

Political Selection and the Optimal Concentration of Political Power*

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Abstract

We develop a formal model to study how policy choice and political selection are affected by the concentration of political power. In a setting with inefficient policy gambles, variations in power concentration give rise to a trade-off. On the one hand, power-concentrating institutions allocate more power to the voters' preferred candidate. On the other hand, they induce the adoption of more overly risky policies and decrease the voters' capability to select well-suited politicians. We show that full concentration of power is optimal if and only if the conflict of interest between voters and politicians is small. Otherwise, an intermediate level of power concentration is optimal.

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1 Introduction

The concept of representative democracy is based on the premises that voters are able to elect well-suited politicians into office and that politicians adopt beneficial policies while in office.¹ Both aspects cannot be taken for granted. First, voters may face difficulties in distinguishing between good (competent, public-spirited) and bad (incompetent, egoistic) politicians. Second, politicians may choose policies that are not in the voters' best interests. Voters hence face the problem to simultaneously discipline politicians and to elicit better information about the politicians' qualities. The theoretical literature on political accountability studies how political institutions should be designed to solve these problems and increase voter welfare.²

We contribute to this literature by investigating the effects of political institutions in a model where electoral incentives lead to the adoption of overly risky policies. The model builds on the ideas that, first, policy outcomes are risky, and second, these risks are decreasing in the privately observable abilities of the politicians. The equilibria of the induced game involve inefficient policy gambles: the politicians choose overly risky policies in order to appear more competent and increase their chances for electoral success. Over the last decade, models with this basic structure have been used in a growing number of papers to study electoral competition and explain empirical policy choices (Majumdar & Mukand 2004, Fox & Van Weelden 2010, Fu & Li 2014, Honryo 2016, Dewan & Hortala-Vallve 2017). As argued by the authors, these models capture the inherent uncertainty in the process of policy-making and the "lacking of a clear blueprint" (Majumdar & Mukand 2004) on optimal choices in many policy fields. Both features have recently become apparent in a number of political episodes, ranging from the financial and sovereign debt crisis starting in 2007, over the ongoing and intensifying war against terrorism, to the European migrant crisis culminating in 2015 and the uncertainty surrounding the UK Brexit decision in 2016. We complement the previously mentioned papers by investigating how political institutions affect policy choice and political selection in this framework.

We also contribute to the literature by investigating the effects of a central aspect of the institutional setting as a whole instead of modeling specific institutions, such as alternative voting systems or presidential versus parliamentary systems. We thereby follow Arend Lijphart (1984, 1999, 2012) and George Tsebelis (1995, 2002),

¹As argued by James Madison (1788*b*) in the Federalist #57, "[t]he aim of every political Constitution, is or ought to be, first to obtain for rulers men who possess most wisdom to discern, and most virtue to pursue, the common good of society; and in the next place, to take the most effectual precautions for keeping them virtuous whilst they continue to hold their public trust."

²For recent surveys of this literature, see Besley (2006) and Ashworth (2012).

who strongly argue for taking into account institutional configurations rather than studying specific institutions in isolation. Both authors identify as the most important characteristic of the institutional setting the extent to which it concentrates or disperses political power, i.e., the capacity of the election winner to change policy.³ Empirically, there are large differences along this dimension even across established Western democracies. Political power is almost fully concentrated in the hands of the party winning the general election in the UK, while it is strongly dispersed between different political actors in Switzerland, the Netherlands and Belgium. Yet other countries such as the US and Germany feature intermediate levels of power concentration.

To formalize the concept of power concentration, we model political institutions in a stylized way. In particular, we assume that the expected outcome of the political process is given by a weighted average of two policies, one proposed by an incumbent (the election winner) and one proposed by her opponent (the election loser). This approach allows us to capture variations in a broad set of political institutions that affect the concentration of political power.⁴ For example, institutions such as the electoral system of proportional representation, a strong second chamber in parliament, a constitutional court, supermajority requirements for constitutional amendments and the use of public referendums to adopt or confirm policy decisions are commonly considered as power-dispersing. As argued by Lijphart (1984, 1999) and Tsebelis (1995, 2002), all these institutions restrict the discretion of the governmental parties and provide opposition parties with direct or indirect possibilities to veto policy changes and influence policy adoption.⁵ In Section 3, we discuss our modeling approach and its relation to observed political systems in more detail.

This modeling approach enables us to study continuous variations in the institutional setting instead of focusing on only two polar variants of specific institutions. As a result, we are able to account for the large set of hybrid institutions that can be observed empirically as argued by Tsebelis (1995). Crucially, this also allows the theoretical effects of, e.g., proportional representation to depend on whether the

³Lijphart (1999) distinguishes between power-concentrating and power-dispersing variants for a catalogue of ten institutional aspects, arguing that these are not combined randomly. He identifies two polar types of democratic systems, which he labels *majoritarian democracies* and *consensus democracies*. Tsebelis (1995) classifies institutional settings according to the implied number of veto players, defined as individual or collective actors whose consent is required for changing policy.

⁴This formalization - sometimes referred to as *probabilistic compromise* - was first used to study political decision-making by Fishburn & Gehrlein (1977) and Grossman & Helpman (1996). Recently, Sahuguet & Persico (2006), Iaryczower & Mattozzi (2013), Saporiti (2014), Herrera et al. (2016) and Matakos et al. (2016) have used similar approaches to model political institutions.

⁵In contrast, majoritarian voting systems, unicameralism, simple majority rules for amendments and the lack of judicial review and public referendums are commonly considered as power-concentrating institutions.

election winner's power is otherwise unlimited or already restricted by other power-dispersing institutions. An obvious drawback of this strategy is that we cannot model the details of specific real-world institutions. We hence perceive our approach as complementary to papers who investigate the effects of specific institutional rules (e.g., Besley & Smart 2007, Smart & Sturm 2013, and Buisseret 2016).

To investigate the effects of power concentration on policy choice and political selection, we set up a stylized model of political competition with a representative voter and two candidates. The candidates are privately informed about their competences and motivations (egoistic or public-spirited). In equilibrium, they adopt overly risky reform policies to appear competent and increase their electoral prospects.

We derive three main results in this framework. First, we show that variations in power concentration give rise to a previously undiscussed trade-off that involves three distinguishable effects on voter welfare. On the one hand, power-concentrating institutions induce a direct positive *empowerment effect*. As long as political campaigns confer at least some information about candidate qualities, the voter selects the candidate that provides in expectation the highest welfare. Thus, an increase in power concentration gives on average more influence to the better-suited candidate, which *ceteris paribus* increases voter welfare. On the other hand, power-concentrating institutions induce negative *disciplining* and *selection effects*. By increasing the electoral stakes, they induce incompetent politicians to adopt more overly risky reforms in order to appear competent (disciplining effect). This increased mimicking also reduces the voter's capability to identify well-suited politicians and take a well-informed electoral choice (selection effect). Note that the resulting trade-off is specific to our setting with policy gambles. In contrast, the disciplining and selection effects go in opposite directions in models where the politicians may engage in rent seeking (Besley & Smart 2007, Hindriks & Lockwood 2009).

Second, we show that it is typically optimal to implement an intermediate level of power concentration, instead of either full concentration or full dispersion of political power. In particular, some limited dispersion of power is optimal whenever the share of egoistic candidates is sufficiently high, i.e., the conflict of interest between the voter and the candidates is sufficiently large.⁶ This result provides a potential explanation for the combination of some power-concentrating institutions and some power-dispersing institutions in many countries, including the US and Germany (see Lijphart 1999 and Tsebelis 1995). It also highlights one advantage of considering a

⁶Otherwise, it is optimal to concentrate political power completely in the hands of the election winner.

continuous set of institutional variants instead of focusing on two dichotomous pairs as in many previous papers.

Third, we show that the optimal level of power concentration is decreasing in the size of the conflict of interest between voter and candidates. The basic intuition behind this result is the following: A larger conflict of interest induces the adoption of more overly risky policies and reduces the informativeness of campaigns, i.e., aggravates the disciplining and selection problems. As a consequence, it becomes more beneficial to decrease these inefficiencies by means of power-dispersing institutions, even though these allocate some power to inferior candidates. Note that this result contrasts with findings in the previous literature. In a number of related papers, institutions that limit political accountability or the incumbent's scope of action are only beneficial if the share of public-spirited candidates is sufficiently large (Maskin & Tirole 2004, Besley & Smart 2007, Hindriks & Lockwood 2009, Smart & Sturm 2013).⁷ In Appendix C, we show that our theoretical result is consistent with illustrative data for a small set of established democracies.⁸

In the following sections, we focus on a basic model with a representative voter, which allows us to study the underlying mechanism as transparently as possible. In Section 8, we explain how the model can be generalized to a continuous set of voters with heterogeneous policy preferences. In this case, we are also able to consider more complex and flexible representations of the institutional configuration, in which the political power of the election winner is increasing in the margin of victory. All qualitative results from the basic model extend to these more general settings. Additionally, the extended model enables us to relate the aspect of political selection to another argument for introducing power-dispersing institutions: their capacity to foster the representation of political minorities. We find that agency and selection problems on the one hand and a desire for minority representation on the other hand can be regarded as two independent motives for reducing the concentration of political power: If both motives are considered, the optimal level of power concentration is always lower than if only one of these motives is taken into account.

The paper proceeds as follows. The next section reviews the related literature.

⁷In Section 2, we discuss the relation between power concentration and the institutions studied in these papers, and comment on the reasons for the opposite results.

⁸In particular, we study the joint variation of a) a measure for the conflict of interest, b) a measure for power concentration, and c) economic growth as a measure for the performance of economic policy-making for a set of 18 established democracies. We document that economic growth and power concentration are positively correlated in countries with a low conflict of interest, but negatively correlated in countries with a large conflict of interest. A rigorous test for a causal relationship is, however, beyond the scope of this paper.

Section 3 discusses our approach to model political institutions and its relation to real-world institutional settings. Section 4 presents the model of political competition. Section 5 delivers a benchmark case of perfect information. Thereafter, we analyze equilibrium behavior under two-dimensional private information in Section 6. We examine the effects of power-concentrating institutions in Section 7. Section 8 discusses the extended model with heterogeneous voters, and Section 9 concludes. The appendix provides all formal proofs and a brief look at illustrative data.

2 Related literature

This paper contributes to the theoretical literature on political accountability, as surveyed by Besley (2006) and Ashworth (2012). This literature investigates the effects of a variety of political institutions on policy choice and political selection. In particular, it includes papers that study whether politicians should be held accountable at all (Maskin & Tirole 2004), excluded from reelection through term limits (Smart & Sturm 2013), restricted in their policy choice by fiscal restraints (Besley & Smart 2007) or fiscal decentralization (Hindriks & Lockwood 2009, Cheng & Li 2017), provided with only limited authority (Ashworth & Bueno de Mesquita 2016), and whether they should be subject to joint appointment (Buisseret 2016). We complement these papers by analyzing the effects of power concentration, i.e., of how easily the election winner can change policy. In our view, this dimension captures a central aspect of many specific institutions and the political system as a whole (see also Lijphart 1984, 1999, Tsebelis 1995, 2002). Similar to the previously mentioned institutions, the level of power concentration affects political accountability, i.e., the link between the voters' information about politicians and the power delegated to them.

Most previously mentioned papers use models in which the politicians are privately informed about their characteristics. A general insight of these papers is that increasing electoral accountability induces politicians to adopt more policies that are popular among voters. This reduces the voters' capacity to distinguish between good and bad politicians and, hence, to select well-suited politicians. Depending on the type of information asymmetry between voters and politicians, however, accountability induces more or less efficient policy choice. It is hence helpful to structure the previous literature with respect to the assumed information structure.

Maskin & Tirole (2004) and Smart & Sturm (2013) study a setting where a decision-maker is privately informed about her preferences (congruent or dissonant with the voters). Moreover, she is able to identify the policy that maximizes voter

welfare, while the voters prefer a policy based on prior beliefs only. Reducing accountability induces the politicians to behave more in line with their preferences. However, it also reduces the voter’s ability to identify public-spirited politicians.⁹

Besley & Smart (2007) and Hindriks & Lockwood (2009) study a setting where the politicians are privately informed about their motivations (egoistic or public-spirited) and can engage in shirking or rent extraction *à la* Barro (1973), Ferejohn (1986). Voters can base their votes on observable policy outcomes only. In this setting, reducing the incumbent’s scope of action gives rise to a trade-off between improving policy choice (disciplining effect) and reducing the voters’ capabilities to remove egoistic candidates (selection effect).

Ashworth & Bueno de Mesquita (2016) and Ashworth et al. (2017) study a setting where the politicians are not informed about their own abilities and exert non-verifiable effort, as in the career-concerns model by Holmström (1999). The authors find that higher benefits of reelection and unified authority induce the provision of higher effort, but hinder political selection.

In contrast to these papers, we study the effects of political institutions in a setting with policy gambles. Similar settings are used in Majumdar & Mukand (2004), Fox & Van Weelden (2010), Fox & Stephenson (2011), Fu & Li (2014), Buisseret (2016), Cheng & Li (2017) and Dewan & Hortala-Vallve (2017). Common to all these papers is the assumption that policy making involves inherent risks that are decreasing in the privately observable abilities of the politicians. In this setting, electoral incentives induce office-motivated politicians to adopt overly risky policies in order to signal high ability.

To the best of our knowledge, Buisseret (2016) and Cheng & Li (2017) are the only previous papers that study the effects of political institutions on policy choice as well as political selection in this setting.¹⁰ Buisseret (2016) analyzes whether an incumbent and a veto player should be held accountable separately (in two independent elections) or jointly (in a single election). On the one hand, joint accountability leads to less flexibility in holding officials accountable. On the other hand, it provides the voter with better information, as it reduces the veto player’s incentive to boost her reputation by rejecting the incumbent’s policy. Cheng & Li (2017) compare the effects of fiscal centralization and fiscal decentralization. They show that

⁹Morelli & Van Weelden (2013) study how this tradeoff is affected by variations in the information asymmetry between voters and politicians.

¹⁰Fox & Van Weelden (2010), Fox & Stephenson (2011) and Fu & Li (2014) study how institutions affect the policy choice by an exogenously given office-holder. They do not model political selection, however. Prato & Wolton (2016, 2017) use a setting with policy gambles to analyze the effects of variations in voter responsiveness, which can be regarded as a part of the country’s political culture.

voters are better able to elicit information about an incumbent’s competence under fiscal centralization, as each district’s performance provides an additional signal about the same politician.

One of our main findings differs from most of the previous literature. In our model, some dispersion of political power is beneficial if and only if the share of public-spirited politicians is low. In other information settings, reducing political accountability can only increase voter welfare if the share of public-spirited politicians is sufficiently high (Maskin & Tirole 2004, Besley & Smart 2007, Hindriks & Lockwood 2009, Smart & Sturm 2013). These diametrically opposed results stem from the different effects that electoral incentives have on policy choice: In our model, higher accountability induces egoistic candidates to choose more overly risky policies. Although this is rewarded at the ballot, it is not in the voters’ interest. Hence, disciplining and selection effects work in the same direction. In the other settings, higher accountability induces egoistic candidates to follow more closely the voters’ preferences, so that disciplining and selection effects go in opposite directions.

3 Modeling political institutions

In the next section, we set up a formal model of political competition with two candidates. Prior to the election, each candidate $i \in \{1, 2\}$ commits to a policy platform x_i in a policy space X to be specified below. We assume that the implemented policy is in expectation given by the weighted average $x = \pi_1 x_1 + \pi_2 x_2$, where the policy weights π_1 and $\pi_2 = 1 - \pi_1$ take values in $[0, 1]$.

This expected policy can be interpreted as the outcome of a *probabilistic compromise* as in Grossman & Helpman (1996) and Sahuguet & Persico (2006). As a result of the political process, candidate i is drawn to choose policy with probability π_i . Hence, the implemented policy equals either x_1 or x_2 ex post. An alternative interpretation of this formalization is that the politicians have to decide on a continuum of ex ante identical public projects, and that candidate i is allocated the right to decide on the share π_i of these projects. In this case, the implemented policy x is a non-probabilistic compromise that involves elements of both platforms x_1 and x_2 ex post.¹¹ Given both interpretations, the policy weight π_i can naturally be interpreted as a measure of i ’s decision-making rights, i.e., her share of political power. For the sake of clarity, we will stick to the first interpretation in the following.

A central assumption in our model is that the policy weights π_1 and π_2 are not only affected by the election result, but also by institutions that shape the

¹¹We are grateful to an anonymous referee for providing us with the second interpretation.

political process. To formalize this idea, we represent the political institutions by a continuous parameter $\rho \in [1/2, 1]$ and assume that candidate i 's political power π_i is given by

$$\pi_i(w, \rho) = \begin{cases} \rho & \text{if } w = i, \text{ i.e., } i \text{ is election winner} \\ 1 - \rho & \text{if } w \neq i, \text{ i.e., } i \text{ is election loser.} \end{cases} \quad (1)$$

The higher parameter ρ is, the more political power is assigned to the election winner and the less power is retained by the election loser. Correspondingly, we refer to ρ as the degree of power concentration.¹²

This reduced-form approach is similar to the modeling of political institutions in a number of recent papers.¹³ It allows us to model the introduction of a power-dispersing (power-concentrating) institution in a tractable way as a reduction (increase) in ρ from any initial level. The polar case $\rho = 1$ represents a political system where power is fully concentrated, i.e., the election winner has full policy discretion. Arguably, this case can be seen as an idealized representation of majoritarian democracies such as the UK and a number of countries with British colonial heritage. Lower values of ρ represent political systems where power is dispersed, i.e., the election loser retains some influence on policy choice. The consensus democracies of Switzerland, the Netherlands, Belgium and Israel are commonly seen as political systems with particularly low levels of power concentration.

Note that we deviate in two respects from some of the previous literature. First, we interpret parameter ρ as a measure of the entire institutional configuration of a political system as in the papers by Sahuguet & Persico (2006), Saporiti (2014) and Herrera et al. (2016). In contrast, Iaryczower & Mattozzi (2013) and Matakos et al. (2016) use a similar formalization to model alternative electoral systems, specifically. Our broader interpretation follows the widespread view that the degree of power-sharing between different political actors does not only depend on the electoral system, but on a wider range of political institutions (for example, see Lijphart 1984, 1999 and Tsebelis 1995, 2002).

For the sake of concreteness, consider the difference between unicameral and bicameral legislatures. In unicameral systems, the dominating party in parliament commands almost unlimited political power. There are no further veto players who can block the ruling party's policy. In bicameral systems with an almost equally

¹²In an extended model version, we assume that the election winner's power is increasing both in ρ and in the margin of victory. Qualitatively, our results are not affected by this change (see Section 8).

¹³See, for example, Sahuguet & Persico (2006), Iaryczower & Mattozzi (2013), Saporiti (2014), Herrera et al. (2016) and Matakos et al. (2016).

strong second chamber, in contrast, there is a substantial probability that both chambers are dominated by different parties at any specific point in time. A similar argument can be made with respect to presidential systems, where the president's party can sometimes be dominated in parliament.¹⁴ In both cases, opposition parties can use their majority in parliament (or in the second chamber) to veto government policies and to substantially affect the adopted policies. Several other institutions affect the allocation of political power in a similar way. For example, the government party commands less power in a federal country where the implementation of some policies requires the consent of all state authorities, some of which are typically dominated by opposition parties. Moreover, supermajority requirements for constitutional amendments, judicial review and the availability of public referendums provide opposition parties with additional instruments to intervene with the government's policies.

As emphasized by Lijphart (1984, 1999) and Tsebelis (1995, 2002), all the previously mentioned institutions do not only restrict the ruling party's power. Instead, they exert pressure on the ruling party to adopt compromising policies and provide opposition parties with a significant influence on policy choice. Our modeling of political institutions in (1) accounts for this view by assigning a strictly positive policy weight to the election loser whenever $\rho < 1$.¹⁵

Second, we allow the parameter ρ to vary continuously in the interval $[1/2, 1]$, while some previous papers focus on comparing two polar institutional variants.¹⁶ The main reason for this modeling decision is that real-world political systems rarely coincide with the two ideal types of majoritarian and consensus democracies. In practice, most political systems are typically considered as hybrid systems with varying degrees of implied power concentration (see Tsebelis 1995, Lijphart 1999). Even with respect to specific institutions such as the number of parliamentary chambers or the electoral system, many observed institutions are located in between the classical dichotomy of power-concentrating and power-dispersing variants. For ex-

¹⁴In the US, episodes with *divided government* cover 44 out of 72 years since 1945 (in 12 of these years, the House and the Senate were additionally controlled by different parties). In France, there have been three periods of *cohabitation* since 1986, covering 9 out of 31 years. In Western Germany, the second chamber (Bundesrat) was controlled by the governmental parties in only 24 out of 68 years since 1949, while it was controlled by opposition parties in 12 years (in 33 years, neither the governmental parties nor the opposition parties possessed a majority in the Bundesrat).

¹⁵In the veto player model by Tsebelis (1995), the government party responds to the presence of a veto player by offering a policy that compromises between the preferences of both agents. Alternatively, one could model negotiations over policy choice explicitly. A detailed verbal discussion of the compromising effects of power-dispersing institutions is given by Lijphart (1999).

¹⁶Similarly, Saporiti (2014), Herrera et al. (2016) and Matakos et al. (2016) study a continuous set of institutional variants, while Iaryczower & Mattozzi (2013) restrict their analysis to the comparison between two polar electoral systems.

ample in bicameral democracies, one chamber of parliament is often stronger than the other chamber. Also, most electoral systems produce intermediate degrees of disproportionality between vote shares and seat shares, reflecting differences in subordinate elements of electoral systems such as electoral thresholds, district magnitudes and apportionment rules.¹⁷ A continuous set of institutional variants is in our view better suited to reflect the observed heterogeneity of institutional configurations and the large set of hybrid institutions. Allowing for continuous variations in the parameter ρ also enables us to highlight non-monotonic effects of power concentration on voter welfare.

4 The model

We study an electoral setting with two candidates and one voter. The candidates differ in their motivations - they are either egoistic or public-spirited - and in their abilities to design policies that enhance voter welfare. Both characteristics are unobservable to the voter. The candidates have to decide on whether or not to conduct a reform. More precisely, the policy space is given by the unit interval $[0, 1]$ and represents the magnitude of the implemented reform, where 0 represents the status quo and 1 represents a full-scale reform. Reforms of any magnitude are costly and risky. The voter elects one candidate, thereby allocating political power, i.e., the right to set policy. As explained in the previous section, the institutional setting determines whether power is allocated completely to the election winner or divided between election winner and loser.

The game consists of three stages. At the first stage, nature independently draws both candidates' two-dimensional private types. At the second stage, candidates simultaneously make binding policy proposals, x_1 and x_2 . At the third stage, the voter observes the proposals, and casts his vote. Based on the political institutions, a policy decision is taken.

4.1 Voter

The representative voter is risk-neutral. His utility depends on the (stochastic) outcome of the adopted policy. If a reform of magnitude $x \in [0, 1]$ is implemented and succeeds, the voter's return is x . If the reform instead fails, he receives a return of zero. Independent of its success, the reform adoption gives rise to a cost of cx

¹⁷Correspondingly, many commonly used measures of electoral systems are continuous or multi-categorical indices such as Gallagher (1991)'s index of disproportionality and the *effective threshold* in the commonly used version by Lijphart (1994).

with $c \in (0, 1)$, which the voter bears. Thus, the voter benefits from a reform if and only if it succeeds. In summary, if the implemented reform has magnitude x , the voter receives the payoff

$$v(x) = \begin{cases} (1 - c)x & \text{if reform succeeds} \\ -cx & \text{if reform fails.} \end{cases} \quad (2)$$

As assumed in (1), the implemented policy x depends on the institutional setting as captured by parameter ρ . If political power is dispersed, $\rho < 1$, each candidate is entitled to implement her policy proposal with a strictly positive probability. Ex post, voter welfare thus follows as

$$V(w, \rho, x_1, x_2) = \sum_{i=1}^2 \pi_i(w, \rho) v(x_i) \quad (3)$$

The representative voter chooses a candidate as the election winner $w \in \{1, 2\}$. As the candidates' characteristics are unobservable, he can condition his ballot only on the proposed policies. His voting strategy $s : [0, 1]^2 \mapsto [0, 1]$ specifies for each combination of reform proposals (x_1, x_2) the probability that candidate 1 wins the election. This notation allows to capture mixed voting strategies.

4.2 Candidates

Prior to the election, each candidate $i \in \{1, 2\}$ proposes a policy $x_i \in [0, 1]$. Depending on the vote result and the institutional setting, she receives the share of political power π_i according to (1). We assume that the share of power both determines her influence on the implemented policy x and the share of the spoils of office she receives.¹⁸ In particular, we normalize the overall spoils of office to 1 and assume that each agent's share of the spoils of office is equal to her political power π_i (as in Sahuguet & Persico 2006 and Iaryczower & Mattozzi 2013). This assumption implies that, e.g., the US president would enjoy larger spoils of office under unified government than under divided government.¹⁹

We assume that candidates are heterogeneous in and privately informed about

¹⁸The assumption that an agent's share of office spoils depends on his policy weight reflects the idea that (egoistic) candidates have a desire for commanding as much power as possible, instead of winning an election per se. On a more fundamental level, the desire for possessing power may either result because higher levels of political power lead to larger psychological ego rents, or because higher levels of power simplify rent extraction and clientelism (see, e.g., Persson et al. 1997, Diermeier & Merlo 2000).

¹⁹Our qualitative results would continue to hold if the election loser would receive a share $\zeta(1 - \rho)$ of the spoils of office, with $\zeta \in (0, 1)$ or $\zeta > 1$ and ρ above some threshold ρ_ζ .

two independently distributed characteristics: their abilities and their motivations. First, they differ in their abilities to design a welfare-enhancing reform. If candidate i implements a reform of any amount $x_i > 0$, it succeeds with the idiosyncratic probability $a_i \in [0, 1]$. We henceforth refer to parameter a_i as candidate i 's ability. Both candidates' abilities are realizations of two identically and independently distributed random variables with twice continuously differentiable cdf Φ , corresponding pdf ϕ and full support on the unit interval.

Second, candidates differ in their motivations, captured by the preference parameter θ_i . This parameter measures the utility gain that candidate i derives from a unit of the office spoils. It can take two possible values, θ^H or $\theta^L \in (0, \theta^H)$. To simplify the exposition, we concentrate on the limit case $\theta_L \rightarrow 0$, where public-spirited candidates do not care for the spoils of office at all.²⁰ In the following, we refer to candidates with preference parameter θ^H as egoistic, and candidates with θ^L as public-spirited. Both candidates' preference parameters are realizations of identically and independently distributed random variables, where $\mu \in (0, 1)$ denotes the probability that $\theta_i = \theta^H$.

We assume that the candidates are driven by a mixture of policy considerations and office motivation as in Maskin & Tirole (2004). If candidate i proposes policy x_i and the election outcome is given by w , her expected utility²¹ follows as

$$U(x_i, w, a_i, \theta_i, \rho) = \underbrace{\pi_i(w, \rho)x_i(a_i - c)}_{\text{legacy payoff}} + \underbrace{\pi_i(w, \rho)\theta_i}_{\text{office rent}}. \quad (4)$$

The first term in (4) captures the candidate's interest in providing efficient policies. Note that we do not assume that the candidate is interested in maximizing voter welfare per se. Instead, she only cares about the welfare increase that is related to her own policy, i.e., about her legacy to the public (Maskin & Tirole 2004). The legacy payoff depends both on the candidate's policy proposal and on her private ability a_i , i.e., the probability that her policy is successful. The second term in (4) represents candidate i 's office rents, i.e., the utility from enjoying the share π_i of the spoils of office. The preference parameter θ_i measures the relative weight that candidate i associates with the spoils of office compared to the legacy payoff.

Candidate i maximizes her utility by choosing a strategy $X_i : [0, 1] \times \{\theta^L, \theta^H\} \mapsto$

²⁰We consider the limit case $\theta_L \rightarrow 0$ to ensure equilibrium uniqueness, which is guaranteed for any $\theta_L > 0$, but not for $\theta_L = 0$. Note that all qualitative results of this paper hold for any case $\theta^L \in (0, \theta^H)$ (see also footnote 26).

²¹To simplify the exposition, we provide the utility function of candidate i in ex interim formulation, i.e., after the election has taken place, but before the stochastic reform outcome has materialized.

$[0, 1]$, which specifies a policy proposal for each combination of ability type and preference type.

For the remainder of the paper, we impose two assumptions on the distribution of the candidates' types.

Assumption 1. *The share of egoistic candidates satisfies*

$$\mu > \frac{\int_c^1 (a - c) d\Phi(a)}{\int_0^c (c - a) d\Phi(a)}. \quad (5)$$

Assumption 1 imposes a lower bound on the share of egoistic candidates.²² Intuitively, it implies that the selection problem is sufficiently large. We impose this assumption to eliminate uninteresting cases. In particular, it rules out pooling equilibria in which egoistic candidates take the same action for all ability levels $a_i \in [0, 1]$. In these equilibria, political institutions do not affect the behavior of politicians.

The second assumption is expressed using the auxiliary function $K(a) := \mu\Phi(a) + (1 - \mu)\Phi(c)$ and its derivative $k(a) = \mu\phi(a)$. Both functions will prove useful in the following analysis. We refer to K as the weighted ability distribution, as it measures the probability that a randomly drawn candidate is either egoistic with ability below a , or public-spirited with ability below c .

Assumption 2. *For all $a \in (0, c)$, $k(a)$ is bounded from above with $k(a) < \frac{1+K(a)}{c-a}$.*

Assumption 2 rules out type distributions with a particularly large share of egoistic candidates with low abilities. For a large range of distribution functions including the uniform distribution, it is ensured given any level of $\mu \in (0, 1)$.²³ As will become clear below, this condition rules out the existence of multiple equilibria.²⁴

4.3 Equilibrium concept and normative criterion

We solve for Perfect Bayesian equilibria (PBE) of this game that are robust to the D1 criterion proposed by Cho & Kreps (1987). A PBE of the game consists of a strategy profile (X_1, X_2, s) and a belief system σ such that (1) both candidates play

²² If the expected ability of a randomly drawn candidate is smaller than c , the right-hand side of equation (5) is below 1. Hence, Assumption 1 is satisfied for sufficiently large levels of $\mu \in (0, 1)$. For example, it holds for a uniform distribution of abilities if $\mu > (\frac{c-1}{c})^2$.

²³Hence, Assumptions 1 and 2 are jointly satisfied if abilities are uniformly distributed and the condition in footnote 22 holds. Assumption 2 is also satisfied for all levels of μ if the distribution function has (a) weakly increasing density or (b) weakly decreasing density and $\phi(0) < 1/c$.

²⁴If Assumption 2 is violated and multiple equilibria exist, we can nevertheless study the effects of institutional variations. Then, these equilibria can be strictly sorted in terms of voter welfare. Our results apply with respect to the welfare-best equilibrium.

mutually best responses, anticipating the voter’s strategy s , (2) the voter’s strategy s is optimal given his beliefs σ , and (3) the voter’s belief system σ is derived from the candidates’ strategies X_1 and X_2 according to Bayes’ rule everywhere on the equilibrium path. The D1 criterion is a commonly used equilibrium refinement that restricts the set of viable out-of-equilibrium beliefs.²⁵ Finally, we restrict our attention to equilibria with anonymous voting strategies. Thus, we assume that the voter treats both candidates equally, $s(x_1, x_2) = 1 - s(x_2, x_1)$, if he holds symmetrical beliefs about their types.

The aim of this paper is to analyze how power concentration affects the performance of the political system if the voter faces a selection problem. We capture this performance by the expected utility of the representative voter, which we refer to as voter welfare in the following. More precisely, we evaluate voter welfare at the ex ante stage, i.e., before candidates’ abilities and motivations are drawn.

5 Benchmark: Perfect information

A useful benchmark is given by the case in which the voter is able to observe both candidates’ characteristics perfectly. In this case, the selection problem vanishes because candidates cannot improve their electoral prospects through opportunistic behavior. As a consequence, all candidates’ policy choices are undistorted: Each candidate proposes a full-scale reform if her ability is above c , and the status quo policy if her ability is below c . For each type, this behavior maximizes both the candidate’s electoral prospects and her contribution to voter welfare. In consequence, the voter prefers a reforming candidate over a non-reforming one, and reforming candidates with higher ability to those with lower ability.

This has direct implications for the normative effects of political institutions. Variations in power concentration ρ have neither an effect on the behavior of candidates nor on the informativeness of campaigns. They consequently do not affect the quality of political selection. However, power-concentrating institutions allocate more power to the winning candidate, who provides higher expected policy payoff to the voter. Hence, voter welfare strictly increases with the level of power concentration.

Proposition 1. *Under perfect information, each candidate proposes a full-scale reform if and only if her ability exceeds the reform cost c . Voter welfare is maximized*

²⁵Intuitively, D1 requires that off-equilibrium path beliefs are “reasonable” in the sense that each deviation from equilibrium actions must be attributed to the type that profits most of it. In our model, this refinement rules out equilibria in which the status quo policy $x = 0$ is proposed by all candidates including the most able ones.

if political power is concentrated completely in the hands of the election winner.

6 Equilibrium analysis

For the remainder of this paper, we assume that candidates are privately informed about their abilities as well as their motivations. The following proposition establishes the existence of a unique D1 equilibrium and characterizes the equilibrium behavior of candidates. It thus provides the basis for the following analysis of the effects of political institutions.

Proposition 2. *There is a unique D1 equilibrium. The equilibrium strategy X_i^* of candidate i is characterized by a threshold $\alpha^H < c$, such that*

$$X_i^*(a_i, \theta_L) = \begin{cases} 0 & \text{if } a_i < c, \\ 1 & \text{if } a_i \geq c, \end{cases}, \quad \text{and} \quad X_i^*(a_i, \theta_H) = \begin{cases} 0 & \text{if } a_i < \alpha^H, \\ 1 & \text{if } a_i \geq \alpha^H. \end{cases} \quad (6)$$

The proposition shows that the unique D1 equilibrium displays the following three properties: (i) Public-spirited candidates propose a reform if and only if it is efficient. (ii) Egoistic candidates adopt a cutoff strategy that involves inefficiently many reform proposals. (iii) All candidates revert to the extreme policies and either propose no reform or a full reform. We proceed by discussing these properties subsequently.

By property (i), public-spirited candidates propose reforms if and only if they are efficient, i.e., $a_i \geq c$. Recall that $\theta_L = 0$ implies that their only objective is to maximize their legacy payoff. Put differently, they choose policies to maximize the voter's payoff. Hence, they propose a reform if their ability a_i is above c and the status quo otherwise.²⁶

By property (ii), egoistic candidates also play a cutoff strategy involving only two policies. Note first that, under asymmetric information, a candidate's electoral prospects depend on her policy proposal only. Thus, the expected office rent resulting from any proposal does not vary with her private ability a_i . However, the more able a candidate is, the more beneficial are larger-scale reforms for her legacy payoff. In consequence, high-ability candidates propose larger-scale reforms than low-ability candidates in equilibrium. Correspondingly, the voter attributes larger-scale reforms to candidates with higher ability. This monotonicity in beliefs implies

²⁶ If public-spirited candidates care about the spoils of office with $\theta_L \in (0, \theta_H)$, they play a cutoff strategy with inefficient reform proposals as well. In particular, both type-specific cutoffs satisfy $\alpha_L - c = (\alpha^H - c)\theta_L/\theta_H > 0$. Moreover, both cutoffs are strictly increasing in the degree of power concentration (see Lemma 1).

that a candidate proposes the largest reform on the equilibrium path whenever her ability is above c . This proposal does not only maximize her chance of winning but also her legacy payoff.

As a consequence, any smaller-scale reforms could only be proposed by and attributed to candidates with ability below c . Hence, such a proposal would be associated with a negative expected payoff to the voter and, correspondingly, with a lower winning probability than a status quo proposal. Therefore, proposing a smaller-scale reform is a dominated choice. For any $a < c$, egoistic candidates strictly prefer to propose one of only two possible actions, either the status quo or the largest reform on the equilibrium path.

Due to this binary choice, egoistic candidates will play a cutoff strategy. For candidates with ability below c , a large-scale reform will be associated with a higher winning probability and higher office rents, but also with a lower legacy payoff than the status quo. While a candidate's gain in office rents is independent of her ability, her legacy loss is decreasing in a_i . Hence, there is at most one ability level $\alpha^H < c$ at which an egoistic candidate is indifferent between both equilibrium actions. As α^H is smaller than c , the equilibrium involves inefficient policy gambles, i.e., some politicians choose overly risky reforms to increase their electoral prospects.

By property (iii), the most able candidates always propose a full reform in equilibrium. Consider a strategy profile such that all candidates including the most able ones propose either the status quo or a smaller reform. Intuitively, these candidates could profitably deviate to the full reform unless this deviation would decrease their winning probability. Hence, this strategy profile can only be an equilibrium if the voter associates the full reform with low-ability candidates, i.e., if he has very pessimistic beliefs. The D1 criterion rules out these pessimistic beliefs, however.²⁷ As a consequence, an equilibrium is robust to the D1 refinement if and only if it involves full-scale reform proposals.

We proceed by deriving the conditions for the equilibrium behavior of egoistic candidates, i.e., for the equilibrium level of the threshold α^H . It proves useful to introduce two additional pieces of notation. First, we denote by $s_{10} := s(1, 0)$ the probability that the voter opts for a reforming candidate if her opponent proposes the status quo. Second, we define the number $\underline{a} \in (0, 1)$ implicitly by

$$\mu \int_{\underline{a}}^1 \phi(a) (a - c) da + (1 - \mu) \int_c^1 \phi(a) (a - c) da = 0. \quad (7)$$

²⁷In particular, the D1 refinement requires that the deviation to a full reform is associated to candidates who benefit most from it, i.e., to the most able candidates.

If the cutoff α^H of egoistic types is at ability level \underline{a} as defined by (7), the expected ability of a reforming candidate is equal to c . Thus, \underline{a} represents a lower bound for α^H : If and only if the egoistic candidates' strategy involves a higher cutoff than \underline{a} , the voter expects a larger policy payoff from a reforming candidate than from a candidate who proposes the status quo. Note that \underline{a} is strictly positive by Assumption 1.

Corollary 1. *The unique D1 equilibrium is either*

1. *an interior equilibrium with $\alpha^H \in (\underline{a}, c)$ and $s_{10} = 1$, or*
2. *a boundary equilibrium with $\alpha^H = \underline{a}$ and $s_{10} \in (\frac{1}{2}, 1]$.*

Corollary 1 implies that the unique equilibrium is characterized by a tuple (α^H, s_{10}) such that two equilibrium conditions are satisfied. First, if the voter strictly prefers one of the candidates given α^H , he must vote accordingly, i.e., s_{10} must equal 1. Second, a candidate with type (α^H, θ^H) must be indifferent between proposing the full-scale reform and the status quo, given behavior (α^H, s_{10}) . Formally, this indifference condition is given by

$$\begin{aligned}
 R(\alpha^H, s_{10}, \rho) &:= \underbrace{2 \left(s_{10} - \frac{1}{2} \right) \left(\rho - \frac{1}{2} \right) \theta^H}_{\text{gain in office rents}} + \underbrace{\left[\frac{1}{2} + 2K(\alpha^H) \left(s_{10} - \frac{1}{2} \right) \left(\rho - \frac{1}{2} \right) \right]}_{\text{loss in legacy payoff}} (\alpha^H - c) \\
 &= 0.
 \end{aligned} \tag{8}$$

We refer to R as the reform incentive function. It measures the utility difference between proposing the full-scale reform and the status quo for an egoistic candidate with cutoff ability α^H , given behavior (α^H, s_{10}) and institution ρ . This utility difference is composed of two effects from proposing the reform instead of the status quo: a gain in office rents and a loss in legacy payoff. At the equilibrium values α^H and s_{10} , both effects outbalance each other. Assumption 2 ensures that the reform incentive function is monotonically increasing in α_H . In consequence, the D1 equilibrium is unique.

Corollary 1 distinguishes between interior and boundary equilibria. In interior equilibria, the equilibrium cutoff α^H is above its lower bound \underline{a} , i.e., the average ability of reforming candidates exceeds the reform cost c . Thus, proposed reforms have a positive expected payoff. As the voter strictly prefers reforming over non-reforming candidates, the voting strategy in these equilibria is pinned down at $s_{10} = 1$. For interior equilibria, equation (8) implicitly defines the equilibrium cutoff α^H . In boundary equilibria, in contrast, α^H equals the lower bound \underline{a} , and the expected

reform payoff is zero. The voter is thus indifferent between reforming and non-reforming candidates, and between all voting strategies. However, her set of optimal strategies includes a unique voting strategy $s_{10} \in (\frac{1}{2}, 1]$ such that the indifference condition (8) is satisfied given $\alpha^H = \underline{a}$.

7 Effects of power-concentrating institutions

Empirically, democratic countries differ strongly with respect to power concentration. In the United Kingdom, for example, virtually all power is enjoyed by the winning party in the elections for the House of Commons, while power is considerably more dispersed between several parties and multiple political actors in Switzerland and Belgium. We show that these variations in the institutional setting shape the incentives of political candidates, thereby affecting the performance of political systems in selecting well-suited political candidates for office and ensuring the implementation of welfare-enhancing policies.²⁸

7.1 Effects on behavior

With asymmetric information about the candidates' abilities and motivations, policy choice is distorted in equilibrium: Some egoistic candidates with ability below the reform cost c propose welfare-reducing reforms, thereby mimicking the behavior of more able candidates, in order to increase their electoral prospects. By shaping electoral incentives, political institutions affect the magnitude of these policy distortions. In particular, we find that higher levels of power concentration induce more severe distortions in policy.

Lemma 1. *In every interior equilibrium, increasing power concentration induces the proposal of more inefficient reforms, $\frac{d\alpha^H}{dp} < 0$.*

In interior equilibria, a reforming candidate wins the election whenever she runs against a non-reforming opponent because the voter's expected payoff from a reform is positive. Consequently, an increase in power concentration allocates in expectation more power to reforming candidates and less to non-reforming candidates. Intuitively, this reallocation of power makes it more attractive to propose a reform. Hence, egoistic candidates become willing to take even more excessive risks, i.e., propose reforms at even lower abilities. More formally, the equilibrium cutoff α^H shifts downwards. Figure 1 illustrates this relationship.

²⁸It should be noted that the effects of variations in power concentration differ from those of variations in the spoils of office. In our setting, an increase in the latter does not only lead to the proposal of more inefficient reforms, but also to an unambiguous reduction of voter welfare.

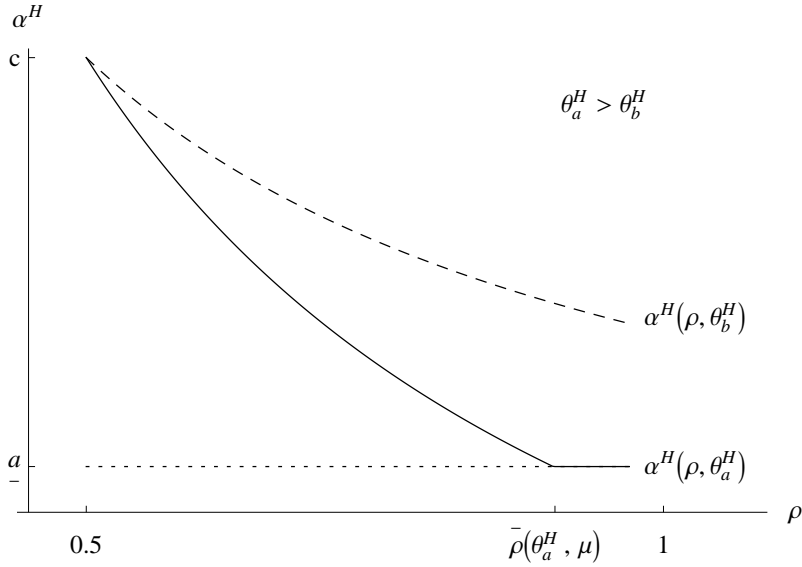


Figure 1: The effect of power concentration on candidate behavior. *Parameters: uniform ability distribution, $c=0.6$, $\mu=0.8$, $\theta_a^H=1$, $\theta_b^H=0.6$.*

The strength of electoral incentives also determines whether an interior equilibrium or a boundary equilibrium arises.

Proposition 3. *If the conflict of interest is small, i.e., if $\theta^H < \bar{\theta}(\mu)$ with $\bar{\theta}'(\mu) < 0$, the unique equilibrium is interior for all levels of power concentration. Otherwise, the equilibrium is interior if and only if power concentration is below some threshold $\bar{\rho}(\theta^H, \mu) \in (\frac{1}{2}, 1]$.*

For a small conflict of interest, $\theta^H < \bar{\theta}(\mu)$, egoistic candidates only care to a limited extent for the spoils of office. Hence, they are only willing to accept limited policy risks, and the cutoff α^H remains above its lower bound \underline{a} even with fully concentrated power $\rho = 1$. By Lemma 1, the cutoff will be even higher for all other levels of ρ : An interior equilibrium arises for all levels of power concentration (see dashed line in Figure 1).

For a large conflict of interest, $\theta^H \geq \bar{\theta}(\mu)$, egoistic candidates care more strongly for the spoils of office. Correspondingly, they are willing to take more excessive policy risks if this allows them to achieve more power. If power is strongly concentrated (ρ close to 1), the election winner receives a much higher share of the spoils of office than the election loser. Hence, egoistic candidates find it so attractive to increase their electoral prospects through reform proposals that the cutoff α^H is reduced to its lower bound \underline{a} . Put differently, high levels of power concentration induce boundary equilibria. With strongly dispersed power (ρ close to $\frac{1}{2}$), in contrast, the election winner and the election loser receive almost the same power. Therefore, egoistic candidates can hardly gain spoils of office by proposing a reform. Hence, they are

not willing to accept the expected loss in legacy payoff that follows from excessively risky reforms. As a result, the cutoff α^H is close to its efficient level c , and the equilibrium is interior. By Lemma 1, there always exists a unique threshold $\bar{\rho}(\theta^H, \mu)$ such that an interior equilibrium arises for all lower levels of power concentration, while a boundary equilibrium results for all higher levels (see solid line in Figure 1).

7.2 Effects on welfare

Finally, we assess the performance of power-concentrating institutions by studying their effects on voter welfare. We start by explaining how the candidates' policy proposals enter expected voter welfare. Suppose candidate 1 with type (a_1, θ_1) proposes policy x_1 . Her contribution to voter welfare is then given by her expected power multiplied by the expected payoff from her policy per unit of power,

$$E[\pi_1(w, \rho) | x_1, X_2(a_2, \theta_2), s] x_1 (a_1 - c),$$

where the expectation in the first term is taken over the characteristics of the second candidate, a_2 and θ_2 . This welfare contribution is equal to zero if candidate 1 proposes the status quo, $x_1 = 0$. Consequently, voter welfare is equal to the sum of welfare contributions by the reforming candidates only. Recall that the winning probability of all reforming candidates is identical. In the following, we denote this probability by $s^R > 1/2$. The expected power of each reforming candidate is hence given by $s^R \rho + (1 - s^R)(1 - \rho)$, independent of his type. In contrast, the expected policy payoff depends on the candidate's ability a_i .

Summing over both candidates and all types, voter welfare thus follows as

$$W(\rho) = 2 [s^R \rho + (1 - s^R)(1 - \rho)] B(\alpha^H), \quad (9)$$

where the second term sums up the expected policy payoffs from all reforming types, given the equilibrium strategy $X^*(a, \theta)$,

$$B(\alpha^H) := \mu \int_{\alpha^H}^1 \phi(a)(a - c) da + (1 - \mu) \int_c^1 \phi(a)(a - c) da.$$

It proves useful to divide the marginal welfare effect of an increase in power concentration into three partial effects with meaningful economic interpretations.

$$\frac{dW}{d\rho} = \underbrace{\frac{\partial W}{\partial \rho}}_{\text{empowerment effect}} + \underbrace{\frac{\partial W}{\partial B(\alpha^H)} \cdot \frac{\partial B(\alpha^H)}{\partial \alpha^H} \cdot \frac{d\alpha^H}{d\rho}}_{\text{disciplining effect}} + \underbrace{\frac{\partial W}{\partial s^R} \cdot \frac{ds^R}{d\rho}}_{\text{selection effect}} \quad (10)$$

First, there is a direct effect of an increase in ρ on welfare: Holding behavior of political candidates and the voter fixed, some political power is shifted from the election loser to the election winner. This improves welfare as the voter rationally opts for the candidate who provides larger expected welfare.²⁹ Hence, there is a positive *empowerment effect*.

Second, a change in political institutions affects the behavior of politicians. As shown in Lemma 1, a higher level of ρ reduces the cutoff α^H , i.e., induces more egoistic candidates to choose inefficient policy gambles.³⁰ This in turn reduces the sum of expected policy payoffs $B(\alpha^H)$ and thus leads to a reduction in voter welfare: there is a negative *disciplining effect*.

Third, the increased gambling impedes the voter's ability to select well-suited candidates for office. In particular, the voter cannot discriminate between beneficial reforms proposed by high-ability candidates and detrimental reforms proposed by low-ability candidates. Hence, the marginal candidates switching to a reform proposal are elected more often than before, and all other candidates are elected less often. In particular, this lowers the winning probability s^R of each candidate who initially proposed a reform. As the marginal candidates provide lower policy payoffs than all other candidates, voter welfare is unambiguously reduced: there is a negative *selection effect*.

Overall, variations in power concentration give rise to a tradeoff between the positive *empowerment effect* on the one hand, and the negative *disciplining* and *selection effects* on the other hand. The optimal level of power concentration can be found by studying the relative sizes of these countervailing effects over the range of institutional settings, $\rho \in [\frac{1}{2}, 1]$. As will become clear, the sum of all three effects may be non-monotonic in ρ . The following assumption on the joint type distribution ensures that there is a unique welfare maximum, nevertheless. Therefore, it allows to focus on the underlying mechanism of interest. We impose this assumption for the remainder of the paper.

Assumption 3. *The weighted ability distribution $K(a) = (1 - \mu)\Phi(c) + \mu\Phi(a)$ is log-concave in a .*

Log-concavity is a property that is satisfied for many commonly used probability distributions, including the uniform distribution, the normal distribution, and the Pareto distribution. It implies that the weighted ability distribution has a non-

²⁹Formally, the winning probability of reforming candidates is given by $s^R > 1/2$. Together with $B(\alpha^H) > 0$, this ensures a strictly positive partial derivative $\frac{\partial W}{\partial \rho}$.

³⁰Formally, the equilibrium cutoff α^H decreases, adding additional negative terms in the first integral of term $B(\alpha^H)$.

decreasing hazard rate $K(a)/k(a)$.³¹ Under this regularity condition, we get the following results on the optimal level of power concentration.

Proposition 4. *Full concentration of power is optimal if and only if the conflict of interest is sufficiently small, i.e., θ^H is below a threshold $\tilde{\theta}(\mu) < \bar{\theta}(\mu)$ with $\tilde{\theta}'(\mu) < 0$. Otherwise, voter welfare is maximized at a unique intermediate level of power concentration, $\rho^* \in (\frac{1}{2}, 1)$.*

By Proposition 4, the optimal level of power concentration ρ^* is uniquely determined for each combination of μ and θ^H . In particular, ρ^* is given by full concentration of power if and only if the conflict of interest between the voter and the candidates is small. This result can be derived in three main steps. First, the optimal level of power concentration will induce an interior equilibrium. Second, welfare is strictly quasi-concave in ρ within the range of parameter values giving rise to an interior equilibrium. Hence, the optimal level of power concentration is well-defined and unique. Third, full concentration of power is optimal if and only if the conflict of interest is sufficiently small. Otherwise, some intermediate level of power concentration is optimal.³²

The first step follows because the voter is strictly better off in each interior equilibrium than in any boundary equilibrium. In interior equilibria, the expected payoff $B(\alpha^H)$ from proposed reforms is strictly positive as argued above. The same is true for expected voter welfare, as can be seen in equation (9). In boundary equilibria, on the contrary, politicians propose so many detrimental reforms that the expected reform payoff and expected welfare are equal to zero. To ensure an interior equilibrium, the optimal level of power concentration ρ^* must be located below the threshold $\bar{\rho}(\theta^H, \mu)$, which we have established in Proposition 3.

In the second step, we show that welfare is strictly quasi-concave over the range of interior equilibria under Assumption 3. For this purpose, we analyze how the sizes of the three welfare effects evolve with ρ . We start with the positive empowerment effect, which results because additional power is shifted to the election winner, who is likely to be a reforming candidate. The higher ρ is, the more detrimental reforms are proposed and the lower is the expected reform payoff $B(\alpha^H)$, which makes shifting

³¹Note that log-concavity is usually imposed on the unweighted ability distribution $\Phi(a)$. We slightly generalize this regularity assumption by imposing it on the weighted ability distribution. For the uniform distribution and any distribution with decreasing density ϕ , Assumption 3 follows from log-concavity of Φ .

³²Note that full dispersion of political power (random allocation of decision rights) is never optimal, but always dominated by some level of intermediate power concentration. This finding qualifies the result of Maskin & Tirole (2004) who show that, under some conditions, political decisions should rather be delegated to randomly appointed “judges” than to elected “politicians”.

power to reforming candidates less beneficial. Hence, the empowerment effect is large for ρ close to $1/2$, but shrinks with increasing power concentration.³³

Next, consider the negative disciplining effect, which results because additional political candidates propose detrimental reforms. The size of this effect depends on the expected payoff from these marginal reforms, $\mu\phi(\alpha^H)(\alpha^H - c)$. For low levels of power concentration, policy choice is almost efficient with α^H close to c . The higher ρ is, the more distorted is policy choice and the more detrimental are the marginal reforms. Hence, the disciplining effect is negligible for ρ close to $1/2$, but grows larger for strongly concentrated power.³⁴

Finally, the negative selection effect arises because the winning probability s^R of reforming candidates is reduced. First, the size of this effect depends on how strongly the winning probability affects the expected power of reforming candidates. If ρ is small, the election winner and the loser receive almost the same power shares. Therefore, a change in s^R has only little impact on voter welfare and the selection effect is weak. Second, the size of the effect depends on how beneficial it is to shift additional power to reforming candidates, i.e., how large their welfare contribution $B(\alpha^H)$ is. As argued above, $B(\alpha^H)$ decreases in ρ . Consequently, the selection effect is also weak for high levels of ρ . While the selection effect is thus close to zero for low levels and high levels of ρ , it attains more negative values for intermediate levels of power concentration. Hence, this effect is in general non-monotonic in ρ .

The previous discussion has provided two insights that are illustrated in Figure 4 in Appendix B. First, the positive empowerment effect always dominates for small levels of ρ , but may be dominated by the negative disciplining and selection effects for high levels of ρ . Second, the selection effect is in general non-monotonic in ρ . Assumption 3 ensures that the welfare function has a unique and well-defined maximum, nevertheless. In particular, the assumption requires a monotonically decreasing hazard rate $\frac{K(\underline{a})}{k(\underline{a})}$. Thereby, it imposes restrictions on how changes in α^H affect the share of reforming candidates, $1 - K(\alpha^H)$, relative to the density of marginal candidates, $k(\alpha^H)$. While the share of reforming candidates is crucial for the expected payoff from all reforms $B(\alpha^H)$ (which enters the empowerment and selection effects), the density of marginal candidates shapes the disciplining effect. As a result, the negative and positive effects outbalance each other at most at one level of ρ (see formal proof of Proposition 4). Put differently, expected welfare is strictly quasi-concave in ρ and has a unique maximum $\rho^* \in (1/2, 1]$.

³³If high levels of ρ push the cutoff α^H towards its lower bound \underline{a} , the empowerment effect vanishes completely: Shifting power to reforming candidates is not beneficial anymore.

³⁴Whether or not the disciplining effect is monotonic in ρ , depends on the gradients of the density function ϕ and the derivative $\frac{d\alpha^H}{d\rho}$.

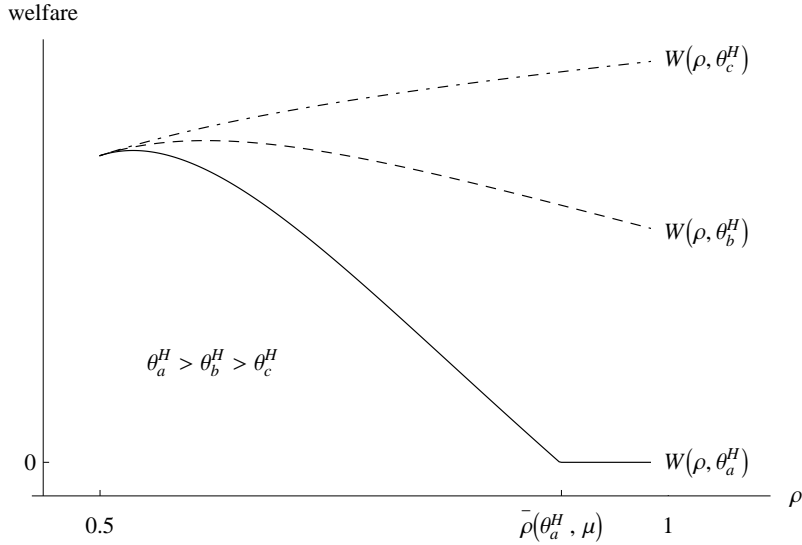


Figure 2: The effect of power concentration on welfare. *Parameters: uniform ability distribution, $c=0.6$, $\mu=0.8$, $\theta_a^H=1$, $\theta_b^H=0.6$, $\theta_c^H=0.3$.*

Whether the maximum is given by some moderate level $\rho < 1$ or by full power concentration $\rho = 1$, depends on the conflict of interest as measured by θ^H and μ . Figure 2 illustrates this relation by depicting the welfare functions for three different conflicts of interests. If the conflict of interest is large, full concentration of power induces a boundary equilibrium with zero welfare. Hence, it is optimal to set an intermediate level of $\rho < \bar{\rho}(\theta^H, \mu)$ that is sufficiently small to ensure an interior equilibrium (see solid line in Figure 2). If the conflict of interest is moderate, full concentration of power gives rise to an interior equilibrium with cutoff α^H close to its lower bound \underline{a} . In this case, the expected reform payoff $B(\alpha^H)$ is so small that the positive empowerment effect is dominated by the negative disciplining and selection effects. Consequently, voter welfare can be increased by introducing some dispersion of power (see dashed line in Figure 2). If the conflict of interest is small, finally, full power concentration induces only limited policy gambles so that α^H remains close to its efficient level c . In this case, the overall effect is positive for all levels of ρ : it is optimal to fully concentrate power in the hands of the election winner (see dot-dashed line in Figure 2).

Finally, we investigate how the optimal level of power concentration is affected by a marginal reinforcement in the conflict of interest between voter and politicians. In our setting, the conflict of interest is affected by two parameters, the strength of the office motive θ^H and the share of egoistic candidates μ . Recall that full power concentration is optimal if the conflict of interest is sufficiently small, $\theta^H \leq \tilde{\theta}(\mu)$. The following Corollary considers marginal variations in both parameters in all other cases.

Corollary 2. *If $\theta^H > \tilde{\theta}(\mu)$, the optimal level of power concentration is strictly decreasing in θ^H as well as μ .*

By this Corollary, the optimal concentration is unambiguously decreasing in the size of the conflict of interest. A stronger office motive makes mimicking more attractive and induces more inefficient reforms by egoistic candidates. Similarly, a larger share of egoistic types aggravates the distortions in policy choice, and impedes the voter's ability to select well-suited candidates. In both cases, the stronger distortions in policy proposals reduce the positive empowerment effect and increase the negative disciplining and selection effects of power concentration. Thus, it becomes more beneficial to reduce these distortions by means of power-dispersing institutions.

In Appendix C, we show that our theoretical results are in line with some illustrative data. Corollary 2 suggests that countries with a weak conflict of interest between politicians and voters should experience a positive welfare effect of power concentration. In contrast, countries with a stronger conflict of interest should experience a smaller or even negative welfare effect of power concentration. While a rigorous empirical test is beyond the scope of this paper, we can operationalize key variables of our model for a cross-country set of 18 established democracies. We find that the data is broadly in line with the conjecture: For countries where voters evaluate politicians as mainly public-spirited, power concentration is positively correlated with economic growth (as a broad performance measure). For countries where voters assess politicians as mainly egoistic, in contrast, power concentration and growth are negatively correlated.

8 Extension: Heterogeneous voters

In the previous section, we have considered a stylized electoral setting with a representative voter. This allowed us to delineate the effects of power concentration on the quality of information provided through electoral campaigns. Clearly, this approach leaves aside the crucial role of public elections to aggregate preferences in heterogeneous electorates. The results of the previous sections extend, however, to the case with preference heterogeneity among voters. In the following, we provide a verbal summary of our results for an extended model. All formal proofs are available upon request.

Let there be a continuum of voters with heterogeneous policy preferences. If a full-scale reform is successfully adopted, the return to voter k is equal to some individual preference parameter β_k . We assume that parameter β_k is symmetrically

distributed on some compact interval. Aside this heterogeneity, all voters are equal: They bear the same cost c of reform implementation, and receive a zero payoff if the status quo is adopted. As normative criterion, we use an unweighted utilitarian welfare function, i.e., average voter utility. The election winner is determined by simple majority rule. With sincere voting, every election is consequently won by the median voter's preferred candidate.

As the median voter's behavior does not qualitatively differ from the behavior of a representative voter, voter heterogeneity does not affect the equilibrium behavior of candidates. In consequence, variations in power concentration have the same effects on political selection and voter welfare as in the basic model.

With heterogeneous voters, we can generalize our results to institutional settings in which the winner's political power depends on the margin of her electoral victory. In the real world, the electoral margin affects political power for formal reasons (e.g., supermajority requirements) as well as informal reasons (e.g., party discipline). We capture this aspect by assuming that the political power of each candidate depends on both her vote share and some parameter of power concentration.³⁵ Our main results carry over to this larger class of institutional settings: First, limiting the concentration of power improves political selection and voter welfare whenever the conflict of interest between voters and candidates is sufficiently large. Second, the optimal level of power concentration monotonically decreases if political selection is further exacerbated by a larger conflict of interest.

Finally, the introduction of heterogeneous voters allows to integrate concerns for the political representation of minorities in our setting. From political philosophers to modern political scientists (see, e.g., Madison 1788*a* in the *Federalist* # 51, Lijphart 1999), power-dispersing institutions have often been recommended in order to foster the representation of minorities in the society, and to circumvent a tyranny of the majority. To integrate these concerns in our model, we assume that there are two groups of voters. While the majority of voters benefit from a successfully implemented reform, the minority do not benefit from a reform and prefer the status quo. Furthermore, we use as the social planner's objective a weighted welfare function that assigns larger weights to voters from the minority.

If the concern for minorities is sufficiently strong, limiting the concentration of power becomes optimal even in the benchmark case of perfect information. For

³⁵Formally, we introduce a continuously differentiable power allocation function $\tilde{\pi}$ that maps the vote share v_i and the power concentration parameter ρ into a power share for each candidate. We assume $\tilde{\pi}$ to be symmetric, i.e., $\tilde{\pi}(v, \rho) = 1 - \tilde{\pi}(1 - v, \rho)$, monotonically increasing in the vote share and, if and only if $v > \frac{1}{2}$, monotonically increasing in ρ . A similar approach is used by Saporiti (2014), Herrera et al. (2016) and Matakos et al. (2016).

any degree of minority concerns, however, the optimal level of power concentration is weakly smaller under asymmetric than under perfect information. Conversely, political power should be weakly more dispersed if the normative criterion exhibits concerns for the minority than without such concerns.³⁶ Intuitively, power dispersion may have beneficial effects through two separate channels. A concern for minorities calls for power dispersion as a means to adapt the implemented policy to the interests of the minority. A selection problem, in contrast, calls for power dispersion to discipline politicians in their reform proposals. Overall, the quality of political selection and the representation of minorities can be regarded as two independent motives for the introduction of power-dispersing political institutions.

9 Conclusion

In this paper, we have investigated how the concentration of political power affects policy choice and political selection. In particular, we have considered a model in which the politicians propose overly risky policies to appear more competent and increase their electoral prospects (as in, e.g., Majumdar & Mukand 2004, Fox & Van Weelden 2010, Fu & Li 2014). In this setting, power-concentrating institutions induce three distinguishable effects on voter welfare. On the one hand, they shift additional power to the voter's preferred candidate, giving rise to a positive *empowerment effect*. On the other hand, they induce the adoption of more inefficiently risky policies and reduce the voter's capability to identify well-suited candidates, giving rise to negative *selection* and *disciplining effects*. If and only if the conflict of interest between voter and politicians is small, it is optimal to concentrate political power fully in the hands of the election winner. The larger the conflict of interest, the more power should be dispersed in order to maximize voter welfare.

We have studied a model in which some policies are associated with higher exogenous risks than others, and political institutions can help to limit the adoption of excessively risky policies by the politicians. A natural next step for future research would be to endogenize these policy risks. For this purpose, one could assume that politicians can exert non-verifiable effort to reduce the risks associated to their policy-making. This approach would allow to jointly study the effects of political institutions on political selection and on politician's effort, thereby relating our findings to those in Ashworth & Bueno de Mesquita (2016) and Ashworth et al.

³⁶There are cases in which either full concentration or full dispersion of power is optimal both under asymmetric and under perfect information. In all other cases, optimal power concentration is strictly smaller under asymmetric information. The same applies for the comparison of optimal power concentration with and without a concern for the minority.

(2017). Alternatively, one could assume that politicians can use public funds to either reduce policy risks or increase their private rents. Such a model could build a bridge between models with policy gambles and models with shirking or rent-seeking (e.g., Besley & Smart 2007, Hindriks & Lockwood 2009).

Finally, we are convinced that a sensible analysis of specific political institutions should take into account the overall configuration of the political system, as emphasized by Tsebelis (1995, 2002) and Lijphart (1984, 1999, 2012). This paper has proposed a simple and abstract way to model this overall configuration by focusing on the implied concentration of political power, similar to Saporiti (2014), Herrera et al. (2016) and Matakos et al. (2016). While this modeling approach is certainly not without caveats, a major advantage is that it can easily be incorporated into more complex models. Hence, it could allow many theoretical studies to account in a tractable way for the empirically evident heterogeneity of institutional settings.

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Appendix

A Proofs of Propositions and Lemmas

Proof of Proposition 1

Under perfect information, the optimal voting strategy of the voter induces the following winning probabilities for candidate 1

$$s(x_1, x_2) = \begin{cases} 1 & \text{if } x_1(a_1 - c) > x_2(a_2 - c) , \\ \frac{1}{2} & \text{if } x_1 = x_2 \text{ and } x_1(a_1 - c) = x_2(a_2 - c) , \\ 0 & \text{if } x_1(a_1 - c) < x_2(a_2 - c) . \end{cases}$$

Given the strategy X_2 of agent 2, candidate 1 chooses x_1 to maximize

$$\underbrace{E_{a_2, \theta_2}[\rho s(x_1, X_2(a_2, \theta_2)) + (1 - \rho)(1 - s(x_1, X_2(a_2, \theta_2)))]}_{E[\pi_1(w, \rho)]} [x_1(a_1 - c) + \theta_1].$$

First, consider a candidate with ability $a_1 > c$. She can maximize her winning probability by choosing $x_1 = 1$. Moreover, $x_1 = 1$ is also the unique maximizer of the term $x_1(a_1 - c)$. Hence, a candidate with ability above c always proposes a full-scale reform. Second, consider a candidate with ability below c . She maximizes her chances to win the election by playing the status quo. In particular, the associated winning probability is always strictly positive. Hence, the status quo proposal also strictly maximizes her legacy payoff $E[\pi_1(\dots)]x_1(a_1 - c)$, implying that candidates with ability below c always play the status quo in equilibrium. For candidate 2, corresponding arguments apply.

The result has direct normative implications. Changes in power concentration ρ neither influence candidate behavior nor the quality of political selection. However, the higher ρ , the higher is the expected power of the winning candidate, i.e., the one providing higher expected utility to the voter. Hence, voter welfare strictly increases with the level of power concentration.

Proof of Proposition 2 and Corollary 1

The proof proceeds in several steps, starting with the general case where $\theta^H > \theta^L > 0$. First, we show that in every PBE candidates play a cutoff strategy that features only two different policy proposals. Second, we show that in every D1 equilibrium these proposals have to be the status quo and the complete reform. Third, we derive existence of a D1 equilibrium. Fourth, we concentrate on the limit case $\theta^L \rightarrow 0$, for which we calculate the cutoff of public spirited politicians. Fifth, we show that candidates' strategies have to be symmetric in equilibrium. As the sixth step, we prove Corollary 1. In the final step, we

derive equilibrium uniqueness.

Step 1: In every PBE candidates play cutoff strategies

Fix some $\theta^H > 0$ and $\theta^L \in (0, \theta^H)$. The following notation is used in the proofs below. We denote by $\hat{a}_i(x_i)$ the expected ability that the voter associates with candidate i if she proposes policy x_i . In equilibrium, $\hat{a}_i(x_i) = \mathbb{E}[a_i | X_i(a_i, \theta_i) = x_i]$. The optimal voting strategy of the voter induces the following winning probability for candidate 1

$$s(x_1, x_2) = \begin{cases} 1 & \text{if } x_1 (\hat{a}_1(x_1) - c) > x_2 (\hat{a}_2(x_2) - c) , \\ \frac{1}{2} & \text{if } x_1 = x_2 \text{ and } x_1 (\hat{a}_1(x_1) - c) = x_2 (\hat{a}_2(x_2) - c) , \\ 0 & \text{if } x_1 (\hat{a}_1(x_1) - c) < x_2 (\hat{a}_2(x_2) - c) . \end{cases}$$

Denote by $\hat{\pi}_1(x_1) = \mathbb{E}_{a_2, \theta_2} [\rho s(x_1, X_2(a_2, \theta_2)) + (1 - \rho)(1 - s(x_1, X_2(a_2, \theta_2)))]$ the expected power share that candidate 1 gains by proposing x_1 , given her opponent's strategy X_2 (for reasons of readability, X_2 is not explicitly included as argument of $\hat{\pi}_1$). The expected power share $\hat{\pi}_2(x_2)$ is defined correspondingly.

The proof of step 1 involves four steps. First, we show that the status quo is always proposed in equilibrium. Second, the equilibrium reform proposals of candidates are ordered in the sense that candidates with higher ability play proposals with higher x_i $\hat{\pi}_i(x_i)$. Third, we argue that the preceding two properties together imply that each candidate actually proposes at most one positive reform amount $x_i > 0$. Fourth, using the uniqueness of the reform amount, each candidate's strategy can be characterized by two cutoffs α^L and α^H such that candidates with ability lower than their corresponding cutoff play the status quo and those with ability above the cutoff play the unique positive reform amount.

For the first step, we show that $X_i^*(a_i, \theta_i) = 0$ is true for some type (a_i, θ_i) with strictly positive probability in equilibrium. Assume the contrary, i.e., $X_i^*(a_i, \theta_i) > 0$ for all a_i and θ_i . Because the expected ability is below c , there must be some equilibrium action $x' > 0$ such that $\hat{a}_i(x') < c$. Because this implies a negative expected payoff $x' (\hat{a}_i(x') - c)$, it follows that the voter prefers a candidate that proposes the status quo to a candidate that proposes x' . Hence, the expected power is larger when proposing the status quo than in the case of x' , $\hat{\pi}_i(0) \geq \hat{\pi}_i(x')$.

By the same argument, the opponent also either proposes the status quo or plays some equilibrium action $x'' > 0$ with $x'' (\hat{a}_{-i}(x'') - c) < 0$ along the equilibrium path. When i faces an opponent that plays either one of these actions she gains at least half of the votes by choosing $x_i = 0$. Hence, $\hat{\pi}_i(0) > 0$. As a consequence, candidate i is strictly better off with the status quo proposal than with x' if she has ability $a_i < c$:

$$\hat{\pi}_i(0) \theta_i > \hat{\pi}_i(x') [\theta_i + x' (a_i - c)] .$$

Thus, x' can at most be proposed by candidates with ability $a_i \geq c$, which contradicts

$\hat{a}_i(x') < c$. We conclude that the status quo is played in equilibrium by both candidates for some (a_i, θ_i) .

Second, candidates' proposals are ordered such that candidates with higher ability (but the same motivation) play proposals with higher associated $x_i \hat{\pi}_i(x_i)$. Denote by X^* the set of equilibrium actions. Consider two different actions $x' \in X^*$ and $x'' \in X^*$. Candidate i prefers playing x'' to x' if and only if

$$\begin{aligned} \hat{\pi}_i(x'') [x''(a_i - c) + \theta_i] &\geq \hat{\pi}_i(x') [x'(a_i - c) + \theta_i] \\ \Leftrightarrow [\hat{\pi}_i(x'')x'' - \hat{\pi}_i(x')x'] (a_i - c) &\geq [\hat{\pi}_i(x') - \hat{\pi}_i(x'')] \theta_i. \end{aligned} \quad (\text{A.1})$$

For $\hat{\pi}_i(x'')x'' = \hat{\pi}_i(x')x'$, $x'' \neq x'$ implies $\hat{\pi}_i(x'') \neq \hat{\pi}_i(x')$. Hence, all types strictly prefer the same action, which contradicts the assumption that both are elements of X^* . Thus, $\hat{\pi}_i(x'')x'' \neq \hat{\pi}_i(x')x'$ must hold. Without loss of generality, let $\hat{\pi}_i(x'')x'' > \hat{\pi}_i(x')x'$. Since the left-hand side of (A.1) is monotonic in a_i , there is a unique cutoff $\alpha_i^J(x', x'')$ such that i with $\theta_i = \theta^J$ strictly prefers x'' if $a_i > \alpha_i^J(x', x'')$, and x' if $a_i < \alpha_i^J(x', x'')$.

Third, we show that each candidate proposes at most one positive reform $x_i > 0$. This part of the proof needs three substeps. First, we show that egoistic and public-spirited candidates with ability c play the same action. Second, we show that all candidates with ability below c either play the status quo or the action played by candidates with ability c . Third, we show that candidate i plays the same action for all abilities $a_i \geq c$.

For the first substep, denote by x_c^L an action played by i for type (c, θ^L) with positive probability. This action has two properties. First, it must be the unique maximizer of the power share $\hat{\pi}_i$ in X^* . Second, it must also be played by some types with higher ability, and thus be associated with a belief $\hat{a}_i(x_c^L)$ above c . For the first property, note that i only cares about the winning probability if she has ability c . If there were multiple maximizers of $\hat{\pi}_i$ in X^* , candidate i would strictly prefer the higher action for $a_i > c$, and the lower action for $a_i < c$. But then, both actions cannot simultaneously provide the same winning probability and be maximizers of $\hat{\pi}_i(x_i)$. As x_c^L is the unique maximizer of $\hat{\pi}_i(x_i)$, it is also strictly preferred to all other actions by a candidate with type (c, θ^H) . For the second property, if x_c^L would not be associated with some belief above c , the cutoff property implied that at least one other action would only be played by candidates above c and associated with a strictly higher expected payoff. Hence, x_c^L could not be the maximizer of $\hat{\pi}_i(x_i)$.

For the second substep, let $a_i < c$. If candidate i plays an action $x' \neq x_c^L$ for $a_i < c$, then the cutoff property implies $\hat{a}_i(x') < c$. For $x' \neq 0$, this would mean $\hat{\pi}_i(x') < \hat{\pi}_i(0)$, and x' would yield lower utility to candidate i than the status quo. Hence, i plays either x_c^L or 0 for any $a_i < c$. More precisely, i prefers x_c^L to 0 if and only if

$$x_c^L \hat{\pi}(x_c^L) (a_i - c) > [\hat{\pi}(0) - \hat{\pi}(x_c^L)] \theta_i.$$

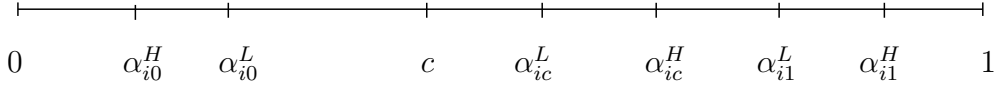


Figure 3: Necessary ordering of cutoffs if $x_L^c \neq x_L^1$ were true (third substep).

It follows that there are two cutoffs α_{i0}^L and $\alpha_{i0}^H < \alpha_{i0}^L$ such that, for $\theta_i = \theta^J$, candidate i strictly prefers x_L^c if $a_i \in (\alpha_{i0}^J, c)$, and 0 if $a_i < \alpha_{i0}^J$.

For the third substep, consider the behavior by candidate i for abilities above c . Denote by x_1^L an action played by type $(1, \theta^L)$ with positive probability. If $x_1^L = x_c^L$, the cutoff property implies that public-spirited candidates play x_c^L , the action maximizing the winning probability, for all $a_i \geq c$. Moreover, if public-spirited types prefer x_c^L to all other proposals in $[0, 1]$ for all $a_i > c$, then the same is true for egoistic types (see inequality A.1). In this case, we can conclude that only one positive reform amount and the status quo are played by candidate i in equilibrium.

Assume in contrast that $x_1^L \neq x_c^L$. By the ordering of actions, this can only be the case if $x_1^L \hat{\pi}_i(x_1^L) > x_c^L \hat{\pi}_i(x_c^L)$, although x_1^L yields a lower winning probability than x_c^L . This would only be possible if the belief $\hat{a}_i(x_c^L)$ exceeded the belief $\hat{a}_i(x_1^L)$. In the following, we prove by contradiction that this is inconsistent with the required ordering of cutoffs.

Using again (A.1), there exist two cutoffs $\alpha_{i1}^L \in (c, 1]$ and $\alpha_{i1}^H > \alpha_{i1}^L$ such that candidate i prefers action x_1^L to all other actions in X if and only if $\theta_i = \theta^J$ and $a_i > \alpha_{i1}^J$. Similarly, there exist two smaller cutoffs $\alpha_{ic}^L \in (c, \alpha_{i1}^L]$ and $\alpha_{ic}^H \in (c, \alpha_{ic}^L]$ such that i prefers action x_c^L to all other positive actions $x > 0$ if and only if $\theta_i = \theta^J$ and $a_i < \alpha_{ic}^J$. Note that $\alpha_{ic}^L < \alpha_{ic}^H$. Figure 3 depicts this ordering of cutoffs that necessarily follows for $x_L^c \neq x_L^1$. It implies that $\hat{a}_i(x_1^L) > E[a_i | \alpha_{i1}^L \leq a_i \leq \alpha_{i1}^H]$ and $\hat{a}_i(x_c^L) < E[a_i | \alpha_{ic}^L \leq a_i \leq \alpha_{ic}^H]$. As $\alpha_{i1}^L \geq \alpha_{ic}^L$ and $\alpha_{i1}^H \geq \alpha_{ic}^H$, it is impossible that the condition $\hat{a}_i(x_1^L) < \hat{a}_i(x_c^L)$ is satisfied. We conclude x_1^L cannot differ from x_c^L , and that candidate i plays action x_c^L for all $a_i > c$.

Finally, the previous steps imply that there is a unique pair of cutoffs $\alpha_i^L = \alpha_{i0}^L < c$ and $\alpha_i^H = \alpha_{i0}^H < \alpha_i^L$ such that $X_i^*(a_i, \theta_i) = 0$ if $\theta_i = \theta^J$ and $a_i < \alpha_i^J$, and $X_i^*(a_i, \theta^L) = x_c^L$ otherwise. Hence, candidates propose reforms according to a cutoff rule.

Step 2: Candidates propose either the status quo or a complete reform

To show that candidates propose a complete reform, denote the reform proposal which is not equal to the status quo by b .

Non-robustness of $(0, b)$ equilibria with $b < 1$:

The D1 criterion introduced by Cho & Kreps (1987) refines the equilibrium concept by restricting off-equilibrium beliefs. It requires that each deviation from equilibrium strategies must be associated to the set of types that would benefit from this deviation for the largest set of beliefs. More formally, a deviation to some action cannot be associated

to a type t if there is some other type t' such that the deviation would be profitable for an agent with type t' , first, for all beliefs such that the deviation would be profitable for type t , and second, for some beliefs such that the deviation would not be profitable for type t .

Generally, the set of D1 equilibria is a subset of the set of Perfect Bayesian equilibria. In our model, this criterion eliminates all equilibria in which $X_i^*(1, \theta_i)$ is unequal to 1. Consider some equilibrium with $b_i < 1$. We first identify the set of beliefs for the off-equilibrium action $x_i = 1$ that is consistent with the D1 criterion. For a candidate with ability such that $a_i + \theta_i \leq c$, the status quo is more attractive than the full reform for every belief $\hat{\pi}_i(1)$. Moreover, for an agent with type (a_i, θ_i) and $a_i + \theta_i > c$, a deviation to $x_i = 1$ would be profitable for any belief such that

$$\begin{aligned} \hat{\pi}_i(1) [\theta_i + a_i - c] &\geq \hat{\pi}_i(X_i^*(a_i, \theta_i)) [\theta_i + X_i^*(a_i, \theta_i)(a_i - c)] \\ \Leftrightarrow \hat{\pi}_i(1) &\geq \hat{\pi}_i(X_i^*(a_i, \theta_i)) \frac{\theta_i + X_i^*(a_i, \theta_i)(a_i - c)}{\theta_i + a_i - c}. \end{aligned}$$

Given any equilibrium strategy $X_i^*(a_i, \theta_i)$, the right-hand side is strictly decreasing in a_i . Thus, the set of beliefs giving rise to a profitable deviation for any type (a_i, θ_i) with $a_i < 1$ is a strict subset of the corresponding set for type $(1, \theta_i)$. According to the D1 criterion, the voter must hence believe to face a candidate with $a_i = 1$ and vote accordingly if he observes the off-equilibrium action $x_i = 1$. Given this belief, however, $1(\hat{a}_i(1) - c) > b_i(\hat{a}_i(b_i) - c)$ implies $\hat{\pi}_i(1) > \hat{\pi}_i(b)$. Consequently, deviating to a full reform is strictly profitable for high-ability candidates. Thus, no equilibrium with $b_i < 1$ is robust to the D1 criterion.

Robustness of (0, 1) equilibria:

Second, all PBE equilibria with $b_1 = b_2 = 1$ are robust to D1. Consider a deviation to any $b'_i \in (0, 1)$. For candidate i with office motivation θ^J and $a_i < \alpha_i^J$, this deviation is profitable if and only if

$$\hat{\pi}_i(b'_i) [\theta^J + b'_i(a_i - c)] > \hat{\pi}_i(0)\theta^J.$$

As the left-hand side is strictly increasing in a_i , the set of beliefs such that the deviation is profitable is “largest” for the cutoff type $a_i = \alpha_i^J < c$. For agents with $a_i \geq \alpha_i^J$, $\theta^J + b'_i(a_i - c) > 0$ holds and the deviation is profitable if

$$\hat{\pi}_i(b'_i) > \hat{\pi}_i(1) \frac{\theta^J + a_i - c}{\theta^J + b'_i(a_i - c)}.$$

As the right-hand side is strictly increasing in a_i , the deviation can again only be attributed to the cutoff type $a_i = \alpha_i^J$. As both cutoffs α_i^L and α_i^H are located below c , we have $\hat{a}_i(b'_i) < c$, which induces $\hat{\pi}_i(b'_i) < \hat{\pi}_i(0)$. Hence, this deviation is never profitable for candidate i .

Step 3: Existence of D1 equilibria

In the following, we show that a symmetric D1 equilibrium exists. In such an equilibrium, each candidate proposes a full reform if $\theta_i = \theta^J$ and $a_i \geq \alpha_i^J = \alpha^J$, and the status quo otherwise. Thus, we need to show that two cutoffs α^L and α^H exist such that these strategies are indeed mutually best responses.

Note that there are only four possible equilibrium pairs of actions. If both candidates propose the same policy, the winning probability and expected power share of each candidate is equal to one half. If only candidate 1 proposes a reform, $x_1 = 1$, her winning probability is given by $s_{10} = s(1, 0)$ and her expected power share by $s_{10} \rho + (1 - s_{10})(1 - \rho)$.

The proof makes use of three auxiliary functions. First, define the pair of functions

$$R_J(\alpha^J, \alpha^L, \alpha^H, s_{10}, \rho) := \left[\frac{1}{2} + \bar{K}(\alpha^H, \alpha^L) \left[s_{10} \rho + [1 - s_{10}] (1 - \rho) - \frac{1}{2} \right] \right] (\alpha^J - c) \\ + \theta^J \left[s_{10} \rho + [1 - s_{10}] (1 - \rho) - \frac{1}{2} \right]$$

for $J \in \{L, H\}$, where $\bar{K}(x, y) := \mu \Phi(x) + (1 - \mu) \Phi(y)$. An equilibrium is given by each vector $(\alpha^L, \alpha^H, s_{10})$ that satisfies (a) $R_L(\alpha^L, \alpha^L, \alpha^H, s_{10}, \rho) = 0$, (b) $R_H(\alpha^H, \alpha^L, \alpha^H, s_{10}, \rho) = 0$, and (c) $s_{10} = 1$ if $\hat{a}(1) > c$, and $s_{10} = 0$ if $\hat{a}(1) < c$. Verbally, (a) and (b) ensure that candidates are indifferent between a full reform and the status quo if their type equals (α^J, θ^J) for $J \in \{L, H\}$. In other words, egoistic and public-spirited candidates are willing to play the corresponding cutoff strategies. Condition (c) ensures optimal voter behavior.

Second, define the function $q(\alpha) := (\alpha - c) \frac{\theta^L}{\theta^H} + c$, which is strictly increasing in α . The function $R_L(q(\alpha^H), q(\alpha^H), \alpha^H, s_{10}, \rho)$ attains zero at some level α^H if and only if the same is true for function $R_H(\alpha^H, q(\alpha^H), \alpha^H, s_{10}, \rho)$. Note also that both functions are continuous in α^H . Hence, if $\alpha^L = q(\alpha^H)$, then (a) is satisfied if and only if (b) is satisfied.

Third, define the lower bound a_c that solves

$$\frac{\mu \int_{a_c}^1 a d\Phi(a) + (1 - \mu) \int_{q(a_c)}^1 a d\Phi(a)}{1 - \bar{K}(a_c, q(a_c))} = c,$$

a_c is well defined since the left hand side of this equation is monotonically and continuously decreasing in a_c , and larger c for $a_c = c$ as well as smaller c for $a_c = 0$. If candidate behavior is given by $\alpha^L = q(\alpha^H)$ and α^H greater, equal, or smaller than a_c , the associated belief $\hat{a}(1)$ is higher, equal, or smaller than c , respectively. Thus, optimal voting behavior is given by $s_{10} = 1$ for $\alpha^H > a_c$ and $s_{10} = 0$ for $\alpha^H < a_c$.

Using these definitions, in the following we prove the existence of at least one symmetric equilibrium, which can be either interior or boundary. If $R_H(a_c, q(a_c), a_c, 1, \rho) < 0$, at least one interior equilibrium with $\alpha^H > a_c$ and $s_{10} = 1$ exists. Note that $q(c) = c$ and that $R_H(c, q(c), c, 1, \rho) > 0$ for ρ . The continuity of functions R_H and R_L , and the construction of function q ensure the existence of at least one pair $\alpha^L = q(\alpha^H)$ with $\alpha^H > a_c$ such that

all equilibrium conditions are satisfied for $s_{10} = 1$.

If instead $R_H(a_c, q(a_c), a_c, 1, \rho) \geq 0$, there exists a boundary equilibrium with $\alpha^L = q(a_c)$, $\alpha^H = a_c$ and some value $s_{10} \in (\frac{1}{2}, 1]$. Given that the candidates' symmetric strategy is given by $\alpha^H = a_c, \alpha^L = q(a_c)$, the voter expects the same payoff from reforming candidates and status quo proposing candidates. Hence, every voting behavior $s_{10} \in [0, 1]$ is incentive-compatible. In particular, this includes a unique number in $(\frac{1}{2}, 1]$ such that both candidates are indeed willing to play the strategy characterized by the cutoffs $\alpha^L = q(a_c)$ and $\alpha^H = a_c$.

Step 4: Behavior of public spirited candidates

If candidate 1 is public-spirited with any $\theta^L \in (0, \theta^H)$, the corresponding cutoff α_1^L solves the equation:

$$\begin{aligned} & \left[\frac{1}{2} + \bar{K}(\alpha_2^H, \alpha_2^L) \left[s_{10}\rho + (1 - s_{10})(1 - \rho) - \frac{1}{2} \right] \right] (\alpha_1^L - c) \\ & + \theta^L \left[s_{10}\rho + [1 - s_{10}](1 - \rho) - \frac{1}{2} \right] = 0. \end{aligned}$$

For $\theta^L \rightarrow 0$, the cutoff α_1^L converges to c . The same is true for cutoff α_2^L . Thus, the probability that candidate i proposes a reform is given by $1 - K(\alpha^H)$, where $K : [0, 1] \rightarrow [0, 1]$ is defined by

$$K(\alpha_i^H) := \bar{K}(\alpha_i^H, c) = \mu\Phi(\alpha_i^H) + (1 - \mu)\Phi(c).$$

Step 5: Symmetry of cutoffs

To simplify notation, we define the conditional power shares of candidate 1:

$$\begin{aligned} \pi_{10} &:= \rho s(1, 0) + (1 - \rho)(1 - s(1, 0)), \\ \pi_{01} &:= \rho s(0, 1) + (1 - \rho)(1 - s(0, 1)), \\ \pi_{11} &:= \rho s(1, 1) + (1 - \rho)(1 - s(1, 1)). \end{aligned}$$

For candidate 1, proposing the status quo gives an expected utility of

$$\left\{ K(\alpha_2^H) \frac{1}{2} + [1 - K(\alpha_2^H)] \pi_{01} \right\} \theta^H,$$

while the reform proposal $x_1 = 1$ gives an expected utility of

$$\left\{ K(\alpha_2^H) \pi_{10} + [1 - K(\alpha_2^H)] \pi_{11} \right\} [\theta^H + a_1 - c].$$

We show by contradiction that there cannot be an asymmetric equilibrium in which both candidates play strategies with different egoistic-type cutoffs $\alpha_1^H \neq \alpha_2^H$. Assume there

were such an equilibrium. Necessarily candidate 1 is then indifferent between proposing the status quo and the reform if she has type (α_1^H, θ^H) , i.e., the following equation holds

$$\frac{\theta^H}{c - \alpha_1^H} \left[K(\alpha_2^H) \left(\pi_{10} - \frac{1}{2} \right) + (1 - K(\alpha_2^H)) (\pi_{11} - \pi_{01}) \right] = \pi_{11} + K(\alpha_2^H) (\pi_{10} - \pi_{11}).$$

Correspondingly, candidate 2 must be indifferent between both actions for type (α_2^H, θ^H) :

$$\frac{\theta^H}{c - \alpha_2^H} \left[K(\alpha_1^H) \left(\frac{1}{2} - \pi_{01} \right) + (1 - K(\alpha_1^H)) (\pi_{10} - \pi_{11}) \right] = 1 - \pi_{11} + K(\alpha_1^H) (\pi_{11} - \pi_{01}).$$

Subtracting these indifference conditions from each other, we get the necessary equilibrium condition

$$\begin{aligned} & \frac{\theta^H}{c - \alpha_1^H} \left[K(\alpha_2^H) \left(\pi_{10} - \frac{1}{2} \right) + (1 - K(\alpha_2^H)) (\pi_{11} - \pi_{01}) \right] \\ & - \frac{\theta^H}{c - \alpha_2^H} \left[K(\alpha_1^H) \left(\frac{1}{2} - \pi_{01} \right) + (1 - K(\alpha_1^H)) (\pi_{10} - \pi_{11}) \right] = \\ & K(\alpha_2^H) \pi_{10} + [1 - K(\alpha_2^H)] \pi_{11} - 1 + K(\alpha_1^H) \pi_{01} + [1 - K(\alpha_1^H)] \pi_{11} \\ \Leftrightarrow & \left[\frac{\theta^H K(\alpha_2^H)}{c - \alpha_1^H} - \frac{\theta^H (1 - K(\alpha_1^H))}{c - \alpha_2^H} - K(\alpha_2^H) \right] \left(\pi_{10} - \frac{1}{2} \right) \\ & - \left[\frac{\theta^H K(\alpha_1^H)}{c - \alpha_2^H} - \frac{\theta^H (1 - K(\alpha_2^H))}{c - \alpha_1^H} - K(\alpha_1^H) \right] \left(\frac{1}{2} - \pi_{01} \right) \\ & + \underbrace{\left[(1 - K(\alpha_2^H)) \left(\frac{\theta^H}{c - \alpha_1^H} - 1 \right) + (1 - K(\alpha_1^H)) \left(\frac{\theta^H}{c - \alpha_2^H} - 1 \right) \right]}_{>0} \left(\pi_{11} - \frac{1}{2} \right) = 0. \end{aligned}$$

If $\alpha_1^H = \alpha_2^H$, this condition is trivially fulfilled. For $\rho = \frac{1}{2}$, we would get a symmetric equilibrium with $\alpha_1^H = \alpha_2^H = c$. Thus, consider the case $\rho > 0$. Assume w.l.o.g $\alpha_1^H > \alpha_2^H$, so that $K(\alpha_1^H) > K(\alpha_2^H)$. As this implies $\pi_{11} - \frac{1}{2} > 0$, the equality above can only be satisfied if

$$\begin{aligned} & \left[\frac{\theta^H K(\alpha_2^H)}{c - \alpha_1^H} - \frac{\theta^H (1 - K(\alpha_1^H))}{c - \alpha_2^H} - K(\alpha_2^H) \right] \left(\pi_{10} - \frac{1}{2} \right) < \\ & \left[\frac{\theta^H K(\alpha_1^H)}{c - \alpha_2^H} - \frac{\theta^H (1 - K(\alpha_2^H))}{c - \alpha_1^H} - K(\alpha_1^H) \right] \left(\frac{1}{2} - \pi_{01} \right). \end{aligned} \quad (\text{A.2})$$

However, $\alpha_1^H > \alpha_2^H$ implies $\pi_{10} \geq 1 - \pi_{01}$. Furthermore, we can show that

$$\begin{aligned} & \frac{\theta^H}{c - \alpha_1^H} K(\alpha_2^H) - \frac{\theta^H}{c - \alpha_2^H} (1 - K(\alpha_1^H)) - K(\alpha_2^H) > \\ & \frac{\theta^H}{c - \alpha_2^H} K(\alpha_1^H) - \frac{\theta^H}{c - \alpha_1^H} (1 - K(\alpha_2^H)) - K(\alpha_1^H) \end{aligned}$$

$$\Leftrightarrow \frac{\theta^H}{c - \alpha_1^H} + K(\alpha_1^H) > \frac{\theta^H}{c - \alpha_2^H} + K(\alpha_2^H).$$

Hence, (A.2) cannot be satisfied. This contradicts the initial assumption that an asymmetric equilibrium exists. We conclude that there are only symmetric equilibria.

Before we show complete the proof of Proposition 2 by showing uniqueness, we prove Corollary 1. At this point the proposition follows directly from the previous steps.

Step 6: Corollary 1

To prove the corollary, the only thing left is to insert the lower bound \underline{a} from Equation (7) in the main text for a_c , and $q(\alpha^H) = c$ for all α^H into the equation in Step 3 of the proof of Proposition 2. If $R_H(\underline{a}, c, \underline{a}, 1, \rho) < 0$, there is at least one interior equilibrium with $\alpha^L = c$, $\alpha^H > \underline{a}$, and $s_{10} = 1$. If instead $R_H(\underline{a}, c, \underline{a}, 1, \rho) > 0$, there is a boundary equilibrium with $\alpha^L = c$, $\alpha^H = \underline{a}$, and $s_{10} \in (\frac{1}{2}, 1]$. In boundary equilibria, the voter is indifferent between all voting strategies, and votes such that both candidates cannot profitably deviate from the strategy characterized by the cutoffs $\alpha^L = c$ and $\alpha^H = \underline{a}$.

Step 7: Uniqueness of the D1 equilibrium

For the remainder of the appendix, define $g(\rho, s_{10}) = \pi_{10} - \frac{1}{2} = s_{10}\rho + (1 - s_{10})(1 - \rho) - \frac{1}{2}$. The term g represents the power share exceeding $\frac{1}{2}$ that a reforming candidate receives in equilibrium when running against a non-reforming opponent. Note that g is strictly increasing in s_{10} for $\rho > \frac{1}{2}$, and strictly increasing in ρ for $s_{10} > \frac{1}{2}$. To simplify notation, we suppress the arguments of g in the following.

In step 3, we showed that at least one interior equilibrium exists if $R_H(\underline{a}, c, \underline{a}, 1, \rho) < 0$. The derivative of R_H with respect to α_H is given by

$$\frac{\partial R_H}{\partial \alpha^H} = \frac{1}{2} + (K(\alpha^H) + (\alpha^H - c)k(\alpha^H))g.$$

Under Assumption 2, it is strictly positive. Thus, R_H has exactly one root with $\alpha \in (\underline{a}, c]$ and $s_{10} = 1$ if and only if $R_H(\underline{a}, c, \underline{a}, 1, \rho) < 0$. Hence, there is a unique interior equilibrium. In this case, there is no boundary equilibrium since R_H is monotonic in s_{10} , and $R_H(\underline{a}, c, \underline{a}, \frac{1}{2}, \rho) < 0$.

If instead $R_H(\underline{a}, c, \underline{a}, 1, \rho) \geq 0$, then the positive derivative $\frac{\partial R_H}{\partial \alpha^H}$ implies that there exists no interior equilibrium. In this case, however, there is a unique boundary equilibrium. In this case, R_H is strictly increasing in s_{10} , while $R_H(\underline{a}, c, \underline{a}, \frac{1}{2}, \rho) < 0$ continues to hold. Consequently, R_H has a unique root with $s_{10} \in (\frac{1}{2}, 1]$ and $\alpha^H = \underline{a}$. As argued above, this constitutes an equilibrium as voters are indifferent between all voting strategies.

Proof of Lemma 1

By Corollary 1, the behavior of the public-spirited candidates does not depend on ρ . In contrast, changes in ρ affect the cutoff α^H of egoistic types, which is implicitly defined by equation (8) in the main text. Implicit differentiation gives

$$\frac{d\alpha^H}{d\rho} = -\frac{\frac{\partial R}{\partial \rho}}{\frac{\partial R}{\partial \alpha^H}} = -\frac{[\theta^H + (\alpha^H - c)K(\alpha^H)]g_\rho}{\frac{1}{2} + K(\alpha^H)g + (\alpha^H - c)k(\alpha^H)g} < 0.$$

By equilibrium condition (8), the numerator equals $\frac{c-\alpha^H}{2g}g_\rho$. It is strictly positive for all $\rho > \frac{1}{2}$, as the same is true for g_ρ . Under Assumption 2, the denominator is strictly positive as well. Consequently, the overall effect is negative.

Proof of Proposition 3

First, the unique equilibrium is always interior for $\rho = \frac{1}{2}$. In this case, winning and losing the election promises the same amount of power ($g = 0$), so that even egoistic candidates care only about their legacy payoff. As a consequence, equilibrium condition (8) is satisfied for $\alpha^H = c$.

As implied by Lemma 1, the cutoff α^H strictly decreases with ρ . Moreover, implicit differentiation of (8) gives $\frac{d\alpha^H}{d\theta^H} < 0$ and $\frac{d\alpha^H}{d\mu} < 0$ for any interior equilibrium with $\rho > \frac{1}{2}$. Two possible cases arise.

Case a: If $\theta^H < \bar{\theta}(\mu) = [1 + K(\underline{a})](c - \underline{a})$, then $R(\underline{a}, 1, 1) = \frac{1}{4}\theta^H + \frac{1}{4}[1 + K(\underline{a})](\underline{a} - c) < 0$ is true. Hence, there is an interior equilibrium for all $\rho \in [\frac{1}{2}, 1]$. (Note that K depends on \underline{a} as well as μ , the probability to draw an egoistic candidate.)

Case b: If $\theta^H \geq \bar{\theta}(\mu)$, we get $R(\underline{a}, 1, 1) \geq 0$. Hence, $R(\underline{a}, 1, \rho)$ attains negative values if and only if power concentration ρ is sufficiently small. Formally, there is a unique threshold $\bar{\rho}(\theta^H, \mu)$ such that $R(\underline{a}, 1, \rho) < 0$ is true, and an interior equilibrium exists, if and only if $\rho < \bar{\rho}(\theta^H, \mu)$.

The derivative of $\bar{\theta}(\mu)$ with respect to μ is given by

$$\bar{\theta}'(\mu) = [\Phi(\underline{a}) - \Phi(c)](c - \underline{a}) < 0.$$

Proof of Proposition 4

Unique maximum

We measure welfare by the voter's expected utility from ex ante perspective. As explained in the main text, this is given by

$$W(\rho) = 2 [s^R \rho + (1 - s^R)(1 - \rho)] B(\alpha^H).$$

A reforming candidate wins the election with probability s_{10} if her opponent proposes the status quo and with probability 50% if her opponent proposes a reform as well. As a consequence, the winning probability s^R is given by

$$s^R = K(\alpha^H)s_{10} + \frac{1 - K(\alpha^H)}{2}.$$

Inserting this probability and our definition of $g(\rho, s_{10})$ yields the following welfare function:

$$W(\rho) = 2 \left[\frac{1}{2} + K(\alpha^H)g(\rho, s_{10}) \right] \underbrace{\left[(1 - \mu) \int_c^1 \phi(a)(a - c)da + \mu \int_{\alpha^H}^1 \phi(a)(a - c)da \right]}_{z(\alpha^H)}.$$

First, note that $z(\underline{a}) = 0$, and $z(\alpha) > 0$ for all $\alpha > \underline{a}$ by the construction of \underline{a} . Hence, welfare is strictly positive in all interior equilibria, and equals zero in all boundary equilibria. We conclude that the welfare-maximizing level of power concentration satisfies $\rho^* < \bar{\rho}(\theta^H, \mu)$, where the latter is strictly larger than $\frac{1}{2}$. Hence, the welfare maximizing ρ^* always gives rise to an interior equilibrium.

Second, we show that the welfare function is strictly quasi-concave for interior equilibria, $\rho < \bar{\rho}(\theta^H, \mu)$, where $s_{10} = 1$ and α^H is implicitly defined by (8). In an interior equilibrium, the derivative of W with respect to ρ is given by

$$\begin{aligned} \frac{dW}{d\rho} &= \frac{\partial W}{\partial \rho} + \frac{\partial W}{\partial \alpha^H} \frac{d\alpha^H}{d\rho} \\ &= K(\alpha^H)z(\alpha^H) + \left\{ (c - \alpha^H)k(\alpha^H) \left(\frac{1}{2} + K(\alpha^H)g \right) + z(\alpha^H)k(\alpha^H)g \right\} \frac{d\alpha^H}{dg} \\ &= \left\{ K(\alpha^H)z(\alpha^H) \left[\frac{1}{2} + (K(\alpha^H) + (\alpha^H - c)k(\alpha^H))g \right] \right. \\ &\quad \left. - \left[(c - \alpha^H)k(\alpha^H) \left(\frac{1}{2} + K(\alpha^H)g \right) + z(\alpha^H)k(\alpha^H)g \right] [\theta^H + K(\alpha^H)(\alpha^H - c)] \right\} \frac{1}{D} \\ &= \left\{ K(\alpha^H)z(\alpha^H) \left[\frac{1}{2} + K(\alpha^H)g \right] - (c - \alpha^H)k(\alpha^H) \left(\frac{1}{2} + K(\alpha^H)g \right) [\theta^H + K(\alpha^H)(\alpha^H - c)] \right. \\ &\quad \left. - z(\alpha^H)k(\alpha^H)g\theta^H \right\} \frac{1}{D} \\ &= \frac{1}{D} \left\{ [K(\alpha^H) - k(\alpha^H)(c - \alpha^H)] \frac{W(\rho)}{2} - k(\alpha^H)(c - \alpha^H) \frac{\theta^H}{2} \right\}, \end{aligned}$$

where $D > 0$ denotes the denominator of $\frac{d\alpha^H}{d\rho}$ and $k(\alpha^H) := \mu\phi(\alpha^H)$. Hence, the term in brackets has to equal zero in every extremum of W in the interval $(\frac{1}{2}, 1)$. Recall that $W(\rho) > 0$ in all interior equilibria, and note that $\frac{dW}{d\rho}$ is strictly positive for $\rho = \frac{1}{2}$ (where $\alpha^H = c$). The necessary condition for an extremum can be rearranged to read

$$h(\rho) := \frac{K(\alpha^H)}{k(\alpha^H)(c - \alpha^H)} - \left(1 + \frac{\theta^H}{W(\rho)}\right) = 0.$$

Note that h is continuous in ρ and that the sign of $\frac{dW}{d\rho}$ is identical to the sign of h . Under Assumption 3, its first term is strictly increasing in α^H and, consequently, decreasing in ρ . The second term is constant in every extreme value of W (root of h). Hence, h is strictly decreasing in ρ in each root. We conclude that h has at most one root, and that the welfare function has at most one maximum and no minimum in $[\frac{1}{2}, \bar{\rho}(\theta^H, \mu))$. Recalling that $W(\rho) = 0$ in all boundary equilibria, this implies that W is globally quasi-concave and has a unique maximum in $[\frac{1}{2}, 1]$.

Optimality of power dispersion

Proposition 4 states that some power dispersion is optimal if and only if θ^H exceeds a unique threshold $\tilde{\theta}(\mu) < \bar{\theta}(\mu)$.

First, full concentration of power is optimal if and only if $h(1) \geq 0$. This is true for $\theta^H \rightarrow 0$, where $\alpha^H = c$. The derivative of h in θ^H is given by

$$\frac{dh}{d\theta^H} = \frac{\partial h}{\partial \theta^H} + \frac{\partial h}{\partial \alpha^H} \frac{d\alpha^H}{d\theta^H}.$$

The first term is strictly negative, and the same is true for $\frac{d\alpha^H}{d\theta^H}$ in every interior equilibrium. Under Assumption 3, h is strictly increasing in α^H . Hence, the derivative $\frac{dh}{d\theta^H}$ is strictly negative in every interior equilibrium. We conclude that there is at most one threshold $\tilde{\theta}(\mu) > 0$ such that $h(1) = 0$ if $\theta^H = \tilde{\theta}(\mu)$ and $h(1) < 0$ if and only if $\theta^H < \tilde{\theta}(\mu)$.

Second, note that $W(\frac{1}{2}) > 0$ while $W(\rho) = 0$ for all $\rho \geq \bar{\rho}(\theta^H, \mu)$. For values of θ^H such that full power concentration induces a boundary equilibrium, full concentration of power can hence not be optimal. By continuity, the same holds for levels of θ^H slightly smaller than $\bar{\theta}(\mu)$. Hence, the threshold $\tilde{\theta}(\mu)$ for the optimality of power dispersion is strictly below $\bar{\theta}(\mu)$.

Third, implicit differentiation of the threshold $\tilde{\theta}$ with respect to μ gives

$$\tilde{\theta}'(\mu) = - \left. \frac{\frac{dh(1)}{d\mu}}{\frac{dh(1)}{d\theta}} \right|_{\theta=\tilde{\theta}(\mu)}.$$

We have shown that full power concentration can only be optimal if it induces an interior equilibrium. Hence, $\left. \frac{dh(1)}{d\theta} \right|_{\theta=\tilde{\theta}(\mu)}$ is strictly negative as argued above.

Moreover, $\frac{dh(\rho)}{d\mu}$ is given by

$$\frac{dh(\rho)}{d\mu} = \frac{\partial h(\rho)}{\partial \mu} + \frac{\partial h(\rho)}{\partial \alpha^H} \frac{d\alpha^H}{d\mu}.$$

This comprises a direct effect and an indirect effect of μ on the level of $h(\rho)$. The direct effect is given by

$$\begin{aligned} \frac{\partial h(\rho)}{\partial \mu} &= - \frac{\Phi(c)}{k(\alpha^H)(c - \alpha^H)} + \frac{\theta^H}{W(\rho)^2} \frac{\partial W(\rho)}{\partial \mu} \\ &< \frac{\theta^H}{W(\rho)^2} \left[2K_\mu(\alpha^H)gz(\alpha^H) + 2 \left[\frac{1}{2} + K(\alpha^H)g \right] z_\mu(\alpha^H) \right] < 0 \end{aligned}$$

The negative sign follows since $K_\mu(\alpha^H) = \Phi(\alpha^H) - \Phi(c) < 0$ and $z_\mu(\alpha^H) = \int_{\alpha^H}^c \phi(a)(a - c)da < 0$.

With respect to the indirect effect, implicit differentiation of (8) gives

$$\frac{d\alpha^H}{d\mu} = - \frac{K_\mu(\alpha^H)g(\alpha^H - c)}{\frac{1}{2} + K(\alpha^H)g + k(\alpha^H)(\alpha^H - c)g} < 0.$$

As h is strictly increasing in α^H as argued before, the indirect effect of μ on h is negative as well. Hence, the same is true for the derivative of h with respect to μ in every interior equilibrium.

Altogether, we find that $\tilde{\theta}'(\mu) < 0$. Hence, if the conflict of interest is increased with regard to μ , this decreases the level of egoism $\tilde{\theta}(\mu)$ up to which full power concentration is optimal.

Comparative statics of ρ^*

Finally, we show that the optimal level ρ^* is strictly decreasing in θ^H and μ whenever some power dispersion is optimal, i.e., when $\theta^H > \tilde{\theta}(\mu)$. In this case, the optimal level of power concentration is implicitly defined by $h(\rho^*) = 0$.

With respect to θ^H , implicit differentiation of h gives

$$\frac{d\rho^*}{d\theta^H} = - \left. \frac{\frac{dh(\rho)}{d\theta^H}}{\frac{dh(\rho)}{d\rho}} \right|_{\rho=\rho^*} .$$

Above, we have shown that the numerator $\frac{dh(\rho)}{d\theta^H}$ is strictly negative. The denominator is strictly negative as well, as h is strictly decreasing in ρ in every root. Thus, the optimal level ρ^* is strictly decreasing in θ^H .

With respect to μ , implicit differentiation of h gives

$$\frac{d\rho^*}{d\mu} = - \left. \frac{\frac{dh(\rho)}{d\mu}}{\frac{dh(\rho)}{d\rho}} \right|_{\rho=\rho^*} .$$

As shown above, both numerator and denominator of this expression are strictly negative. Hence, the same is true for the whole derivative $\frac{d\rho^*}{d\mu}$.

B Graphical illustration of welfare effects

The following figure illustrates for a numerical example how the sizes of positive empowerment effect and the negative effects (disciplining, selection) on welfare develop change with the concentration of political power ρ .

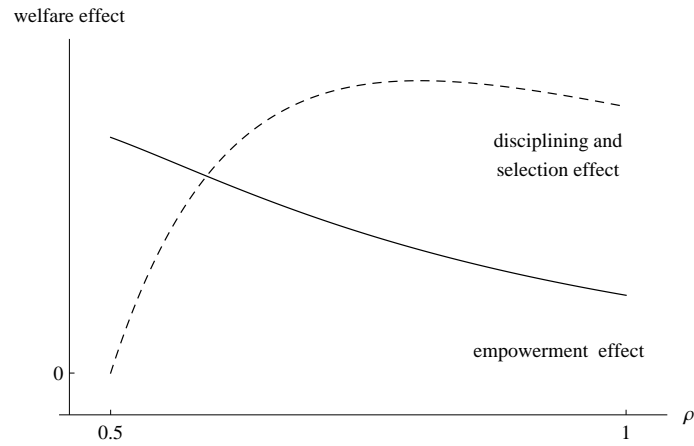


Figure 4: The welfare effects of a change in ρ . The solid line represents the (positive) empowerment effect, the dashed line represents the sum of the (negative) disciplining and selection effects. The optimal level of ρ is attained at the intersection of both lines. Parameters: uniform ability distribution, $c=0.6$, $\mu=0.8$, $\theta^H=0.6$.

C Empirical illustration

Our model makes novel statements about the welfare effect of power concentration and its dependence on the conflict of interest between voters and politicians. A brief look at empirical evidence from established democracies may help illustrate the models' relevance.

Corollary 2 predicts an interaction between power concentration and the conflict of interest between voters and politicians summarized by the following hypothesis.

Hypothesis. *The effect of power concentration on welfare depends on the conflict of interest between voters and politicians. Power concentration has positive effects on welfare if the conflict of interest is low. In contrast, if the conflict of interest is high, the welfare effect of power concentration is significantly smaller or negative.*

In testing the hypothesis, we face a restriction to data availability. A focus on meaningful variations in institutional settings and in politicians' motivation requires a cross-country analysis, but measures for our key variables are only available for some established democracies. We nevertheless propose an empirical strategy to illustrate the consistency of our model predictions with the data.

Operationalization

The empirical analysis is based on three key variables. The dependent variable is a measure of efficient policies. The two major independent variables are the degree of power concentration within the political system and the conflict of interest between voters and politicians. In this subsection, we present the operationalization of our main empirical model. The analysis is followed by several robustness checks in which we show that our results survive the use of alternative operationalizations.

As a measure for *efficient policies*, we use growth in real GDP per capita (World Bank). It provides a concise and objective measure of developments that bear the potential of welfare improvements. Growth has been used as outcome variable by a number of other empirical studies on political institutions, such as Feld & Voigt (2003) and Enikolopov & Zhuravskaya (2007).

We measure the *concentration of power* within a political system by Lijphart's index of the executive-parties dimension (Lijphart 1999). This well-established measure quantifies how easily a single party can take complete control of the government. The index is based on the period 1945-1996 and is available for 36 countries.

The conflict of interest between voters and politicians cannot be measured objectively. However, indication for it may come from voter surveys. The International

Social Survey Programme (ISSP) includes questions on voters' opinions about politicians. In its 2004 survey (ISSP Research Group 2012), conducted in 38 countries, it included the item "Most politicians are in politics only for what they can get out of it personally." Agreement with this statement was coded on a 5-point scale. We use mean agreement in a country as our measure for the conflict of interest between voters and politicians.

We normalize the indices for both power concentration and the conflict of interest to range between zero and one. High values indicate a strong concentration of political power or a strong conflict of interest of politicians, respectively.

Design

Data on both indices are available for 20 countries. Of these countries, New Zealand underwent major constitutional changes after 1996. These changes are not captured by the Lijphart index and we consequently exclude New Zealand from the analysis. As our model focuses on established democracies, we require that countries have a Polity IV Constitutional Democracy index (Marshall & Jaggers 2010) of at least 95 in the year 2002. This excludes Venezuela from the sample. The remaining 18 countries are similar with respect to their economic characteristics. They are economically highly developed (World Bank) and feature a Human Development Index (HDI) of at least 0.9. None of the exclusions changes the qualitative results of the analysis.

We find no correlation between power concentration and the conflict of interest (Pearson's correlation coefficient $\rho = 0.199$, $p = 0.428$). Technically, this means that the analysis will not suffer from multicollinearity and that the hypothesis can be tested by a linear regression model even though the welfare function of our model is non-linear in power concentration.³⁷ It also suggests that political institutions do not affect how voters perceive the motives of politicians.

The time-invariant dependent variables require a cross-section analysis. All explanatory variables correspond to 2004 or earlier years. To address problems of reverse causality, our explained variable captures growth after 2004. To test whether the welfare effect of power concentration varies with the conflict of interest, we include an interaction term between power concentration and the conflict of interest in the regression. We control for variables that may be correlated with both

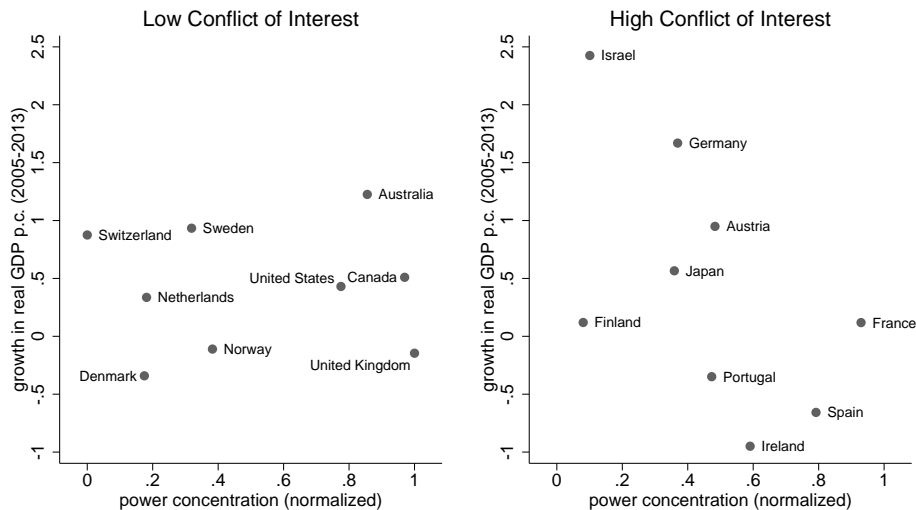
³⁷If power concentration and the conflict of interest were negatively correlated, one might reject the hypothesis based on the observed average welfare effect even if the underlying model is true. The reason is that, in this case, countries in which the conflict of interest is strong might be on a more positively sloped part of the welfare function than countries in which the conflict of interest is low.

our explanatory variables and our explained variable. Most notably, past economic performance affects growth (see, e.g., Barro 1991, Sala-i-Martin 1994) and may alter voters' perception of politicians. We hence control for GDP per capita in 2004. Growth is also affected by other variables, such as capital accumulation, school enrollment rates, life expectancy, or openness of the economy (see, e.g., Sala-i-Martin 1997). To capture these influences and to keep the number of explanatory variables low, we add past growth in real GDP per capita (from 1991 to 2004) to the regression.³⁸

Results

For a first glimpse of the data, we split the country set at the median value of the conflict of interest between voters and politicians. Figure 5 shows how growth is related to the concentration of power for the two sets of countries. The left panel contains countries with a low conflict of interest, while the right panel contains countries with a high conflict of interest. The figure shows that power concentration is only weakly related to growth if the conflict of interest is low, whereas power concentration is negatively related to growth if the conflict of interest is high.

Figure 5: Relationship between power concentration and growth



For the analysis of the relationship between power concentration and economic growth, we use the conflict of interest as a continuous explanatory variable in an OLS regression and control for relevant covariates. Table 1 presents the regression results.

³⁸Descriptive statistics for all variables are provided at the end of this appendix.

Table 1: OLS regression results

	Growth in real GDP per capita (2005-2013)	
	(a)	(b)
Power concentration	-0.526 (0.642)	4.224** (1.635)
Conflict of interest	-0.196 (1.305)	3.096** (1.235)
Power concentration × Conflict of interest		-9.530** (3.581)
Real GDP per capita in 2004 (in \$ 1000)	-0.020 (0.027)	-0.019 (0.019)
Growth in real GDP per capita (1991-2004)	-0.301*** (0.084)	-0.387*** (0.104)
Constant	2.160 (1.588)	0.755 (0.935)
adjusted R^2	0.13	0.42
F	9.26	5.32
N	18	18

Heteroskedasticity-robust standard errors are provided in parentheses. ***, **, * indicate significance at the 1-, 5-, and 10-percent level, respectively.

Column (a) displays the results of a regression model without interaction term. In this regression, the coefficient of power concentration estimates the effect on economic growth under the assumption that this effect does not depend on the conflict of interest between voters and politicians. We find that this coefficient is insignificant.

This picture changes if the interplay between power concentration and the conflict of interest is taken into account. Column (b) displays the results of a regression model with an interaction term between power concentration and the conflict of interest. Most importantly, the coefficient of the interaction term is negative and significant. Thus, power concentration is more negatively related to growth if the conflict of interest between voters and politicians is high. The inclusion of the interaction term in the regression also strongly increases the explanatory power of the econometric model. The adjusted R^2 increases from 0.13 to 0.42.

As it turns out, the welfare effect of power concentration depends strongly on the conflict of interest. The conditional effect of power concentration at the lowest and the highest level of conflict of interest in our country set are reported in Table 2. At the lowest level of conflict, power concentration is positively related to growth. By contrast, at the highest level of conflict, power concentration is negatively related to growth. Our analysis thus leads to the following result.

Table 2: Effect of power concentration

	minimal conflict of interest	maximal conflict of interest
Coefficient	4.224**	-5.306**
Standard error	1.635	2.083

The table depicts the coefficient of power concentration for the lowest level of conflict and for the highest level of conflict in the dataset. ***, **, * indicate significance at the 1-, 5-, and 10-percent level, respectively.

Result. *The higher the conflict of interest between voters and politicians is, the more negative is the relation between power concentration and growth. Furthermore, power concentration is negatively related to growth if the conflict of interest is high and positively related to growth if the conflict of interest is low.*

We conclude that the data is in line with our model. While the evidence is only suggestive, it indicates that the effect of power concentrating institutions depend on the specific conditions of a country. The direction and the size of the effect seems to depend on the conflict of interest between voters and politicians, as predicted by our model. Our model delivers a plausible explanation for the pattern in the data: Countries with low conflict of interest benefit from power concentration as it helps them empower better candidates; Countries with high conflict of interest suffer from power concentration as it induces more inefficient reforms and worse selection of candidates. The data support our theoretically derived hypothesis, but we are unable to test the explanation provided by our model against alternative explanations.

Discussion of empirical results

We finally want to discuss potential issues with the analysis, the robustness of the result, and one alternative explanation for the result.

The specification we use is parsimonious and may give raise to a concerns of omitted variable bias. However, for an omitted variable to bias the coefficient of the interaction effect, it would have to be correlated with the interaction term between power concentration and the conflict of interest, and with growth potential. Any omitted variable bias, if existent, would have to be strong to explain the result. The most obvious candidate for an omitted variable is general trust amongst the population. Trust may be correlated with the perception of politicians' motivation and may reduce opposition towards power concentration. If in addition, trust had a non-linear effect on growth, the absence of a quadratic trust term would bias the coefficient of the interaction effect between power concentration and the conflict of

interest. We control for this possibility and add general trust, as measured by the 2004 ISSP survey,³⁹ as linear and quadratic term to our regression. This does not change our result.

To further confirm robustness of the result, we check whether the negative and significant interaction term between power concentration and the conflict of interest is robust to the use of different measures for our key variables. For any alternative model run we provide the p-value of the interaction term and the F-statistic of the regression model in parenthesis. As alternative measures for power concentration we use a more recent index by Armingeon et al. (2011) ($p = 0.013$, $F = 5.75$, $N = 17$) as well as its modified version that focuses on institutional factors only ($p = 0.011$, $F = 6.87$, $N = 17$). Ganghof & Eppner (2017) suggest a modified index for the executive-parties dimension that focuses on the clarity of responsibility and accountability. Using this index yields similar results ($p = 0.005$, $F = 4.10$, $N = 19$). We also use the index for checks and balances by Keefer & Stasavage (2003) and the political constraint (POLCON) index by Henisz (2006). Again, the interaction effect shows the expected sign ($p = 0.019$, $F = 16.12$, $N = 18$ and $p = 0.060$, $F = 15.60$, $N = 18$, respectively). For the nine-categorical type of electoral system (IDEA 2004), however, the coefficient of the interaction term is insignificant ($p = 0.216$, $F = 5.32$, $N = 18$).

As alternative measures for the conflict of interest between voters and politicians we use the belief that politicians are more interested in votes than peoples' opinions, elicited in the European Social Survey (2002), and the perceived corruption in the public sector, measured by the Corruption Perception Index (Transparency International 2004). For these specifications, the interaction term is of the expected sign ($p = 0.020$, $F = 7.12$, $N = 17$ and $p = 0.005$, $F = 7.86$, $N = 18$, respectively). Using trust in political parties from the Eurobarometer (European Commission 2012), however, yields an insignificant interaction term ($p = 0.173$, $F = 1.38$, $N = 16$).

One might fear that our result is influenced by the financial crisis, which affected output beginning in 2008. To test whether this is the case, we may exclude countries from the sample that were hit hardest by the financial crisis. The result is robust to the exclusion of any subset of the countries Ireland, Spain, and Portugal (all p -values < 0.085 , $F > 2.53$).

Finally, it could be argued that the empirical observation is not caused by the channel described in our model but rather by the disciplining of rent-seeking politi-

³⁹The wording of the question is "Generally speaking, would you say that people can be trusted or that you can't be too careful in dealing with people?"

cians. This alternative channel has been addressed by Besley & Smart (2007) who analyze fiscal restraints that limit the office holders' discretion and thereby restrict rent extraction. Empirically, we cannot distinguish between our channel and this alternative, as measures for politicians' motivation may capture not only preferences for power, but also preferences for rent extraction. However, the model of Besley & Smart (2007) predicts a different interaction between power concentration and politicians' motivation than our model. Three of the four constraints they analyze enhance welfare only if the share of benevolent politicians is sufficiently large. Hence, the empirical findings presented above are consistent with our model, but not in line with Besley & Smart (2007).

Data description

Description and sources of variables

Main variables

Growth in real GDP per capita	Average growth rate. Computed based on per capita GDP in constant 2005 US\$. World Bank (2012).
GDP per capita	Denominated in constant 2005 TUS\$. World Bank (2012).
Conflict of interest	International Social Survey Programme 2004: Citizenship I. ISSP Research Group (2012).
Power dispersion	Lijphart's index for executive-parties dimension. Lijphart (1999).

Variables for robustness checks

General trust	International Social Survey Programme 2004: Citizenship I. ISSP Research Group (2012).
Power dispersion II	Time-variant proxy for Lijphart's executive-parties dimension, year 2004. Armingeon et al. (2011).
Power dispersion III	Revised executive-parties dimension. Ganghof & Eppner (2017).
Checks and balances	Number of veto players. Keefer & Stasavage (2003).
Political Constraint Index	Feasibility of policy change. Henisz (2006).
Electoral system	Type of electoral system, 9 minor categories. IDEA (2004).
Motivation of politicians	Politicians' interest in votes. European Social Survey 2002/2003. ESS (2002).
Corruption Perception Index	Perception of corruption in the public sector. Transparency International (2004).
Trust in political parties	Eurobarometer 62.0 (2004). European Commission (2012).

Country list

Australia	Austria	Canada	Denmark
Finland	France	Germany	Ireland
Israel	Japan	Netherlands	Norway
Portugal	Spain	Sweden	Switzerland
United Kingdom	United States		

Summary of variables

	Mean	Std. dev.	Min	Max	Poss. values
Power dispersion	0.31	0.98	-1.21	1.77	[-2,2]
Trust in politicians	3.37	0.37	2.61	4.20	[1,5]
GDP p.c. (2004)	37.43	10.98	18.16	64.55	
GDP p.c. growth (2005-2013)	0.42	0.84	-0.95	2.43	
GDP p.c. growth (1991-2004)	2.11	1.13	0.56	5.82	

For the regression analysis, the variables power dispersion and conflict of interest are rescaled to range between 0 and 1.

Correlation table

	Power dispersion	Conflict of interest	GDP p.c.	GDP p.c. growth (2005-2013)
Conflict of interest	-0.20 (0.43)	1		
GDP p.c. (2004)	0.15 (0.54)	-0.75 (0.00)	1	
GDP p.c. growth (2005-2013)	0.29 (0.25)	0.14 (0.58)	-0.28 (0.25)	1
GDP p.c. growth (1991-2004)	-0.28 (0.26)	-0.10 (0.70)	-0.23 (0.35)	-0.52 (0.03)

Pearson's correlation coefficient, *p*-values in parentheses.