Term limits and electoral accountability ☆

Michael Smart [a], Daniel M. Sturm [b],*

[a] *Department of Economics, University of Toronto, 150 St. George Street, Toronto, ON M5S 3G7, Canada*
[b] *Department of Economics, London School of Economics, Houghton Street, London WC2A 2AE, United Kingdom*

ABSTRACT

Periodic elections are the main instrument through which voters can hold politicians accountable. From this perspective term limits, which restrict voters' ability to reward politicians with re-election, appear counterproductive. We show that despite the disciplining effect of elections, term limits can be ex-ante welfare improving from the perspective of voters. By reducing the value of holding office, term limits can induce politicians to implement policies that are closer to their private preferences. Such "truthful" behavior by incumbents in turn results in better screening of incumbents. We characterize under which circumstances two-term or even longer term limits are the optimal institution for voters.

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1. Introduction

In representative democracies, periodic elections are the main instrument through which voters can hold politicians accountable. A broad lesson from the growing literature on political economy is that electoral accountability should benefit voters through two main channels. First, elections enable voters to selectively retain incumbents whose track record suggests that they are of high ability. Second, electoral accountability constrains the opportunistic behavior of incumbents. If the payoffs from future terms in office are sufficiently large, then the threat of being replaced by a challenger should reduce politicians' willingness to implement policies which are not in the interests of the electorate.

From this perspective, term limits, which limit politicians to a maximum number of terms in office, are a curious intervention into the political process. In the presence of term limits, voters are unable to retain good politicians who face a binding term limit. Furthermore, term limits reduce or, in the case of a binding term limit, eliminate the incumbent's payoffs from future periods in office, which reduces voters' ability to punish opportunistic behavior by threatening to replace the incumbent

with a challenger. It would therefore not be surprising if voters were strongly opposed to term limits.

However, the opposite seems to be the case in practice. Opinion polls suggest substantial support for term limits among voters from all sides of the political spectrum. Carey et al. (2000) document that large majorities of voters supported the introduction of term limits in a series of referenda in the US states during the 1990s. Term limits are not only popular, but also widely used. Several US states have limited their governor to a maximum number of terms in office since the foundation of the United States.[1] Currently, in the United States the office of the president, over two-thirds of state governors and many other politicians in the state executive face term limits.[2]

In this paper we address this apparent puzzle. We argue that term limits can in fact serve the interests of voters — even though elections do indeed have a disciplining effect on politicians. We analyze a model in which politicians have private information about the effectiveness of a policy and can be of one of two types: some are "public-spirited," with payoffs that coincide with those of the electorate, while others have biased preferences. The key mechanism behind our results is that the incentives created by electoral accountability may not only reduce opportunistic behavior by biased politicians, but also distort the behavior of public-spirited politicians. The reason is that the payoffs from future periods in office can make even public-spirited politicians unwilling to take actions today that are in the interests of voters, if doing so reduces their re-election prospects.

[1] See Grofman and Sutherland (1996) for a history of term limits in the United States.
[2] See Johnson and Crain (2004) for an overview of the use of term limits outside the United States.

In this context, limiting politicians to a finite number of terms in office can be an attractive institution. Consider a restriction to at most two terms in office. This reduces the value of staying in office after the first term and it changes the political equilibrium in our model sharply. It is immediate that politicians will follow their own preferences in their second term in office, when re-election is not an option. However, the reduced payoff from re-election ensures that politicians in their first term are also less inclined to implement policies that would enhance their re-election probability but are not in line with their own policy preferences. We refer to this as the "truthfulness effect" of term limits. Furthermore, increased truthfulness reduces the re-election probability of biased incumbents. As past policy choices become a better indicator of the true preferences of the incumbent, it is easier for voters to detect and remove biased politicians. We refer to this as the "selection effect" of term limits.

Our main contribution is to show that the combination of the truthfulness effect and selection effect can make term limits preferable from the perspective of voters relative to a situation without term limits. The welfare impact of truthfulness is in general ambiguous: truthfulness by public-spirited politicians must be beneficial, but truthfulness by biased politicians is less benign. However, the welfare implications of the selection effect induced by more truthful behavior are unambiguously positive. An increase in voters' ability to weed out politicians who do not share their preferences must increase voters' utility. We show that if the costs of more truthful behavior are small (they could even be negative), then the positive selection effect ensures that two-term limits increase voter welfare.

The reason that two-term limits can be optimal from the perspective of voters can be understood as a simple commitment problem. In the absence of term limits, the payoffs from future periods in office induce both good and bad incumbents to ignore their private information about the state of nature and to instead implement policies that maximize their re-election probability. One way out of this problem could be for voters to announce that an incumbent's probability of re-election *in the future* will be lower, which would reduce the anticipated continuation payoff to remaining in office and make truthful short-run behavior more palatable. As voters cannot easily bind their future behavior in this way, such an announcement is unlikely to be credible. In this context, therefore, a constitutional restriction on the number of terms that an incumbent can stay in office may serve as a commitment device for the electorate that alters the equilibrium behavior of incumbents and increases the equilibrium welfare of voters.

We consider a number of extensions of the basic analysis of two-term limits. First, we compare two-term limits to longer term limits and to one-term limits. We show that for high discount rates longer term limits are optimal, while one-term limits are always dominated in the basic model. Second, we look at the implications of an endogenous pool of challengers. Third, we relax the degree of asymmetric information between voters and the incumbent. Fourth, we add ego rents from holding office to the model in addition to the utility that politicians derive from implementing their preferred policy. Fifth, we consider the implications of gains from experience for the attractiveness of term limits. Finally, we discuss how the predictions of the model compare to the existing empirical evidence on term limits.

The most prominent explanation for term limits was introduced by Dick and Lott (1993) and Buchanan and Congleton (1994) in a legislative setting and is developed further in Chari et al. (1997) and Bernhardt et al. (2004). Dick and Lott (1993) and Buchanan and Congleton (1994) argue that politicians' ability to transfer resources to their districts increases in their tenure in office relative to the tenure of other delegates. This seniority bonus makes it costly for voters from one district to unilaterally replace their incumbent, which in turn allows senior incumbents to extract rents. Term limits are one solution to this dilemma, because they reduce the average tenure of politicians and make it less costly to punish bad behavior by replacing incumbents. Chari et al. (1997) develop a model in which the voters in each electoral

district have an incentive to elect a representative who values public spending more than they themselves. The reason for this strategic delegation is that this increases the probability that the representative is part of the winning coalition that receives public spending which is financed by a uniform tax on all districts. If voters only learn the public spending preferences of their incumbent from first-period policy-making, a one-term limit can prevent them from using this information to re-elect more fiscally liberal representatives to a second term in office.

The key mechanism behind these explanations for term limits is an externality that voters in one district impose on voters in other districts through their choice of representative which can be mitigated through term limits. Our contribution differs from this literature in a number of ways. First, we provide an explanation for term limits which does not rely on externalities in a legislative setting. Second, our approach applies in particular to the executive branch, where – at least in the US – term limits have been particularly popular and widespread. Third, our approach provides a natural explanation of why term limits that take effect after an incumbent's second – or even later – term in office can be optimal for voters. In contrast, the externality view of term limits by itself only justifies the use of one-term limits. However, the peculiar combination of a limited number of re-election possibilities followed by certain removal from office, which is present under two-term or longer term limits, seems to be the empirically most popular type of term limit.

An alternative explanation for term limits, which is not limited to a congressional setting, is introduced by Tabarrok (1996) and formalized in Glaeser (1997). In this model a right-wing and a left-wing party have an equal probability of winning the first election. However, an exogenous incumbency advantage ensures that the party which wins the first election is also re-elected for a second term in office. If right and left-wing voters are sufficiently risk averse, then a term limit at the end of the first term, which eliminates the incumbency advantage, can increase the ex-ante utility of both the left-wing and right-wing parties. Our approach does not rely on this insurance mechanism. It takes accountability seriously and is able to explain longer term limits. Closest in spirit to our analysis is the almost entirely informal discussion in Glazer and Wattenberg (1996). They argue that in a world without term limits the spoils of future periods in office lead politicians to divert time from legislative work, which is viewed as a public good, to narrow services for their constituencies. Our model captures similar ideas in a formal model and makes precise when term limits can improve the welfare of voters.[3]

Our results are also closely related to the growing literature on the potentially negative effects of career concerns, including Morris (2001) and Ely and Välimäki (2003). In this literature long-lived agents who are concerned about their future reputations can end up taking short-run actions that are suboptimal for their principal. These ideas have been prominently applied to a political economy setting by Maskin and Tirole (2004), building on Canes-Wrone et al. (2001). They develop a two-period model in which strong re-election incentives can induce politicians to "pander" to public opinion and to ignore their private information about the effectiveness of different policies. In this case representative democracy is dominated by either a regime of judicial power, where the incumbent cannot be re-elected and stays in office for a fixed period of time, or direct democracy, where voters directly vote over policies. Our contribution differs from Maskin and Tirole (2004) in two main ways. First, we consider an infinite horizon model which has a large number of potential equilibria and we show that with repeated elections the best possible equilibrium for voters involves

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[3] Two further explanations for term limits are developed in Konrad and Torsvik (1997), where the optimal provision of incentives for a bureaucrat requires that the politician is removed from office after every period, and Adams and Kenny (1986), where term limits are used as a substitute for elections to implement an optimal tenure for politicians. See Lopez (2003) and Tabarrok (1994) for surveys of the term limits literature.

pandering in every period. Second, we show how two-term or longer term limits can improve the utility of voters relative to this benchmark. In the terminology of Maskin and Tirole (2004) two-term or longer term limits can be understood as a combination of periods with electoral accountability and periods with judicial power, because the incumbent faces a binding term limit. We find that this frequently used combination dominates pure judicial power, which is formally equivalent to a one-term limit.[4]

The remainder of the paper is organized as follows. The next section introduces the model. Section 3 analyzes the properties of the model in the absence of term limits. Section 4 investigates the impact of term limits and considers both two-term limits and shorter and longer alternatives. Section 5 discusses the implications of an endogenous candidate pool, different degrees of asymmetric information, ego rents and gains from experience. Section 6 discusses the relationship between our model and the existing empirical evidence and the final section concludes.

2. Model

We develop a simple political agency model which captures the key features of a representative democracy.[5] In this model an incumbent has to make a binary policy decision on behalf of a representative voter. Incumbents can have preferences which are either identical to those of the voter or biased. Finally, there is asymmetric information between the voter and the incumbent because the incumbent possesses private information about the effectiveness of the policy. If voters could process all policy relevant information in the same way as governments, there would be little reason to delegate policy making to governments. The informational advantage of politicians is arguably at the heart of why countries use representative democracy rather than direct democracy for most policy issues.[6]

In particular, we consider a game between an infinitely lived representative voter and a sequence of elected politicians. In each of an infinite number of periods, the incumbent makes a policy decision $x_t \in \{0,1\}$. The payoff from the policy depends on a state of nature $s_t \in \{0,1\}$. The voter's per period payoff from the decision is

$$v(x_t, s_t) = x_t s_t + (1-x_t)(1-s_t), \qquad (1)$$

i.e. the voter receives a payoff of one if $x_t = s_t$ and zero otherwise. The probability that $s_t = 0$ is assumed to be equal to $p > 1/2$, i.e. the voter believes ex-ante that action $x_t = 0$ is the right choice.

Each incumbent politician may be of one of two types $\theta \in \{B,G\}$. Type G agents will be referred to as "good" and type B agents as "bad" politicians. Good politicians are public-spirited officials who derive utility from implementing the policy that is in the interest of the voter and their per period utility u_G is simply:

$$u_G(x_t, s_t) = v(x_t, s_t). \qquad (2)$$

Bad politicians' preferences are instead biased in favor of choosing $x_t = 1$. In particular, the preferences of a bad politician depend on a state $r_t \in \{0,1\}$ which captures an idiosyncratic shock to his preferences. His per period utility u_B is:

$$u_B(x_t, r_t) = x_t r_t + (1-x_t)(1-r_t) \qquad (3)$$

i.e. a bad politician receives a payoff of one if $x_t = r_t$ and zero otherwise. We assume that the probability that $r_t = 0$ is equal to $q < p$ and $\text{Prob}(r_t = 1|s_t = 1) = 1$. That is, when a good politician would like to choose $x_t = 1$ then a bad politician agrees. However, bad politicians prefer to choose $x_t = 1$ strictly more often than good politicians.[7] Finally, we assume that bad politicians' preferences satisfy the restriction $b > 1 - p$ where $b = p - q$ is the bias of bad incumbents. The left-hand side of this inequality captures the per period expected difference in utility for the voter between first-best policy-making and the payoff from a bad politician who sets $x_t = r_t$ in every period. The right-hand side of the inequality captures the difference in payoff for the voter between first-best policy-making and the timid equilibrium, which we define formally in Section 3 below. This assumption places a lower bound on the bias in bad politicians' preferences and ensures that the agency problem is sufficiently severe.[8]

The probability that a randomly chosen politician is good is π_0. Let π_t be the updated belief of the voter about the probability that the incumbent is good at the beginning of period t, which will also be referred to as the politician's reputation at date t. Both types of politicians and the voter discount future payoffs relative to current payoffs with a discount factor $\beta = 1 / (1 + \delta) < 1$ where δ is the discount rate. When not in office both types of politicians receive a reservation utility which is normalized to zero. Finally, we assume for simplicity that electoral defeat is an absorbing state in the sense that politicians who are voted out of office never return to holding political office.

The timing and information structure of the game are as follows. At the beginning of each period, nature reveals the state s_t and r_t. The key informational assumption is that r_t and s_t are observed by the incumbent but not by the voter. In Section 5 we return to this assumption and show that our results are unchanged if the voter learns the state s_t with some probability $\varphi < 1$ as long as this probability is sufficiently small.[9] After observing the state of nature the politician chooses x_t which is observed by the voter. At the end of each period there is an election in which the voter decides whether to retain the incumbent or to choose the challenger, who is of the good type with probability π_0.

2.1. Equilibrium definition

We characterize Markov perfect equilibria of this game, i.e. equilibria in strategies that only condition on payoff relevant information. A Markov perfect equilibrium is a strategy for each agent-type that is a best response to others' strategies given beliefs, and a sequence of beliefs that evolves in a way consistent with Bayes' rule. A strategy for good incumbents is a function

$$\lambda^G(\pi_t, s_t) = \text{Prob}(x_t = 1 | \pi_t, s_t) \qquad (4)$$

which specifies the probability with which he implements $x_t = 1$ as a function of his reputation at the beginning of the period, π_t, and his payoff relevant state of nature, s_t. Similarly, a strategy for bad incumbents is a function

$$\lambda^B(\pi_t, r_t) = \text{Prob}(x_t = 1 | \pi_t, r_t) \qquad (5)$$

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[4] Stasavage (2004, 2007) develops a model in which different degrees of transparency of decision processes are used as an alternative mechanism to term limits to reduce the pandering incentives of politicians.

[5] The political agency literature originated with Barro (1973) and recent contributions include Banks and Sundaram (1998), Coate and Morris (1995), Besley and Burgess (2002), List and Sturm (2006), and Vlaicu and Whalley (2011). Besley (2006) provides a synthesis of this literature.

[6] Very similar setups have been used previously in Coate and Morris (1995), Maskin and Tirole (2004), and Vlaicu and Whalley (2011) among others.

[7] While the basic model assumes that politicians only derive utility from choosing their preferred policy as, for example, in Canes-Wrone et al. (2001), in Section 5 below we consider the case where politicians' utility also contains a fixed per period payoff ("ego rent") from holding office.

[8] In a more general model with more than two types of politicians, it would be natural to assume that there are some types who are so biased that they would generate sufficiently negative payoffs for the voter if they behaved truthfully that a variant of this condition always holds.

[9] Note that if $\varphi = 0$ the voter does not observe his own utility, which is similar to the "no-feedback" case in Maskin and Tirole (2004). In a more general model, such as Banks and Sundaram (1998), the policy choices would shift a probability distribution over outcomes. However, from the observed outcomes the voter would not be able to infer with certainty whether the policy matched the state of nature.

which depends on his reputation at the beginning of the period and his payoff relevant state of nature, r_t.[10]

At the end of period t, after the policy choice of the incumbent politician, the updated beliefs of the voter about the incumbent are:

$$\tilde{\pi}_t = \text{Prob}(\theta = G | x_t, \pi_t). \tag{6}$$

Note that $\tilde{\pi}_t$ depends implicitly on the equilibrium strategies λ^θ through their impact on updated beliefs about the quality of retained incumbents. A strategy for the voter is a voting rule $\sigma(\tilde{\pi}_t)$ that determines the probability with which the incumbent is retained as a function of the voter's updated beliefs about the quality of the incumbent $\tilde{\pi}_t$.[11] We restrict attention to voting rules $\sigma(\tilde{\pi}_t)$ that have a finite number of discontinuities.[12]

The strategies are best responses if they are solutions to the value functions of incumbents and the voter. To formalize this, let $P(x_t|\theta)$ denote the probability distribution on x_t induced by the current strategy of type θ, and let $P(x_t) = \pi_t P(x_t|G) + (1 - \pi_t)P(x_t|B)$ be the unconditional distribution on x_t. The value function for a good incumbent is

$$U_G(\pi_t) = \max_{\lambda^G(\pi_t, s_t)} E\left[u_G\left(\lambda^G(\pi_t, s_t), s_t\right)\right] + \beta\sum_{x_t} P(x_t|G)\sigma(\tilde{\pi}_t)U_G(\tilde{\pi}_t). \tag{7}$$

The value function for a bad incumbent is defined analogously. The value function for the voter is

$$V(\pi_t) = E\left[v\left(\lambda^\theta(\pi_t, s_t), s_t\right)\right] \tag{8}$$
$$+ \beta\sum_{x_t} P(x_t) \max_{\sigma(\tilde{\pi}_t)} \left[\sigma(\tilde{\pi}_t)V(\tilde{\pi}_t) + (1 - \sigma(\tilde{\pi}_t))V(\pi_0)\right],$$

where now the expectation is over both s_t and θ, given the voter's current beliefs π_t.

3. Equilibrium with infinitely repeated elections

We now turn to the political equilibria of the game in the absence of term limits. To what extent can elections create incentives for incumbents to make decisions that are in the voter's interest? It turns out that the electoral incentives may be rather limited in this model. Consider first the following equilibrium strategies, which we will refer to as the "timid" equilibrium: Both types of politicians choose $x_t = 0$ if $\pi_t = \pi_0$ and play a "truthful" strategy otherwise, i.e. good politicians choose $x_t = s_t$ and bad politicians choose $x_t = r_t$ for any $\pi_t \neq \pi_0$. The voter re-elects if $x_t = 0$ and replaces the incumbent with the challenger otherwise.

Given that both types always choose $x_t = 0$ on the equilibrium path, both the challenger and the incumbent generate the same continuation payoff for the voter. It is therefore a best response for the voter to re-elect the incumbent after observing $x_t = 0$.[13] Given the equilibrium

strategies, it is also optimal for the voter to replace incumbents who have selected $x_t = 1$ if out of equilibrium beliefs are that incumbents who chose $x_t = 1$ are of the bad type.[14] Given these out of equilibrium beliefs our assumption that $b > 1 - p$ implies that the voter prefers the payoff on the equilibrium path (p) to the payoff from truthful behavior by an incumbent who is bad with probability one ($1 - b$). For the strategy of the incumbent to be a best response, it must be the case that types who view $x_t = 1$ as the right decision (when $s_t = 1$ or $r_t = 1$) prefer to forgo the current payoff to their preferred action (equal to 1) in order to remain in office. Since in this equilibrium the value of office for a good politician is $U^G = p / (1 - \beta)$ and for a bad politician is $U^B = q / (1 - \beta) < U^G$, this implies that timid behavior is a best response for incumbents whenever $1 < \beta q / (1 - \beta)$, or $\beta > 1 / (1 + q)$.

Our main result in this section is that the timid equilibrium is not just one possible political equilibrium of the game without term limits, but that it is in fact the Markov perfect equilibrium with the highest possible payoff for the voter:

Proposition 1. For sufficiently low discount rates, the Markov perfect equilibrium with the highest possible payoff for the voter in the game without term limits is the "timid" equilibrium.

The formal proof of this proposition is relegated to the appendix. The proof proceeds in three steps. The first step characterizes all equilibria in which both types of politicians pool already at π_0 and shows that the timid equilibrium is the best of these pooling equilibria from the perspective of the voter. The second step shows that there can be equilibria in which the two types of politicians do not pool at π_0 but pool at some updated reputations. These equilibria only exist if the voter actually prefers pooling over the non-pooling behavior and these equilibria therefore must also be dominated by the timid equilibrium. Finally, the last step of the proof shows that for low discount rates there cannot be equilibria that do not involve pooling for any reputation of the incumbent. The reason is that low discount rates make the payoff from future periods in office high. If the proposed equilibrium strategy prescribes an action which increases utility in the current period but reduces the probability of re-election, incumbents will prefer to deviate from this proposed equilibrium strategy to the action that offers a higher re-election probability.

Proposition 1 implies that for sufficiently low discount rates the voter is not only unable to induce the politician to implement the first-best policy, but that the best possible outcome for the voter is one in which the politicians always ignore their private information and implement $x_t = 0$ in every period. The upper bound on the utility of the voter, which has been established in Proposition 1, is the benchmark against which we compare the impact of term limits. The next section analyzes how term limits change the political equilibrium and under which circumstances term limits can serve the interests of voters.

4. Term limits

In the last section we showed that for sufficiently low discount rates even public-spirited politicians who care about the welfare of the voter are induced to behave perversely, taking actions arbitrarily often that they know to be deleterious to voter welfare. Evidently the problem is that the equilibrium behavior of voters makes the continuation payoff following untruthful actions too high, and thus the prospect of re-election too important to politicians, relative to the short-run payoff.

One way out of this problem could be for the voter to announce that an incumbent's probability of re-election *in the future* will be lower, which would reduce the anticipated continuation payoff to remaining in office and make truthful short-run behavior more palatable. But,

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[10] While we assume above that both incumbents can observe the current realization of both s_t and r_t in our basic model only one of the states is payoff relevant for each type of politician as the voter only observes the policy choice of the incumbent but not s_t and r_t itself. Allowing both types of politicians to observe both states does not a priori preclude the possibility that bad politicians could use s_t as a randomization device in potential mixed strategy equilibria. Using the realizations of s_t as a randomization device would imply that bad types implement the optimal policy for the voter in every period. We rule out that such equilibria exist in the proof of Proposition 1 and return to this point there.

[11] When we consider term limits, the strategies of politicians and voters will also condition on how many terms an incumbent has already served in office, as this becomes payoff relevant in the presence of term limits.

[12] If the voter in equilibrium uses, for example, a cut-off rule and only re-elects the incumbent if his updated beliefs are above some critical value π^*, then $\sigma(\tilde{\pi}_t)$ would have just one discontinuity.

[13] As the voter is indifferent between the incumbent and the challenger after observing $x_t = 0$ in the timid equilibrium he could randomize between re-electing and firing the incumbent in this case. Allowing the voter to randomize in this case will not change the equilibrium strategy of the politicians as long as the voter re-elects after observing $x_t = 0$ with a sufficiently high probability.

[14] These out of equilibrium beliefs are consistent with the intuitive criterium introduced by Cho and Kreps (1987) as a deviation to $x_t = 1$ is not equilibrium dominated for either good or bad incumbents.

since the electorate cannot easily bind its future behavior in this way, such an announcement is unlikely to be credible. In this context, therefore, a constitutional restriction on the number of terms that an incumbent can stay in office may serve as a commitment device for the electorate that alters the equilibrium behavior of incumbents and might increase the equilibrium welfare of the voter.

We first consider the case where politicians are limited to serve at most two terms in office. This is the restriction on tenure which currently applies, for example, to the US president and also to more than two-thirds of US governors. In the following subsection we consider the relative benefits of two-term limits versus either shorter or longer term limits. The analysis of the central trade-offs behind two-term limits will be key to understanding the choice between shorter and longer term limits.

4.1. Equilibrium with two-term limits

In the presence of two-term limits, there is a unique Markov perfect equilibrium of the game, in which incumbents' strategies differ dramatically from the timid behavior considered above. In this equilibrium both types of politicians have a strictly dominant strategy which involves truthful behavior in each term he is in office, i.e. $x_t = s_t$ and $x_t = r_t$ for good and bad incumbents respectively. That truthful behavior is a dominant strategy when an incumbent is in his second term is immediate, since a second-term incumbent is a "lame duck" with no prospect of re-election. That behavior is also truthful in an incumbent's first term in office follows from the fact that the highest continuation payoff for a first-term incumbent is β, which is strictly lower than the payoff from implementing his preferred policy in his first term in office for any positive discount rate. To complete the equilibrium characterization, we must next solve for the equilibrium re-election rule of the voter, which we relegate to the proof in the appendix of the following proposition:

Proposition 2. There is a unique Markov perfect equilibrium in the presence of two-term limits which involves "truthful" behavior by politicians in all periods. The voter re-elects the incumbent if the incumbent implements $x_t = 0$ during his first term in office and replaces him with the challenger otherwise.

This equilibrium stands in sharp contrast to the timid equilibrium in the absence of term limits. In the timid equilibrium low discount rates make re-election so valuable that both types of politicians always implement the policy that ensures re-election. Under two-term limits, in contrast, both good and bad incumbents choose $x_t = 1$ with strictly positive probability in their first term in office even though this results in certain electoral defeat. The reason is that the smaller payoff from re-election in the presence of term limits no longer dominates politicians' payoffs from implementing their preferred policy in their first term in office.

4.2. When are two-term limits in the interest of voters?

We now ask whether expected voter welfare could be higher with two-term limits on incumbents than in the timid equilibrium of the infinite horizon game, which Proposition 1 establishes as the equilibrium with the highest payoff for the voter when discount rates are small. In the timid equilibrium, the voter's expected payoff in each period is just p, so that the expected present discounted value of equilibrium welfare is

$$V^\infty = p/(1-\beta). \tag{9}$$

Equilibrium voter welfare with two-term limits depends on the expected payoff obtained from first-term and second-term incumbents,

and the probabilities with which the two occur. Since all incumbents behave truthfully in all periods, the expected payoff to the voter from an incumbent who is good with some probability π is

$$v(\pi) = 1-(1-\pi)b. \tag{10}$$

A first-term incumbent is good with probability π_0, while a second-term incumbent is good with probability $\pi_1 = \pi_0 p \,/\, P_0 > \pi_0$, where

$$P_0 = \pi_0 p + (1-\pi_0)q \tag{11}$$

is the probability that a first-term incumbent chooses $x_1 = 0$ and is re-elected.

Relative to the timid equilibrium two-term limits induce both a truthfulness effect and a selection effect. The reduced re-election incentive induces truthful behavior by both types of incumbents in both periods in office. The truthfulness effect increases voter welfare if $v(\pi_0) \geq p$ and decreases it otherwise. Additionally, truthful behavior induces a selection effect: Re-election rates for both good and bad incumbents fall. However, re-election rates of bad incumbents, who are more likely to chose $x_t = 1$, fall more than the re-election rate of good incumbents. This implies that the average quality of politicians in their second term in office is higher than the average quality of first term incumbents. This must increase voter welfare as truthful behavior by a good politician yields a higher payoff to the voter than truthful behavior by a bad politician.

On balance, voter welfare might therefore rise or fall with the introduction of two-term limits. To sort out these effects, we calculate expected voter welfare with two-term limits from the value function

$$V = 1-(1-\pi_0)b + \beta[\pi_0 p(1+\beta V) + (1-\pi_0)q(1-b+\beta V)]$$
$$+\beta(1-P_0)V, \tag{12}$$

which can be solved for V to obtain

$$V = \frac{1}{1-\beta}\left[1-(1-\pi_0)b\frac{1+\beta q}{1+\beta P_0}\right]. \tag{13}$$

The second term in brackets in this expression is equal to the per-period expected loss from the action of a bad politician multiplied by the discounted average probability that a bad politician is in office. It is straightforward to verify that V is an increasing function of π and a decreasing function of b. Moreover, it is the case that $V \to 1 \,/\, (1 - \beta) > V^\infty$ as $\pi \to 1$ or $b \to 0$. Thus we have:

Proposition 3. For sufficiently low discount rates, expected voter welfare is higher with two-term limits than without term limits if the proportion of good politicians π_0 is sufficiently high, or the bias b in bad politicians' preferences is sufficiently low.

The intuition behind this result is as follows: as the proportion of good politicians in the pool of politicians increases, this must make truthful behavior by incumbents more attractive for the voter relative to timidity. In the limit where the fraction of good politicians approaches one, truthful behavior by incumbents approaches the payoff to the voter of first-best policy-making, which must strictly dominate the timid equilibrium.

The welfare effect of a smaller difference in the preferences of good and bad politicians depends on two opposing effects. First, if the preferences of bad incumbents are less biased, this reduces the damage to the voter from truthful behavior by bad politicians. However, more similar behavior by good and bad incumbents also weakens the selection effect of the election at the end of the first period. This second effect is dominated by the first effect and an increase in the similarity of preferences between bad and good incumbents also improves voter welfare.

4.3. Two-term limits versus shorter or longer alternatives

Our analysis has so far concentrated on two-term limits, which are not only a frequently used restriction on tenure but are also difficult to rationalize with other explanations of the benefits of term limits. However, there are also examples of shorter or longer term limits. The presidents of several Latin American countries and the governor of Virginia, for example, are currently subject to a one-term limit. In contrast, a number of US states that have recently introduced term limits for their state legislators limit them to three terms in office.

Consider first the benefits of one-term limits relative to two-term limits. Since it is the spoils from future terms in office that induce undesirable behavior from incumbents in our model, it may seem more natural to impose one-term limits rather than two-term limits. In fact, however, the voter strictly prefers two-term limits to one-term limits in our basic model.[15] Both under one and two-term limits the dominant strategy of incumbents is truthfulness. Since good politicians are strictly more likely to be re-elected to a second term than bad politicians, two-term limits induce a positive selection effect that increases the average payoff to the voter relative to one-term limits. Summarizing this discussion, we have:

Proposition 4. In our basic model, two-term limits always yield a higher equilibrium payoff for the voter than one-term limits.

We now turn to the trade-off between two-term limits versus longer limits. Consider first the choice between two-term and three-term limits. A politician who is in his second term in the presence of three-term limits faces the same incentives as a politician in his first term under two-term limits. It is therefore a dominant strategy for both types of politicians to behave truthfully in their second and third terms in office under three-term limits for any non-negative discount rate. A sufficient condition for this also to be a dominant strategy for both good and bad incumbents in their first term in office under three-term limits is

$$1 > \beta + \beta^2, \tag{14}$$

which is satisfied for sufficiently large discount rates. It is straightforward to check that the voter's optimal response to these strategies is to re-elect the incumbent as long as the updated beliefs about the incumbent are larger than π_0.

If politicians are sufficiently impatient that condition (14) is satisfied, then the voter's utility must be higher under three-term limits than under two-term limits. In this case the expected payoff of the voter during the first two terms of a three-term limit is the same as under a two-term limit. However, under three-term limits the voter has the additional possibility to retain politicians who are more likely to be of the good type than a randomly drawn challenger for an additional term which cannot reduce his welfare.

The same logic can be extended to even longer term limits. If discount rates are sufficiently high to induce truthful behavior by incumbents under even longer term limits, then such longer limits must dominate shorter restrictions on tenure. In fact, there exists a critical discount rate above which an "infinite" term limit, i.e. no term limit at all, dominates any finite term limit. If politicians are so impatient that they behave truthfully even in the absence of term limits, then finite term limits must be unambiguously welfare reducing for the voter, as they restrict his ability to retain good incumbents. The results of this discussion are summarized in the following proposition:

Proposition 5. Sufficiently high discount rates ensure that expected voter welfare with three-term or even longer limits is higher than with two-term limits.

While at high discount rates longer term limits dominate shorter term limits, it is also not difficult to see under what circumstances the reverse is the case for low discount rates. Consider again the choice between two-term and three-term limits. Suppose that politicians are very patient and two-term limits dominate the payoff that the voter receives in the timid equilibrium without term limits. In this case a three-term limit is incompatible with truthful behavior by politicians in all three terms in office. Instead the equilibrium must involve pooling on either $x_t = 0$ or $x_t = 1$ during an incumbent's first term in office and truthful strategies for the second and third terms. If the voter prefers the political equilibrium in an incumbent's second and third terms under three-term limits (which is identical to the equilibrium under two-term limits) to timidity, then he must prefer two-term limits to three-term limits in this case. The same argument can be extended to the choice between even longer term limits and two-term limits and we therefore have:

Proposition 6. For sufficiently low discount rates expected voter welfare is higher under two-term limits relative to longer term limits, whenever two-term limits yield a higher expected payoff to the voter than the timid equilibrium.

5. Extensions

This section discusses the implications of a number of extensions of the model. The next subsection considers the incentives of different types of people to become politicians. The following section considers the importance of asymmetric information for our results. The next section explores the implications of adding "ego rents" from holding office to the model and the final section considers the implications of adding gains from experience to the model.

5.1. Endogenous types

So far we have assumed that the probability that a randomly chosen politician is of the good type is exogenously given. Supporters of term limits frequently argue that term limits encourage different people to run for political office. We can address this claim in our model by comparing the change in the value of holding office for good and bad politicians as term limits are introduced.

The equilibrium payoffs of good and bad incumbents in the timid equilibrium without term limits are $p / (1 - \beta)$ and $q / (1 - \beta)$ respectively. If two-term limits are introduced, then these payoffs change to $1 + \beta p$ and $1 + \beta q$ respectively. Since $p > q$ the equilibrium payoffs of good politicians are higher than the payoffs of bad politicians both in the absence and presence of term limits. The payoff of good incumbents in the presence of term limits relative to the payoff in the timid equilibrium simplifies to $(1 / p + \beta)(1 - \beta)$. The same ratio for bad incumbents is $(1 / q + \beta)(1 - \beta)$ which must be larger as $p > q$. The results of this discussion are summarized in the following proposition.

Proposition 7. The introduction of two-term limits reduces the equilibrium value of holding office proportionately more for good than bad politicians relative to the timid equilibrium of the game without term limits.

How this change in the relative payoff of holding office for good and bad incumbents affects the proportion of good types who seek political office clearly depends on the distribution of outside options of good and bad types. If these are sufficiently similar then the introduction of term limits could endogenously reduce the average quality of politicians. This mechanism therefore has the potential to overturn our finding that two-term limits can be beneficial if the pool of candidates for office is exogenous. However, while there is empirical evidence that some features of the political system, such as wages for politicians, influence who runs for office (see for example Ferraz and Finan, 2009; Gagliarducci and

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[15] Below we return to the relative benefit of one versus two-term limits in the presence of ego rents.

Nannicini, 2013), there is currently limited evidence that term limits have had a similar effect. Carey et al. (2006), for example, show that the introduction of term limits for state legislators in a number of US states in the 1990s has not resulted in substantial changes in the observable characteristics of legislators in these states.[16]

5.2. More information

Our basic model uses a very simple information structure: Politicians observe the realization of the state of nature at the beginning of each period while the voter never learns anything about the state of nature. It is not difficult to see that some degree of asymmetric information is critical for our results. Suppose, for example, that the voter could also perfectly observe the realization of the state s_t.[17] In the absence of term limits, the voter would then be able to enforce first-best policy-making, i.e. both types of politicians choosing $x_t = s_t$, if politicians are sufficiently patient. This equilibrium would be sustained by a strategy for the voter to re-elect the incumbent if $x_t = s_t$ and to replace him with the challenger otherwise. It is also immediate that there would be no role for term limits in this case. Two-term limits would still induce truthful behavior by incumbents, which must be strictly inferior for the voter than first-best policy-making.

While some asymmetric information is therefore critical for our results, our results do not depend on the extreme form of asymmetric information which we have assumed so far. One way to relax this assumption is to assume that with probability $\varphi < 1$ the state s_t is also revealed to the voter at the time of the election. This change in assumptions has no impact on the equilibrium under two-term limits. It is still a dominant strategy for both types of incumbents to behave truthfully in both periods and as a consequence the voter only re-elects the incumbent if the first term action was $x_t = 0$.

Now consider the equilibria of the game without term limits. It is not difficult to see that the timid equilibrium and also the other classes of equilibria characterized in the proof of Proposition 1 continue to exist. For Proposition 1 to continue to apply, we only need to rule out that first-best policy-making, i.e. both types of politicians pool on $x_t = s_t$, is an equilibrium. The first-best equilibrium does not exist if the following inequality is satisfied:

$$1 > \varphi \frac{\beta}{1-\beta}(1-b). \tag{15}$$

The left hand side of (15) is the payoff to a bad incumbent from deviating from this equilibrium strategy to choosing $x_t = 1$ when $r_t = 1$ and $s_t = 0$. The right hand side of (15) is the expected punishment for this deviation from the first-best policy. With probability φ the fact that $s_t = 0$ is revealed and the incumbent loses his continuation payoff of $\frac{\beta}{(1-\beta)}(1-b)$. Clearly condition (15) holds if φ is sufficiently small and the first-best equilibrium therefore ceases to exist if there is a sufficiently large amount of asymmetric information. If we assume that (15) is satisfied, then the upper bound on the utility of the voter established

in Proposition 1 continues to hold and our results on the welfare effects of term limits apply as before.

5.3. Ego rents

In our basic model the only payoff from holding political office is the utility that a politician derives from implementing the policy that he prefers. An obvious extension would be to also allow that politicians receive a per period "ego rent", denoted R, from holding office which is independent of their policy choices. The presence of ego rents reinforces the incentive of politicians to stay in office. Ego rents therefore strengthen our finding in Proposition 1 that the timid equilibrium involves the highest possible payoff to voters for sufficiently low discount rates in the absence of term limits.

Ego rents do, however, offer new possibilities in the presence of term limits. If ego rents are sufficiently high it is possible that one-term limits are the optimal institution for the voter. Consider the parameter range where $1 - b < p < 1 - (1 - \pi_0)b$ and $1 < \beta(1 + R)$ hold. If ego rents are sufficiently important that $1 < \beta(1 + R)$ holds, then the equilibrium involves pooling on either $x_t = 0$ or $x_t = 1$ during a politician's first term in office and truthful behavior during the second term in office. If $p < 1 - (1 - \pi_0)b$ holds, then the voter prefers the truthful second-term behavior to the first-term pooling behavior of incumbents in these equilibria. He must therefore prefer one-term limits which induces politicians' second-term behavior under two-term limits in every period. If politicians are largely motivated by ego rents from holding office rather than the utility they derive from taking their preferred policy decisions there could therefore be scope for one-term limits to be the optimal institution for the voter.

5.4. Gains from experience

A common argument advanced by opponents of term limits is that there are gains to voters from having more experienced politicians in office. A very crude way of capturing this concern would be to add an additional component to the utility of the voter which mechanically increases in the tenure in office of the incumbent. Clearly, a sufficiently high payoff from tenure in office can in this case make term limits unattractive from the perspective of voters.

A more interesting way of capturing gains from experience would be to assume that politicians cannot perfectly observe the state of nature, but that their ability to correctly determine the state of nature increases over time. In particular suppose that good incumbents receive a noisy signal of s_t while bad incumbents receive a noisy signal of r_t and the quality of these signals improves with tenure in office. Interestingly, the benefits to voters of such increases in experience may be limited in the absence of term limits. In the timid equilibrium of the game without term limits both types of politicians always disregard their private information about the state of nature. Any improvement in politicians' ability to determine the correct state of nature therefore does not benefit voters in this case. However, as term limits change behavior from timidity to truthfulness, an improvement in good politicians' ability to determine the state of nature in their second term in office will directly improve voter welfare. Improvements in bad incumbents' ability to determine r_t have an ambiguous impact. This must also improve the welfare of the voter when r_t and s_t coincide, but will reduce welfare when the realizations of r_t and s_t differ. The relative strength of these effects depends on parameter values, but as the proportion of good incumbents in the pool of politicians increases, the voter must benefit from such gains from experience under two-term or longer term limits. This discussion is summarized in the following proposition:

Proposition 8. If increased experience of the incumbent does not increase the utility of the voter directly, but only increases incumbents' ability to determine the state of nature, then gains from experience can increase the relative attractiveness of two-term or longer limits.

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[16] An alternative way of modeling an endogenous pool of challengers is to assume that the quality of the challenger is equal to the reputation of the incumbent at the beginning of the period as in Vlaicu and Whalley (2011). With this alternative assumption the equilibrium with two-term limits and without term limits would remain unchanged. Under two-term limits the quality of the challenger at the end of an incumbent's first period in office is equal to π_0 both with an exogenous pool of politicians and under this alternative assumption. Similarly, also the timid equilibrium and the proof of Proposition 1 would remain unchanged with this alternative assumption.

[17] Note that if the voter can observe s_t then this state becomes payoff relevant for bad incumbents and their strategy and that of the voter will therefore also condition on s_t. See footnote 10 above for further discussion of this point.

6. Discussion

Over the last years a small literature has developed which empirically estimates the effects of term limits. In this section we briefly discuss how the findings of this literature relate to the predictions of our model and alternative explanations for term limits. Besley and Case (1995) were the first to show that a binding term limit changes the behavior of US governors. They find that term limited governors increase government spending and tax revenue relative to governors who can run for re-election. A number of papers, including Besley and Case (2003), List and Sturm (2006), Alt et al. (2011) and Ferraz and Finan (2011) have found further evidence that a binding term limit changes the behavior of politicians.

Our model is consistent with this evidence and also predicts a "lame duck" effect. In our basic model the difference in behavior between term limited incumbents and first-term incumbents is driven exclusively by a selection effect. In the equilibrium characterized in Proposition 2 both types of politicians play the same truthful strategy in their first and second terms, but good types are more likely to be re-elected to a second term. This stark result is driven by the simplicity of the basic setup. When we add ego rents from holding office to the model in Section 5.3, facing a binding term limit changes the equilibrium strategy of incumbents relative to their first term in office, but there is now no longer a selection effect between the first and second periods in office. In a more general model the incentive and selection effect of a binding term limit would both operate at the same time.

Our model predicts not only that there is a lame duck effect, but also that under two-term limits the average utility of the voter is in fact higher when the incumbent faces a binding term limit compared to first-term incumbents. The reason is that if rational voters experienced a predictable decline in utility whenever they re-elect an incumbent to a second (lame duck) term, they would prefer to never re-elect any incumbent.[18] At first sight this prediction clashes with the findings of Ferraz and Finan (2011), who show that Brazilian mayors who face a binding term limit are more corrupt than mayors who can run for re-election. Maybe voters are not as rational as we postulate and employ a more behavioral re-election strategy. Behavioral voters may not be able to select politicians in the same way as rational voters, which would weaken the selection effect behind our result that term limits can be in the interest of voters. However, term limits would still reduce career concerns of politicians and induce truthfulness, which can in itself make term limits beneficial if the proportion of good types in the pool of politicians is sufficiently large. Another interpretation of the evidence in Ferraz and Finan (2011) is that mayors who are re-elected to a second term have characteristics other than being more corrupt that make them on average at least as attractive as first-term incumbents. Mayors who are particularly effective at attracting firms to their district could in turn, for example, also receive more kick-backs.

Another related literature considers the question of the optimal length of terms. A recent contribution to this literature is Dal Bo and Rossi (2011), who use a reform in the Argentine Congress to test whether legislative effort is larger under shorter or longer terms. They find that the reduced electoral accountability which is present under longer terms induces more legislative effort in the Argentine Congress. They interpret this finding in a model in which legislators devote effort to policy proposals which not only increase their re-election probability but also generate payoffs in the form of recognition which are only reaped while the legislator is in office. It is difficult to directly compare these empirical results to our model. However, they are broadly in line with the prediction

of our model that reductions in accountability (here less frequent elections) can be in the interest of voters.

The alternative explanation for executive term limits developed in Glaeser (1997) does not take into account the accountability effect of elections. As a result the model does not predict a lame duck effect, which is one of the most robust empirical findings in this literature. The explanations for legislative term limits following Dick and Lott (1993) and Buchanan and Congleton (1994) in contrast incorporate the accountability effect of elections. The key mechanism behind the attractiveness of term limits in these models is that more senior incumbents are more effective at channeling pork towards their district, which in turn reduces voters' willingness to replace senior incumbents. DeBacker (2011) structurally estimates the effect of seniority on pork barrel spending on data from the US House and finds small returns to having a more senior representative. Using the estimated model for policy simulations, he finds as a result that there is little role for term limits to improve voter welfare in this setting.

7. Conclusion

At first sight, term limits seem paradoxical, as they reduce voters' ability to hold politicians accountable for their policy choices. We have developed a simple political agency model to show that term limits can be in the interest of voters despite the accountability effect of elections. The mechanism that drives our results is that term limits reduce the value of holding office. This induces "truthful" behavior by incumbents, which in turn enables the voter to selectively re-elect higher quality agents to a second term in office. The combination of these two effects can increase the utility of the voter ex-ante.

In broader terms, our analysis is a contribution to an emerging "political theory of the second best" that provides new insights into the design of electoral institutions. Agency problems in government are only partially resolved by having open elections. In this context a term limit can be welfare enhancing – even when the direct effect of term limits is unambiguously negative – because it interacts with the other distortions in the political system. In this respect, our work parallels Besley and Smart (2007), who use an agency model to study how a variety of (non-electoral) restraints on government affect political incentives. The common theme is that re-election rules chosen in equilibrium by fully rational voters are not generally optimal from their own point of view, because voters are unable to pre-commit to use elections as an optimal incentive for their leaders. Thus, institutions like term limits that reduce the discretion of voters may have unexpected and salutary effects on efficiency in government.

Appendix

Proof of Proposition 1. The proof proceeds in three steps. The first step shows that the timid equilibrium is the best equilibrium from the perspective of the voter out of the class of equilibria in which the politicians pool in all periods. The second step shows that all equilibria which involve a pooling strategy for the politicians at some $\hat{\pi} \neq \pi_0$ are worse than the timid equilibrium for the voter. The final step shows that for sufficiently low discount rates there are no equilibria which involve non-pooling strategies for all π.

Step 1 Apart from the timid equilibrium there is only one other pure strategy pooling equilibrium. In this alternative equilibrium both types of incumbents always choose $x_t = 1$ and the voter re-elects if $x_t = 1$ and replaces the incumbent with the challenger otherwise. Equilibrium payoff of the voter in this equilibrium is $(1 - p) / (1 - \beta)$, which is lower than the payoff in the timid equilibrium, which is $p / (1 - \beta)$, as we assume that $p > 1/2$. We now rule out that there can be any pooling equilibria in which the politicians randomize. To simplify the notation we

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[18] This logic is unfortunately obscured in the two-period models that are widely used in this literature. In a two-period setting the voter can replace the incumbent after period one, but the replacement also faces a binding term limit (as the world ends after period 2). In an infinite horizon setting the replacement for a first-period incumbent is another first-period incumbent who is eligible for re-election and hence faces very different incentives than in a two-period model.

will use σ_1 instead of $\sigma(x_t = 1, \pi_t)$ and σ_0 instead of $\sigma(x_t = 0, \pi_t)$. Suppose first that the bad type randomizes between $x_t = 1$ and $x_t = 0$ if the state is $r_t = 1$. The randomization device that the bad type uses in these equilibria can take a number of different forms. One special case is that he uses the realization of s_t as his randomization device, which would imply that he implements the optimal policy for the voter in every period. For any of these mixed strategies to be an optimal response for the bad type, it has to be the case that $1 + \sigma_1\beta U_B = \sigma_0\beta U_B$ where $U_B = q/(1-\beta)$, which implies that

$$(\sigma_0 - \sigma_1) = \delta/q. \tag{16}$$

Suppose that the good type plays a truthful strategy. For this to be optimal it would have to be the case that $1 + \sigma_1\beta U_G \geq \sigma_0\beta U_G$ when $s_t = 1$. As $\delta < q$ whenever the timid equilibrium exists this condition cannot be satisfied when (16) holds. The argument for the case in which the bad type randomizes in state $r_t = 0$ and the cases in which the good type randomizes in either state $s_t = 1$ or $s_t = 0$ are analogous.

Step 2 Pooling at some $\widehat{\pi} \neq \pi_0$. We show that the voter's payoff in any such equilibrium can be no higher than in the timid equilibrium. Note that, as strategies are Markov, pooling is an absorbing state as the incumbent's reputation no longer evolves and $\widetilde{\pi}(x_t, \widehat{\pi}) = \widehat{\pi}$. To support pooling at $\widehat{\pi}$, it must be the case that the re-election probability on the equilibrium path is positive: otherwise, both types of politicians would play the truthful (and non-pooling) strategies $\lambda^G(\widehat{\pi}, s_t) = s_t$ and $\lambda^B(\widehat{\pi}, r_t) = r_t$. It is a best response for the voter to re-elect with a positive probability at $\widehat{\pi}$ if:

$$V(\widetilde{\pi}(x, \widehat{\pi})) = V(\widehat{\pi}) \geq V(\pi_0) \tag{17}$$

i.e. the voter prefers pooling to the payoff $V(\pi_0)$ from starting with a new politician with reputation π_0. Step 1 shows that the timid equilibrium is the best pooling equilibrium from the perspective of voters. This implies that $V(\pi_0)$ in any equilibrium with pooling at some $\widehat{\pi} \neq \pi_0$ cannot be larger than the payoff of the voter in the timid equilibrium which involves pooling already at π_0.

Step 3 Non-pooling strategies for all π. First, consider strategies where $P_x^\theta > 0$, where P_x^θ is the probability that an agent of type θ chooses action x. Note that this implies that $\widetilde{\pi} < 1$ for any $\pi < 1$. We first show that in any such equilibrium there exists a critical reputation $\overline{\pi} < 1$ above which the incumbent is re-elected with probability one regardless of his policy choice. If $P_x^\theta > 0$ Bayes' rule implies that updated beliefs at each action can be written as

$$\widetilde{\pi}_x(\pi) = \frac{\pi}{\pi + (1-\pi)\kappa_x(\pi)} \tag{18}$$

where $\kappa_x = P_x^B/P_x^G$ is the likelihood ratio given strategies at π. Define

$$g(\pi) \equiv \left| \frac{1}{\widetilde{\pi}_1} - \frac{1}{\widetilde{\pi}_0} \right| = \frac{1-\pi}{\pi}|\kappa_1(\pi) - \kappa_0(\pi)| \tag{19}$$

and

$$K^* = \max_{\pi \in [0,1]} |\kappa_1(\pi) - \kappa_0(\pi)| \tag{20}$$

and let $g^*(\pi) = K^*(1 - \pi)/\pi$. By construction, (19) implies that $g(\pi) \leq g^*(\pi)$ for all $\pi \in [0,1]$. Since g^* is continuous in π and $g^*(1) = 0$, $g^*(\pi) \to 0$ as $\pi \to 1$. Since $0 \leq g(\pi) \leq g^*(\pi)$ and $g^*(\pi) \to 0$ as $\pi \to 1$, it follows that $g(\pi)$ also converges to zero. Thus $|\widetilde{\pi}_1 - \widetilde{\pi}_0| \to 0$ as $\pi \to 1$.

As we assume that the voter's re-election rule has a finite number of discontinuities, let π^* be the highest discontinuity in the voter's re-election rule. As the voter's re-election rule σ is continuous above π^*, $|\widetilde{\pi}_1 - \widetilde{\pi}_0| \to 0$ as $\pi \to 1$ implies that $|\sigma_0 - \sigma_1| \to 0$ as $\pi \to 1$ for an arbitrary number of periods. The best response of the incumbent to this re-election rule must be to adopt a truthful strategy. As truthful behavior of an incumbent must be preferred to the equilibrium behavior of the challenger as $\pi \to 1$, it has to be the case that $\sigma_1 = \sigma_0 = 1$. It follows that there exists a $\overline{\pi} < 1$ such that $\sigma(\pi) = 1$ for all $\pi \geq \overline{\pi}$.

Since we assume that $P_x^\theta > 0$ it follows that $\max\{\widetilde{\pi}_0(\pi), \widetilde{\pi}_1(\pi)\} > \pi$. For any $\pi \geq \overline{\pi}$, therefore, $\max\{\sigma(\widetilde{\pi}_0(\pi)), \sigma(\widetilde{\pi}_1(\pi))\} = 1$: the incumbent has the option to remain in office in all periods after achieving reputation $\overline{\pi}$ by choosing whichever action x causes reputation to rise. Thus we have, for all $\pi \geq \overline{\pi}$,

$$U_B(\pi) \geq \frac{\min\{q, 1-q\}}{1-\beta} \tag{21}$$

since the payoff to the action which induces re-election has an expected payoff no less than $\min\{q, 1 - q\}$.

Start from the critical reputation $\overline{\pi}$ as defined above and suppose that the agent reaches it at a time denoted period 0. Fix a type B or G then suppress it. Let σ_t denote the probability that the agent is in office in period t, given he is in office in period $t - 1$. Then

$$P_t = \prod_{i=1}^{t} \sigma_i \tag{22}$$

is the probability that the agent is in office in period t, conditional on being in office in period 0 and playing the equilibrium strategy. Conditional on being in office in period t, the agent receives a per period payoff that is no greater than one. So, the expected payoff in period t is a sequence of numbers no larger than P_t.

Observe that P_t converges to zero: If not, then there exists at time $s > 0$ such that $\sigma_t = 1$ for all $t > s$. Since the agent plays both actions with positive probability in the proposed equilibrium, this requires that the voter re-elects the incumbent following both actions $x = 1$ and $x = 0$. This implies that the agent plays a truthful strategy for all $t > s$, which contradicts the optimality of the voter's strategy. To see this note that this voting strategy would require the voter to re-elect both incumbents for which $\widetilde{\pi} \to 0$ and $\widetilde{\pi} \to 1$ with probability one even though the voter must be better off replacing the incumbent as $\widetilde{\pi} \to 0$.

The payoff to deviating from this equilibrium to the action that improves reputation in every period is no less than $\min\{q, 1 - q\}$ per period, and the payoff to the equilibrium strategy is no higher than P_t per period, where $P_t \to 0$. Since the sequence of deviation payoffs overtakes the sequence of equilibrium payoffs for t sufficiently high, we know that deviation generates strictly higher utility for discount rates close to zero. Hence the proposed strategies are not equilibrium strategies.

Finally, consider the possibility that for some π_t one action reveals the incumbent to be of the good type with certainty and hence $\widetilde{\pi}_t = 1$, which is an absorbing state. For sufficiently low discount rates bad types would deviate to this action as this would enable them to stay in office forever and earn a payoff of one per period. Similar arguments can be used to rule out that one action reveals the incumbent to be of the bad type with certainty. *Q.E.D.*

Proof of Proposition 2. In the main text we have already argued that it is a dominant strategy for both types of incumbents to implement the policy that maximizes their per period utility. We now need to consider the voter's optimal re-election rule. Given the strategies of the politicians, the voter's expected payoff from an incumbent who is in his

first term in office is π_0. Let π_1^x denote the voter's updated beliefs about the type of the incumbent on observing x in the first term. These are given by Bayes' rule as:

$$\pi_1^1 = \frac{\pi_0(1-p)}{\pi_0(1-p) + (1-\pi_0)(1-q)} < \pi_0 \qquad (23)$$

$$\pi_1^0 = \frac{\pi_0 p}{\pi_0 p + (1-\pi_0)q} > \pi_0. \qquad (24)$$

Now let P_x denote the probability that x is observed in the first term given the equilibrium strategies and σ_x the corresponding re-election probabilities at the end of the first term. In each period, if the incumbent is good with probability π, the payoff expected in the current period by the voter is

$$v(\pi) = 1 - (1-\pi)b. \qquad (25)$$

In choosing re-election rules, the voter's problem is

$$V = v(\pi_0) + \beta \sum_{x=0,1} P_x \max_{\sigma_x} \left\{ \sigma_x \left(v(\pi_1^x) + \beta V\right) + (1-\sigma_x)V \right\}. \qquad (26)$$

Differentiation shows $v(\pi_1^x) > (1-\beta)V$ implies $\sigma_x = 1$, and $v(\pi_1^x) < (1-\beta)V$ implies $\sigma_x = 0$. By definition, $V \geq v(\pi_0)/(1-\beta)$, so $\pi_1^1 < \pi_0$ implies $v(\pi_1^1) < v(\pi_0) \leq (1-\beta)V$ and $\sigma_1 = 0$. To show $\sigma_0 = 1$, suppose instead that $\sigma_0 < 1$ is optimal for the voter. Then $V = v(\pi_0)/(1-\beta)$, and $\pi_1^0 > \pi_0$ implies $v(\pi_1^0) > v(\pi_0) = (1-\beta)V$ which implies $\sigma_0 = 1$, a contradiction. Q.E.D.

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