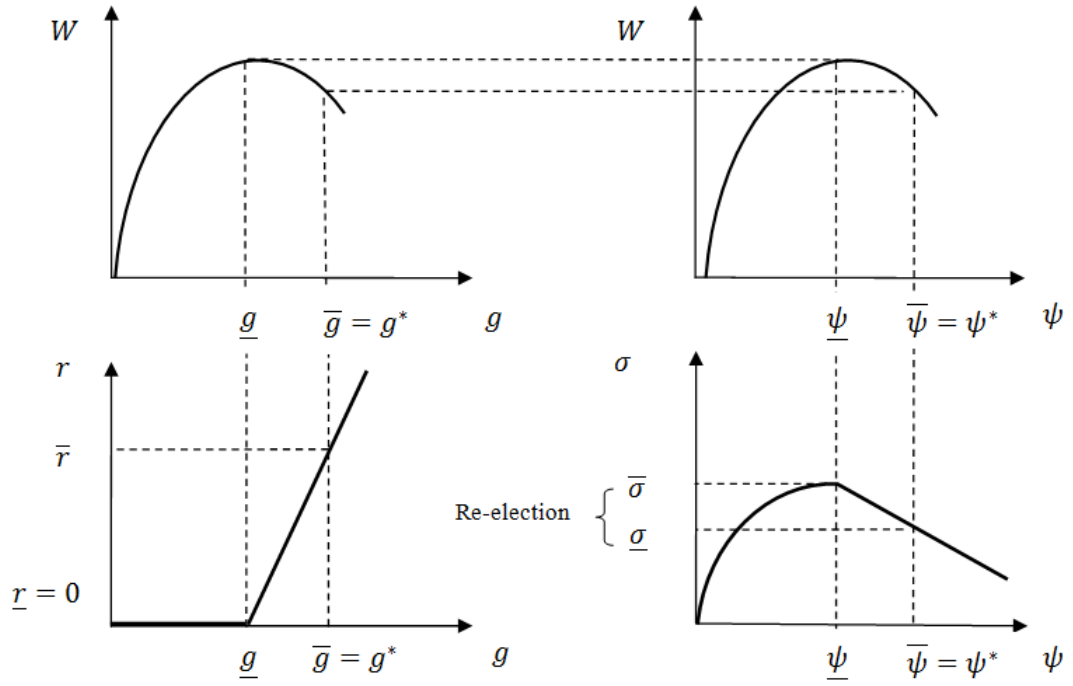

Figure 1: Relationship between public good expenditures, rent-extraction and re-election

the curve). With the realization of wasteful spending voter welfare starts decreasing: $\frac{\partial W}{\partial g} > 0$, $\frac{\partial^2 W}{\partial g^2} < 0$, since wasteful public goods satisfy partial interests (pork-barrels that benefit certain interest groups). After the level of rents $\overline{r}$, the public goods produced inflict more harm than good to the majority of voters, meaning that the incumbent is extracting more rents for itself (or for special interest groups as predicted by Coate and Morris, 1995[21]) than the amount of useful public goods it creates. It is important to note that voters don't react negatively to more government spending, but they do react negatively to more targeted special interest group spending.

Proposition 2. *If the incumbent party is a rational rent-maximizer, it has no desire to choose any level of public goods lower than or equal to* $\underline{g}$ *(and no* ψ *lower than or equal to* $\underline{\psi}$*). The chosen level of public good expenditures will always be:*

$$g > \underline{g}(\underline{r}) \text{ and } \psi > \underline{\psi} \tag{22}$$

Proof: See Appendix A.

The intuition is clear. Any $\psi \leq \underline{\psi}$, meaning that $g \leq \underline{g}$, implies rents to be $\underline{r} = 0$. It wouldn't be profitable for a rent-maximizing incumbent not to produce any wasteful spending, as this

would imply zero rents. The finding in Proposition 2 enables us to focus only on the effect after $\underline{\psi}(\underline{g})$.

The final graph is a quasi-concave curve depicting the relationship between ψ and σ. For rising initial levels of public good expenditures and overall spending and taxation, the state of the economy variable increases at a decreasing rate, as voter preferences for public goods and other forms of spending are being satisfied. After a certain point $\underline{\psi}(\underline{g})$ further public good expenditures start including wasteful pork-barrel spending, as assumed in (4). The fact that rents can only be created after an initially provided level of public goods $\underline{g}$ entails the discontinuous effect they have on the state of the economy curve. A decreasing state of the economy is a mere consequence of negative voter perception on signals of political satisfaction of personal and partial interests.

The deteriorating state of the economy caused by higher rent-extraction will leave more and more voters dissatisfied, who will if $\psi > \overline{\psi}$, for which the state of the economy would be $\sigma < \underline{\sigma}$, elect an incumbent party out of office. The threshold level $\overline{\psi}$ will present the point above which further public good expenditure gains disproportionally more to the incumbent in rents than to the voters in public goods[15].

Proposition 3. *Assume the incumbent party observes $\beta_0 \geq \beta^*$. If the party maximizes rents via the public good expenditures function, and if the re-election probability depends on staying within the desired re-election set $\Omega \in \left[\underline{\psi}, \overline{\psi}\right]$, it will always choose the voters' higher threshold level $\overline{\psi}$ for the observed positive β_0 shock. The equilibrium levels of public good expenditures and the public policy parameter ψ are then:*

$$g^* = \overline{g} \text{ and } \psi^* = \overline{\psi} \tag{23}$$

The incumbent will converge towards the optimal equilibrium level of g^* from which it can extract the optimal amount of rents, $r^* = \overline{r}$.

Proof: See Appendix A.

If $\overline{g}$ would be the total final amount of public good spending, then the area from $\underline{g}$ to $\overline{g}$ depicts total wasteful spending, while $\underline{r}$ to $\overline{r}$ depicts the total amount of rents. By converging to the equilibrium g^* and ψ^*, for a high enough shock β_0, an incumbent party is able to maximize both its rent-extraction ($r^* = \overline{r}$), within the allowed boundaries, and its chances of re-election, since the voter threshold for the current period is respected, $\psi \leq \overline{\psi}$.

Proposition 4. *If the equilibrium public good expenditure is $g^* = \overline{g}$, and the equilibrium public policy parameter is $\psi^* = \overline{\psi}$ according to Proposition 3, and under the assumption of the incumbent observing $\beta_0 \geq \beta^*$, the equilibrium level of the state of the economy is then always:*

$$\sigma^* = \underline{\sigma}(\psi^*(g^*)) \tag{24}$$

[15]Note here how an update of the threshold $\overline{\psi}$ upwards by the voters increases the scope for re-election.

The state of the economy $\underline{\sigma}$ is optimal $\sigma^* = \underline{\sigma}(\psi^*(g^*))$, for any ψ^* and g^* chosen that satisfy Proposition 3.

A possible normative implication would be that rent-extraction leads to a misappropriation of resources which implies a worse off voter perception of the state of the economy and lower voter utility. Instead of achieving a higher state of the economy $\overline{\sigma}$, the equilibrium revolves around a lower $\underline{\sigma}$, which always implies some level of wasteful spending. In addition, Proposition 3 implies higher than voter optimal equilibrium taxation and government spending (since $\psi^* = \overline{\psi} > \psi^v$) thereby possibly explaining some of the growth of government size in the past century.

6 Empirical evidence

The empirical implication is that upon observing a sufficiently negative economic shock, the re-election threshold will be disturbed via more wasteful spending leading to the electoral defeat of the incumbent. The crucial effort in proving this proposition is to quantify the effect of the threshold ψ on the probability of re-election. The paper tests the following propositions: (i) an increase of ψ (which is approximated by capital outlay spending per capita) decreases the probability of re-election after a certain level; and (ii) a decrease of β (approximated by a negative GDP growth shock) one year before the election will lead to an increase of ψ, i.e. higher spending on potentially wasteful public goods.

6.1 Data and empirical strategy

A panel data is collected for gubernatorial and state legislature elections (both upper and lower house) for 48 continental U.S. states over the period from 1992 to 2008. The database contains state elections for every two years[16] which includes 9 elections for both governor and the state legislature. Using U.S. states offers a number of attractive features not only in terms of methodology of data collection and measurement but also the stability of its electoral institutions and rules. In addition all states are accountable to the same constitutional boundaries and long-lasting democratic order, not to mention the prevalence of democratic informal institutions, culture and a roughly similar perception towards corruption across the states (the λ parameter). A panel dataset allows the paper to observe such cultural factors, corruption perceptions and electoral institutions as fixed both across states and over time. Data on state and local spending is collected for each state observed, along with the variables of economic performance proven to have an effect on the re-election of incumbents according to Brendner and Drazen (2008)[14] and Besley and Case (2003)[12]. The summary statistics of all variables used in the model are presented in Tables 1 and 2 in Appendix B. The sources and explanations of electoral data, budget

[16]Five U.S. states (AL, LA, MA, MI, NB) are only holding legislature elections for the lower house every 4 years, while Nebraska has a unicameral and a non-partisan state legislature. All other states hold lower house legislature elections every two years.

spending and all other variables used are given in Appendix B under the summary tables.

The empirical strategy estimates the following binary response model, predicting the effect of changes in ψ on the electoral success of the incumbent:

$$P\left(I_{it}=1|\psi_{it},\epsilon_{it}\right)=G\left(\gamma_0+\gamma_1\psi_{it}+\gamma_2\psi_{it}^2+\xi\mathbf{X_{it}}+\vartheta\mathbf{D_{it}}+\epsilon_{it}\right) \tag{25}$$

Where G is the standard cumulative distribution function (c.d.f.) defined strictly between zero and one, $0<G(z)<1$, for all real numbers z, ensuring that the estimated response probabilities fall between zero and one.

The dependent variable I_{it} for state i and time t is the dummy indicator that takes the value 1 if the incumbent governor is (re-)elected or if the party stays in majority in the state legislature and 0 if the incumbent governor loses elections or the party loses its majority. For a Republican governor in power if the Republicans lose the local assembly elections in the middle of his term, the value assigned is 0. If the Republicans win this implies that they retain majority (or have won the majority in a previously Democratic held assembly), so the value assigned is 1[17].

The explanatory variable is the threshold ψ_{it}, or more precisely public good spending. Decomposing public good spending into white elephant projects and spending on voter-desired public goods is a daunting task. The fact that politicians conceal their corruption and rent-extraction within the budget allocation process makes this task even more difficult. This is why the paper assigns a proxy to try and evaluate the effect of rents on re-election probabilities. As assumed in the theoretical part, the only way to increase rent-extraction is via higher public good spending, in particular higher wasteful spending (see equation 4). To capture this the paper will observe growth of public good spending defined as capital outlays (definition given in Appendix B under Table 2), since this budgetary category is most usually subject to misappropriation in terms of fraudulent procurements and diversion of public funds. Mauro (1998) recognized the existence of such corrupt practices being more frequent for large infrastructure projects that generally fall under the capital outlays category. Capital outlays are presented in per capita terms for each state.

Parameters γ_1 and γ_2 measure the effects of capital outlay spending on incumbent re-election. The squared value (ψ_{it}^2) should be able to indicate the concavity of the voters' preferences over the threshold as presented in Figure 1 (provided that γ_2 turns out negative). The control variables can be divided into a vector of economic ($\mathbf{X_{it}}$) and demographic ($\mathbf{D_{it}}$) differences between states that may affect the likelihood of incumbent re-election. Economic controls include measures of economic performance such as GDP growth in the election year, revenue and expenditure growth, unemployment rate, income tax rate, personal income and deficit to GDP. Demographic controls include total state population, share of population under 15 (young) and share of population

[17]If the governor and the legislature are from two different parties then a governor defeat is counted as zero, since executive power surpasses the legislative one.

over 65 (old), implying that states with high shares of old or young people will have higher levels of targeted social spending.

6.2 Results

6.2.1 Negative economic shocks and wasteful spending

Before testing the effect of wasteful public good spending on re-election, it is necessary to estimate whether there is a link between a negative economic shock and higher spending on white elephant public goods, as assumed in Proposition 1. This could be difficult to prove since politicians could simply be applying countercyclical measures to combat a negative economic shock, thus making the finding trivial. In order to distinguish between which effect is more likely, the paper contrasts the negative growth effect on the proxy for wasteful spending (capital outlays per capita) with how the negative economic shock affects total expenditures. Furthermore the paper also separates the two different types of spending; capital outlays (spending on public goods) and current expenditures which include social spending, public employee wages, unemployment benefits, education and health spending, etc. If an incumbent party facing a negative shock is actually using countercyclical measures to combat the shock, then we should expect to see a significant negative effect between last year economic growth and both total and current expenditures. If however a negative shock only affects public good spending then this would, albeit partially, confirm the intuition presented in Proposition 1 of the model.

The following OLS panel data regression is estimated:

$$E\left(\psi_{it}|\beta_{it},\mu_{it}\right)=\alpha_i+\eta_{it}\beta_{it}+\xi\mathbf{X_{it}}+\vartheta\mathbf{D_{it}}+\mu_{it} \tag{26}$$

The dependent variable, ψ_{it} denotes capital outlay spending per capita as the dependent variable in regressions (1) and (2) in Table 3. Regressions (3) and (4) observe total expenditures per capita as the dependent variable, while regressions (5) and (6) observe current expenditures per capita. β_{it} represents the main explanatory variable an economic shock of state i one year before the election, approximated by real GDP growth. In columns (2), (4) and (6) instead of last year's economic growth, a two year average growth rate has been used to take into account a longer decision-making time span. Parameter η_{it} measures the total effect of previous year(s) GDP growth on the explanatory variable of interest. $\mathbf{X_{it}}$ and $\mathbf{D_{it}}$ represent vectors of similar economic and demographic controls as before, while α_i is the unobserved heterogeneity, containing all the possible unobserved state characteristics. Standard errors are robust to heteroskedasticity and clustered by state.

The results are presented in Table 3 in Appendix B. Column (1) and (2) show that for a lower GDP growth rate one year before the election (or during the entire 2 year term), states tend to have higher values of capital outlays per capita. In a given state, for a 1 percentage

point lower rate of GDP growth in the previous year, capital outlays per capita are predicted to be higher in the current year by 0.19, controlling for all other time-invariant factors. Given that the average value of capital outlays per capita being 0.753 for the entire sample, this represents a rather strong effect. In terms of the two year average growth levels, the effect is much stronger (as expected due to a longer decision-making horizon), but still in the same direction.

The control variables show expected directions; an increase of total expenditures results in higher capital outlay spending, an increase in income taxes as well, while a higher unemployment rate and a larger share of young and old in a state all predict a negative effect on capital outlays per capita. This makes sense since they all imply higher expenditures on social transfers, thus lowering the amount of funds available for public good creation. Finally, the term limit effect signals that as the end of the final term for the governor approaches, even though he has an increasing likelihood to extract more rents[18], the party as a whole will try to decrease public good spending in order to remain in power. It makes sense that parties react differently to the term limit rule than individual politicians. This is one of the crucial insights the paper carries when using party politics with a longer time horizon instead of individual politicians.

In order to test the robustness of this initial result, the paper examines whether the growth shock affects public spending in general. Hence in columns (3) and (4) the paper tests the effect of a negative growth shock on total and current expenditures. In both cases there is a similar relationship as before – a negative growth shock one year before the elections increases total and current spending, even though many of the control variables lose their statistical significance. In the final two columns, the growth effect was tested for current and total spending per capita, and again the same result has been found. In terms of the control variables in the final four regressions the negative effect of old and young in the population is somewhat counterintuitive, even though it could probably be explained by specific state idiosyncrasies.

Overall the findings in Table 3 point to a positive relationship between higher spending on capital outlays and a negative growth shock, however lower GDP growth also causes total spending to increase. It increases public spending on a state level across all categories. This still leaves us unsure whether politicians use a negative growth shock to increase their rents or to ensure their preservation in power, or is it in fact both, where their reaction depends on the magnitude of the shock $\Delta\beta_0 > \Delta g \gtreqless \Delta\tau$. The findings in Tables 4 and 5 could shed more light on this.

In testing the different models a Hausman test has been used every time to differentiate between using fixed effects or random effects. In every case the Hausman test suggested the use of fixed effects. The Chi squared values and the corresponding p-values for the Hausman test are reported under each column.

[18] As empirically proven by many term limit models such as Alt, Bueno de Mesquita and Rose (2011)[2], Besley and Case (1995b)[11], Ferraz and Finan (2011)[24] and Smart and Sturm (2013)[41].

6.2.2 Wasteful spending and re-election

The results of the main prediction of the model — the effect of capital outlay spending on the probability of re-election – are presented in Table 4 in Appendix B. Three limited dependent variable models are compared; a probit random effects panel data regression (columns 1 and 2), a logit random effects panel data regression (columns 3 and 4), and the standard linear probability model (LPM) (column 5). Columns (2) and (4) present the average marginal effects of the subsequent probit and logit estimates, the reason for which was primarily to make all three models more comparable in terms of interpretation.

According to the aggregate results in Table 4 it can be inferred that over time the increasing levels of capital outlays per capita increase the probability of re-election for the incumbent and imply higher public good spending each period. As the population increases, the tax base is larger, revenues are higher and so are the expenditures. The finding goes in line with the prediction in Proposition 2, where the threshold chosen would always be the higher level. However, the negative value of γ_2 (from equation 25), significant at a 5% level in the first four columns and at a 1% in the final column, implies the concavity of voter preferences where too high levels of capital outlay spending lead to a decrease of voter utility that can cause the incumbents to lose office.

The total effect of capital outlays on re-election must be calculated by jointly observing $\widehat{\gamma}_1$ and $\widehat{\gamma}_2$, where we can calculate the cut-off point using the estimated coefficients with the following formula:

$$\widehat{\psi} = \left| \frac{\widehat{\gamma}_1}{2\widehat{\gamma}_2} \right| \tag{27}$$

In column (2) if $\widehat{\gamma}_1 = 1.405$ and $\widehat{\gamma}_2 = -0.497$, then the lower cut-off value of $\underline{\psi}$ is $\widehat{\psi} = 1.405/2(0.497)$. This implies that after the average level of capital outlays per capita exceeds 1.41 it lowers the probability of winning. At that point of spending the incumbent party can maximize its probability of staying in power. For example, the cut-off level of 1.41 will result in a probability of winning of $P(I) = 0.74$. Any value above the cut-off decreases the probability of winning, holding all other parameters constant (see Figure 1). From this one can easily calculate the upper cut-off level of $\overline{\psi}$, above which politicians get thrown out of office. For the entire sample, the average value of the upper cut-off (for which the probability of winning is lower than 0.5) would be around 2.11.

This can be seen by plugging in different cut-off values and summing up the product of the mean of the control variables with the resulting coefficient from column (2). For example, for close to extreme values in the sample a high level of capital outlay per capita of 2.5 will result in a probability of winning of only 0.15, while the lowest value in the sample of 0.26 will yield a probability of winning of only 0.08, controlling for all other factors. The average value of capital outlays p/c for the entire dataset was 0.753, which yields a probability of winning of 0.485. An

increase of capital outlays p/c from 0.83 to 1.4 (a two standard deviation increase up until the lower cut-off) increases the probability of winning by 0.167, whereas an increase of capital outlays from 1.4 to 1.97 (again a two standard deviation increase), decreases probability of winning by 0.155. A one standard deviation increase or decrease from the cut-off value only affects the probability of winning by 0.04. However a one standard deviation increase of capital outlays from the average sample value increases the probability of winning by 0.18. If we compare the effect across individual states, in California a one standard deviation increase of capital outlays p/c from the average value (0.823) increases the probability of winning by 0.12, while an increase above the cut-off level by one standard deviation decreases the probability of winning by 0.15. In Alabama for example, an increase of capital outlays p/c by one standard deviation from the average (0.647) will increase the winning probability by 0.17, while a one standard deviation increase from the cut-off level will lower the probability of winning by 0.16.

Columns (4) and (5), as expected, show almost identical results in terms of size and magnitude of the effects for the other two models, the logit and the LPM. However the cut-off levels are slightly different (1.417 for the logit, but 1.865 for the LPM), as are the calculated probabilities (for the average sample value of capital outlays at 0.753, the logit predicts a probability of winning of 0.476, whereas the LPM predicts the probability of 0.607, controlling for all other factors). In each case the percent correctly predicted is reported (the standard 0.5 threshold was used) as a viable goodness-of-fit measure, as is the pseudo R-squared (in case of the LPM it is a regular R-squared), and the log-likelihood value for the first two models. In each case the model correctly predicts over 60% of the cases, while the pseudo R-squared is around 0.20 for logit and probit, and slightly lower for the LPM.

The inclusion of the term limit variable signals a significant negative relationship in each model tested, implying that if the party's governor is reaching a term limit, the likelihood of the party remaining in office will decrease. This is probably why the results in Table 3 yielded the opposite of the standard term limit effect – parties will try to improve their winning probabilities by decreasing capital outlay spending in periods of pre-observed poor growth when facing a term limit.

Most economic performance indicators across all models in Table 4 seem to show weak and non-significant effects on the probability of re-election. Only deficit to GDP, revenue growth and population growth exhibit some significant effect, with an expected direction of each of the variables according to the standard economic literature. This could be explained by the fact that economic performance of states matters far less in local elections than it does on a national level. The political business cycle theory predicts that the aforementioned set of variables could influence electoral results, but they are more applicable on a national level. In local politics budgetary redistribution and public goods play a much more important role.

However, what if the voters respond to all categories of spending this way, not just capital outlays? Table 5 tests the inclusion of other potential explanatory variables instead of capital

outlays, in a similar way as presented in Table 3. It shows that none of the alternative categories of spending exhibit the same effect capital outlay spending does. Columns (1) and (2) use total expenditures p/c and current expenditures p/c (the same parameters as in Table 3), and even though in the case of total spending p/c there is a positive effect of total expenditures on the probability of winning (as anticipated earlier), neither of the two variables report a comparative effect to that of capital outlay spending. Other potential variables used such as the ratio of capital outlays to current spending (column 3) and current to total spending (column 4) also show no significant effect on the probability of winning. In addition to the ones reported, many other variables of spending have been used (including aggregate total and current spending, and spending to GDP), neither of which showed any significant effect to the extent that capital outlays per capita did. The implication is that politicians in local elections can only affect their re-election chances via manipulating public good spending, while current and social spending seem to be ineffective vis-a-vis re-election probabilities.

If we connect this with the results reported in Table 3, it would appear that for pre-observed negative shocks political parties in power opt to increase all forms of public spending as an initial reaction to the adverse shock. However if they divert too much of their spending towards public good production, there is a danger that this type of spending is used for rent-extraction rather than as a way to help the economy recover. If this is the case, the voters will punish them.

Other types of spending fail to offer similar results with respect to re-election probabilities. Intuitively, higher public spending on various social expenditures will hardly throw a politician out of office, but higher spending on capital outlays will. Why is this so? One of the possible explanations could be the implications vested in the model – capital outlays represent a budgetary category most easily subject to misappropriation, so when politicians increase this category too far (extract too much rents) voters punish them. It is far from conclusive that politicians become more corrupt after a negative shock, but it is possible that higher rent-extraction throws politicians out of office and that this rent-extraction can indeed be preceded and incentivised by a negative economic shock.

In order to prove this relationship with more precision, one should perhaps use a better proxy for political corruption and rent-extraction at the local state level. The availability of such data is extremely scarce, even though in certain instances with a unique database of potentially wasteful political spending (e.g. Bandiera et al, 2009[5]; Ferraz and Finan, 2011[24]; Kaufman and Vicente, 2011[30]) this can indeed be achieved. This paper opens up scope to an entirely new research in this direction aimed at linking corruption and misuse of public office to long-lasting mandates in some levels of local, and perhaps even national, government.

7 Conclusion

The paper anticipates that if agents are infinitely patient they can stay in office for infinite amounts of time, provided that they face a favorable economic shock each period. Even though this may sound implausible, the attractiveness of holding power, particularly on a local level, actually does yield results where certain political parties retain office for as long as they like, or at least until some exogenous shock disturbs their position. From a multitude of examples and anecdotal evidence in the developing world, the most striking one actually comes from the United States and the former major of a small town Bell, California, Robert Rizzo, who managed to stay in power for 17 years and pay himself a salary close to $800,000 per year, even though the majority of Bell's citizens are relatively poor (Bueno De Mesquita and Smith, 2011[19]). Rizzo made sure they remain poor by levying high taxes to pay for the cronies that were keeping him in power. Even though this example testifies of a complex environment which is more likely to resemble state capture than pure rent-extraction, the implications are obvious: it is indeed possible to successfully overcome the trade-off between rent-extraction and holding office.

In order to theoretically assess this possibility the paper alters the classical political agency model by including three assumptions; a single candidate type to focus only on the moral hazard problem, modeling party politics to eliminate the term limit constraint, and determining rents endogenously within the public good expenditure function where they are strictly tied to wasteful spending. Rent-extraction is partially constrained by a voter threshold defined as voter optimal levels of taxes and spending, which get updated every period with respect to a stochastic economic shock. The incumbents base their rent-extracting decisions on the same economic shock that will alter the voter preferences over the optimal threshold of taxes and spending, and send a signal to the incumbents over the anticipated level of future rent-extraction. When facing a positive shock a sufficiently patient incumbent party, upon anticipating more future rents, will play a cooperative strategy with the voters and limit its rent-extraction. For a large enough negative shock the incumbent will play a defection strategy where it extracts the maximum available amount of rents. For a cooperative strategy the state of the economy ends up within the voters threshold and they reward the incumbent with re-election, while accepting the fact that politicians extract some budgetary funds for themselves. For a defection strategy the state of the economy is disturbed and the voters apply an immediate punishment for the incumbent.

Empirically the paper confirms the possibility of seizing the opportunity of higher rent-extraction once in office by finding the cut-off level of wasteful spending the politicians need to respect in order to maintain power. It also finds that parties react differently to the term limit constraint than individual politicians. The main finding is that in times of economic downturns politicians use public good spending to increase their electoral chances; however this only works up until a certain point, where further spending on public goods is likely to be perceived as wasteful spending by the voters, who will then punish the incumbents. These findings open

up scope to a new research direction aimed at uncovering the actual reasons behind long-lasting mandates characterized by rampant corruption and rent-extraction.

Appendix A

Proof of proposition 1. Let G be a finite stage game between voters and politicians, where the strategy of the voters is an action profile $(a_r, a_{-r}) \in A$, while the cooperative strategy of an incumbent party i is $s_i = (s_{i1}, \ldots, s_{in})$, for every $s_i \in S$. A cooperative strategy infers respecting the voter re-election threshold $\psi \leq \overline{\psi}$, implying an expected utility of $u_i(s_i)$. Let the deviation strategy of an incumbent be denoted as s_{-i}, with an expected utility of $u_i(s_{-i})$.

In a one period game, politicians maximize their immediate payoffs by choosing a defection strategy s_{-i} since $E[U_I^0(\widehat{r}|\widehat{g}, \lambda)] > E[U_I^0(\overline{r}|\overline{g}, \lambda)]$ which is true for $\widehat{r} > \overline{r}$ and $\widehat{g} > \overline{g}\ \forall r, g$. The best response of the voters is to apply a punishment strategy, a_{-r}. A one period game ends up with a non-cooperative Nash equilibrium regardless of the shock β_0 since both players are aware that no future periods exist. Define $(x_{e1}, \ldots, x_{en}) \in D(s_{-i}, a_{-r})$ as the one period Nash equilibrium of G for which the payoffs are $(e_1, \ldots, e_n)$, and $(x_{p1}, \ldots, x_{pn}) \in C(s_i, a_r)$ as the set of cooperative actions of both players for which the optimal payoffs are $(p_1, \ldots, p_n)$.

In an infinitely repeated stage game $G(\infty, \delta)$ the players apply a trigger strategy where they both play $x_{pi} \in C(s_i, a_r)$ in the first stage, while at the t^{th} stage if the outcome of all preceding periods has been $(p_1, \ldots, p_n)$, they play x_{pi}; otherwise they play $x_{ei} \in D(s_{-i}, a_{-r})$. If both players adopt this strategy than the outcomes of every period are $(x_{p1}, \ldots, x_{pn})$, with expected payoffs of $(p_1, \ldots, p_n)$. The expected utility of an incumbent following a cooperative strategy in a repeated game is a weighted average of payoffs in each stage, weighted by the common discount factor and an introduced economic shock, β_0, as specified in (19).

According to Friedman's (1971)[25] Theorem if the repeated game satisfies all the above properties, if $p_i \geq e_i$, and if the discount factor is sufficiently close to one (which is by assumption of using political parties always true), then there exists a subgame-perfect Nash equilibrium of the infinitely repeated game $G(\infty, \delta)$ that results in $(p_1, \ldots, p_n)$ as the average payoff.

For the Friedman Theorem to hold in this case, it must be shown that $p_i \geq e_i$, or $u_i(s_i) \geq u_i(s_{-i})$ for any incumbent i. The incumbent plays a cooperative strategy if and only if the payoff from a cooperative strategy is higher than the payoff from a defection strategy, as stated in equation (20):

$$E[U_I^0(\overline{r}|\overline{g}, \lambda)] + (1 + \beta_0) \sum_{t=1}^{n} \delta^t p_I(\psi_{t-1}) E[U_I^t(\overline{r}|\overline{g}, \lambda)] \geq E[U_I^0(\widehat{r}|\widehat{g}, \lambda)] + E[U_C^t] \tag{28}$$

Solving the upper equation for β_0 yields the optimal strategy for the incumbent, as specified in Proposition 1. An incumbent cannot get a better payoff by deviating for the given conditions of β_0, meaning that the cooperative strategy solved for $\beta_0 \geq \beta^*$ yields a Nash equilibrium of the tit-for-tat game for the incumbent. The game $G(\infty, \delta)$ is a repeated stage game, repeated in every single period. A subgame-perfect equilibrium of a repeated game includes a stage game Nash equilibrium in every sub game. Since the stage game Nash equilibrium is played every period, or in every sub game, it is by definition a subgame-perfect Nash equilibrium. □

Proof of proposition 2. Any level of public goods $g < \underline{g}$ implies two effects; a non-optimal amount of rents ($\underline{r} = 0$) and no re-election (as the voter re-election threshold $\Omega \in [\underline{\psi}, \overline{\psi}]$ isn't satisfied). Any level of public goods $g = \underline{g}$ implies re-election since the voter threshold is respected but the level of rents is still $\underline{r} = 0$ by assumption of equation (4) where $\underline{g} = (1 - \lambda) \sum_{j=1}^{m} G_j$. An

incumbent party utility maximization function is according to equation (16) depended on rent-extraction (any $r > \underline{r}$), thus disabling the incumbent from choosing any $g = \underline{g}$ and therefore obtaining no rents. Since it isn't plausible for the incumbent to choose any $g \leq \underline{g}$, the chosen level of public goods always has to be $g > \underline{g}$. □

Proof of proposition 3. From the assumption implied by the model that the level of rents increases with public good expenditures in equation (4) it is obvious that the higher level of g chosen from the set $\mathcal{P} \in [g_0, \ldots, g_i, \ldots, g_n], \forall i \in N$ increases the utility an incumbent gets. The set $\mathcal{P}$ contains increasing members for every level of expenditures chosen, meaning that $g_0 < g_1 < g_2 < \ldots < g_n$. According to the definition of ψ from (6) and (7), the choice of ψ is also determined within a set containing increasing members; $\mathcal{O} \in [\psi_0, \ldots, \psi_n]$ where $\psi_0 < \psi_1 < \psi_2 < \ldots < \psi_n$, and where n denotes the decision on the size of spending and taxes; ψ_0 is the lowest level chosen implying no taxes and no spending, while ψ_n is the highest level chosen implying maximum taxes and spending.

If an incumbent party is playing a cooperative strategy as implied in Proposition 3 ($\beta_0 \geq \beta^*$) it chooses any level of ψ within the set $\Omega \in \left[\underline{\psi}, \overline{\psi}\right]$, where $\Omega \subseteq \mathcal{O}$ (a subset of $\mathcal{O}$). By assumption $\psi_0 < \underline{\psi}$ and $\overline{\psi} < \psi_n$, meaning that the highest level of $\psi \in \mathcal{O}$ is higher than $\overline{\psi}$ and that the lowest level of $\psi \in \mathcal{O}$ is lower than $\underline{\psi}$. If Ω and $\mathcal{O}$ are both sets containing increasing members and if $\psi_0 < \underline{\psi}$ and $\overline{\psi} < \psi_n$, then by choosing the highest ψ within the re-election threshold set Ω in order to maximize its utility from rents and still stay in power, the incumbent will always choose the level $\psi^* = \overline{\psi}$. The decision of optimal $g^* = \overline{g}$ follows the same intuitive conclusion. □

Appendix B

Table 1: Election summary data

Elections/Parties	Governor	State Senate(Upper)	State House(Lower)
Total Democrats	96	218	242
Total Republicans	115	205	181
Total Independent	3	-	-
Total elections	214	423	423

All 48 states included over the period from 1992 until 2008. Total Democrats and total Republicans includes every time when a Democrat or Republican governor or party would either win office or hold office. Source and description of data: Election data on both gubernatorial and state legislature election (upper and lower house) was taken from the Statistical Abstract of the United States from the years 1992 - 2008 published by the Census Bureau (2011)[46]. Notes on electoral results: Nebraska state legislature is unicameral and non-partisan, so only gubernatorial changes are observed in this state (every four years). In California in 2003 gubernatorial recall elections are taken into account instead of the 2002 elections. The democrat governor in power at the time, Gary Davis, instead of ensuring his second term was recalled a year later. On the new elections the Republican candidate Arnold Schwarzenegger won. The dummy value given for 2002 is 0, since it is accounted as an incumbent defeat. Gubernatorial and state legislature elections are all being held in even years except for Kentucky, Louisiana, Mississippi, New Jersey and Virginia which are held in odd years. The growth effects are all taken into account for these 5 states.

Table 2: Summary statistics

Variable	Observations	Mean	Std.Dev.	Min	Max
Re-election	432	0.6041	0.4895	0	1
Capital outlays p/c	432	0.7535	0.2844	0.2644	2.713
Capital outlays p/c sq	432	0.6484	0.5776	0.0698	7.359
Total expenditures p/c	432	6.263	1.8094	3.053	14.108
Current expenditures p/c	432	4.649	1.3712	2.326	10.247
Total expenditures to GDP	432	0.1874	0.0261	0.1233	0.2683
Total expenditures	432	38200000	50300000	2450127	415000000
Current expenditures	432	28000000	36200000	1776200	301000000
Capital outlays	432	4558774	5984458	187120	46700000
Capital outlays to current spending	432	0.1630	0.0399	0.0745	0.3138
Current spending to total spending	432	0.7415	0.0372	0.574	0.83
Term limit	432	0.2176	0.4131	0	1
GDP	432	204000000	250000000	12500000	1910000000
Real GDP growth	432	0.0362	0.0378	-0.0483	0.3597
Lag real GDP growth	432	0.0554	0.0241	-0.0536	0.1399
Two year average growth	432	0.0442	0.0426	-0.0299	0.2135
Expenditures growth	384	0.0748	0.0482	-0.0207	0.3016
Revenue growth	389	0.0667	0.1385	-0.3817	0.5898
Unemployment rate	432	0.0505	0.0135	0.022	0.112
Unemployment change	384	-0.0039	0.2421	-0.4384	1.027
Deficit to GDP	432	0.0102	0.0199	-0.0412	0.1928
Deficit to GDP change	384	-0.0343	9.585	-95.61	115.73
Income tax	432	0.0942	0.0118	0.062	0.127
Change in income tax	384	-0.0015	0.0219	-0.098	0.106
Personal income	432	30779.44	8780.61	15606.07	63889.87
Personal income growth	384	0.0957	0.0434	-0.033	0.2809
Population change	389	0.0133	0.0139	-0.007	0.1045
Share of under 17	384	0.2519	0.0197	0.207	0.352
Share over 65	384	0.1314	0.0682	0.085	1.425

Sources and description of data: Data on public good spending, budget revenues and expenditures decomposed into the data on capital outlays and current expenditures was taken from the US Census Bureau (2011)[46] for the entire period observed. Capital outlays are defined as: Direct expenditure for contract or force account construction of buildings, grounds, and other improvements, and purchase of equipment, land, and existing structures. Includes amounts for additions, replacements, and major alterations to fixed works and structures. However, expenditure for repairs to such works and structures is classified as current operation expenditure. (US Census Bureau, 2011[46]). Current expenditure include direct expenditure for compensation of own officers and employees and for supplies, materials, and contractual services except amounts for capital outlay, assistance and subsidies, interest on debt, and insurance benefits and payments. (US Census Bureau, 2011[46]). Data on GDP and unemployment is taken from the US Bureau of Economic analysis (2011)[47]. Income taxes and personal income data was taken from the Tax Foundation (2011)[44]. Population data was taken from the Statistical Abstract of the United States published by the Census Bureau (2011)[46]. The dummy variables on re-election were assigned as specified under equation (26), and according to the data from Table 1.

Table 3: Public spending and economic shocks

Dependent variable: Threshold (ψ)	(1) Capital outlays p/c	(2) Capital outlays p/c	(3) Total expenditures	(4) Current expenditures	(5) Total expenditures p/c	(6) Current expenditures p/c
Lag real GDP growth (one year before election)	-0.193 (0.084)**		-1.299 (0.387)***		-1.716 (0.494)***	
Two year average GDP growth		-0.803 (0.158)***		-4.871 (0.791)***		-6.432 (0.996)***
Term limit	-0.033 (0.017)*	-0.032 (0.017)*	-0.162 (0.093)*	-0.158 (0.094)*	-0.222 (0.118)*	-0.217 (0.119)*
Revenue growth	-0.097 (0.064)	-0.106 (0.063)*	-0.486 (0.304)	-0.53 (0.313)*	-0.543 (0.388)	-0.6 (0.398)
Expenditure growth	0.556 (0.213)**	0.526 (0.206)**	0.974 (0.852)	0.796 (0.838)	1.61 (1.12)	1.37 (1.09)
Unemployment rate	-3.61 (1.515)**	-4.388 (1.567)***	-8.026 (7.71)	-12.51 (7.70)	-8.24 (10.25)	-14.16 (10.32)
Deficit to GDP	-1.276 (0.802)	-0.989 (0.699)	-4.584 (3.75)	-2.99 (3.5)	-7.10 (4.84)	-5.0 (4.42)
Income tax change	1.229 (0.318)***	1.056 (0.314)***	8.0 (1.95)***	7.025 (1.97)***	9.93 (2.495)***	8.64 (2.5)***
Population growth	-0.593 (0.971)	-0.608 (0.923)	-6.424 (4.363)	-6.513 (4.05)	-7.62 (5.77)	-7.74 (5.36)
Share under 17	-10.33 (1.21)***	-9.716 (1.22)***	-68.99 (6.53)***	-65.34 (6.52)***	-89.64 (8.48)***	-84.82 (8.42)***
Share over 65	-0.107 (0.036)***	-0.109 (0.034)***	-0.892 (0.238)***	-0.905 (0.224)***	-1.164 (0.306)***	-1.18 (0.287)***
Const.	3.582 (0.324)***	3.48 (0.329)***	22.96 (1.6)***	22.41 (1.6)***	29.89 (2.12)***	29.16 (2.12)***
Observations	384	384	384	384	384	384
F test	51.3	56.35	66.78	60.48	66.58	62
R squared	0.5125	0.5276	0.6298	0.6472	0.6306	0.6484
Hausman Chi value	159.63	156.22	74.36	60.44	94.90	87.99
p-value	0	0	0	0	0	0

Notes: See notes to Table 2 for information on sample variables. For years 2001 and 2003 there was no data available for state revenues and expenditures, making the panel unbalanced. All regressions are panel data OLS fixed effects regressions that include a constant and real GDP growth as the main explanatory variable (as according to equation 26). For the Hausman test a p-value of 0 implies a rejection of the null hypothesis and a suggestion to use fixed effects. Standard erros are shown in parentheses and are robust to heteroskedasiticy and clustered by state. *** denotes significance at 1%, ** at 5% and * at 10%.

Table 4: Re-election and wasteful spending

Dependent variable: Re-election	(1) Probit	(2) Probit MFX	(3) Logit	(4) Logit MFX	(5) LPM
Capital outlays per capita	3.513 (1.07)***	1.405 (0.428)***	5.746 (1.788)***	1.436 (0.447)***	1.471 (0.344)***
Capital outlays per capita squared	-1.244 (0.483)**	-0.497 (0.193)**	-2.026 (0.803)**	-0.5066 (0.2)**	-0.394 (0.08)***
Term limit	-0.722 (0.167)***	-0.2889 (0.067)***	-1.176 (0.279)***	-0.294 (0.069)***	-0.254 (0.067)***
GDP growth (election year)	0.679 (2.01)	0.272 (0.804)	1.164 (3.477)	0.291 (0.869)	0.149 (0.752)
Revenue growth	-1.927 (0.794)**	-0.771 (0.317)**	-3.176 (1.337)**	-0.794 (0.334)**	-0.757 (0.253)***
Expenditure growth	-1.302 (2.02)	-0.521 (0.808)	-2.203 (3.45)	-0.551 (0.863)	-0.337 (0.782)
Unemployment	-2.057 (7.84)	-0.823 (3.135)	-3.606 (13.02)	-0.902 (3.256)	2.275 (4.689)
Unemployment change	-0.499 (0.499)	-0.199 (0.199)	-0.846 (0.837)	-0.212 (0.209)	-0.162 (0.155)
Deficit to GDP	11.94 (7.15)*	4.778 (2.862)*	19.68 (12.14)	4.921 (3.034)	4.672 (2.01)**
Deficit change	0.0015 (0.007)	0.00062 (0.003)	0.003 (0.012)	0.0007 (0.003)	0.0014 (0.002)
Personal income	-0.00001 (0.00001)	-0.000004 (0.000005)	-0.000016 (0.00002)	-0.000004 (0.000006)	-0.000015 (0.000006)**
Income change	0.235 (2.81)	0.094 (1.122)	0.202 (4.686)	0.051 (1.17)	0.901 (0.95)
Population change	-11.01 (6.08)*	-4.401 (2.434)*	-18.05 (10.01)*	-4.513 (2.5)*	-4.743 (2.553)*
Under 17	1.592 (5.01)	0.636 (2.001)	2.433 (8.404)	0.608 (2.101)	-1.766 (3.293)
Over 65	-2.012 (2.14)	-0.804 (0.856)	-3.334 (3.872)	-0.833 (0.968)	-0.657 (0.054)
Const.	-0.942 (1.59)		-1.458 (2.69)		0.691 (0.965)
Observations	384	384	384	384	384
Percent correctly predicted	62.33%	62.33%	69.67%	69.67%	62.34%
Pseudo R-squared	0.2038	0.2038	0.2031	0.2031	0.1358
Log likelihood	-230.784	-230.784	-230.992	-230.992	

Notes: See notes to Table 2 for information on sample variables. Regressions in columns (1) and (2) are calcualted using a random effects probit, in columns (3) and (4) a random effects logit, while in column (5) a standard linear probability model. Columns (2) and (4) present the average marginal effects of the probit and logit estimates. The re-election dummy variable is the dependent variable. For the linear probability model results reported in column (5), the regular R-squared is calculated instead of the pseudo R-square. The pseudo R-square used is the McFadden pseudo R-square. Standard errors are shown in parentheses and are robust to heteroskedasiticy and clustered by state. *** denotes significance at 1%, ** at 5% and * at 10%.

Table 5: Robustness checks

Dependent variable: Re-election	(1)	(2)	(3)	(4)
Total spending per capita	0.465 (0.265)*			
Total spending per capita squared	-0.019 (0.016)			
Current spending per capita		0.437 (0.371)		
Current spending per capita squared		-0.0232 (0.03)		
Capital outlays to current spending			3.352 (11.74)	
Capital outlays to current spending squared			8.011 (33.69)	
Current spending to total spending				-74.96 (85.58)
Current spending to total spending squared				48.29 (57.32)
Term limit	-0.695 (0.165)***	-0.693 (0.165)***	-0.717 (0.165***)	-0.719 (0.165)***
GDP growth (election year)	0.425 (1.983)	0.274 (1.99)	-0.983 (1.962)	-0.919 (1.96)
Revenue growth	-1.565 (0.749)**	-1.527 (0.749)**	-1.477 (0.733)**	-1.561 (0.736)
Expenditure growth	-2.108 (1.813)	-1.891 (1.804)	-1.709 (1.77)	-1.243 (1.767)
Unemployment	-10.25 (7.58)	-8.63 (7.45)	-4.272 (7.251)	-8.117 (7.39)
Deficit to GDP	10.68 (6.29)*	10.65 (6.25)*	10.96 (6.15)*	11.45 (6.19)*
Personal income	-0.000021 (0.000018)	-0.000014 (0.000017)	0.000001 (0.00001)	0.000006 (0.00001)
Under 17	3.672 (4.89)	3.637 (4.945)	-2.542 (5.07)	1.092 (4.91)
Over 65	-2.243 (2.01)	-2.25 (2.08)	-2.425 (2.618)	-2.354 (2.206)
Const.	-1.54 (1.961)	-1.266 (2.022)	-0.322 (2.01)	29.21 (31.81)
Observations	384	384	384	384
Percent correctly predicted	62.28%	62.15%	61.98%	61.99%
Pseudo R-squared	0.1877	0.1890	0.1932	0.1849
Log likelihood	-235.443	-235.0678	-233.837	-236.252

Notes: A random effects probit regression has been used in each case. The pseudo R-square used is the McFadden pseudo R-square. Standard errors are shown in parentheses and are robust to heteroskedasiticy and clustered by state. *** denotes significance at 1%, ** at 5% and * at 10%.

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