

Essays on Political Institutions and Institutional Design

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Submitted in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy
in the Graduate School of Arts and Sciences

COLUMBIA UNIVERSITY

2012

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ABSTRACT

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This dissertation attempts to understand the factors that determine the performance and choice of political institutions. We start with the recognition that these two aspects of the problem are fundamentally connected given that political institutions are themselves endogenous, i.e. the way in which they perform and function depends importantly on the reasons behind their adoption. Each chapter of this dissertation analyzes a different class of institutions, identifying specific features of the political and social environment that impact their performance and deriving, whenever possible, implications for institutional design.

The first chapter studies the main factors that determine the constitutional preferences of citizens over the form of government. We focus on the case of Brazil, where a referendum in 1993 allowed the population to choose between a presidential and a parliamentary system of government. A model is proposed to explain the main facts emerging from the data. It is shown that the parliamentary regime requires a strong system of protection against expropriation, particularly at the local level, and a class of politicians that can be trusted to represent well the interests of voters. We also show that the poor groups of the population are

more likely to vote for the presidential regime since the low quality of their local accountability institutions makes them more vulnerable to the expropriation by legislators.

The second chapter studies the question of why checks and balances work well in some cases, but not in others. We investigate the conditions under which a system of checks and balances is beneficial to the society. The analysis emphasizes the important role played by political transparency, which is defined as the ability of voters to observe the proposals submitted to congress during the legislative process. We show that transparency is a necessary, but not sufficient, condition for an effective system of checks and balances. The model yields the surprising result that political transparency may be harmful to voters depending on the characteristics of the social and political environment.

The third chapter studies a committee decision-making problem with career oriented agents who may be biased towards one of the alternatives. We investigate how the interaction between career concerns and bias affects the behavior of members and how this effect depends on transparency. The main result is that public voting leads to better decisions when the magnitude of the bias is large relative to the common value, while secret voting performs better otherwise. We also show that the interaction between transparency and reputation concerns may exacerbate the biases of incompetent members, leading them to vote more in accordance with their individual interests.

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Acknowledgements

This dissertation would not have been possible without the support and help of many people. I am particularly indebted to my advisor, Massimo Morelli, for his continuous encouragement and extraordinary guidance throughout my studies. Massimo's approach to research and life will always serve as an example to me. I am also extremely grateful to Alessandra Casella, Navin Kartik and Suresh Naidu for the generosity with which they offered their time and insightful ideas to me.

I will carry many fond memories of my time at Columbia. Several people contributed to make this long journey more enjoyable. Special thanks to Bruno Giovannetti, Guilherme Martins, Jisun Baek, Mariesa Herrmann, Takakazu Honryo, Hitoshi Shigeoka, Heriberto Tapia and Izzet Yildiz.

Finally, all of this would have been meaningless without the unconditional love and support of my family, especially my parents and sister. Words are not enough to express my affection and gratitude to them.

Dedication

To my parents.

"In my younger and more vulnerable years my father gave me some advice that I've been turning over in my mind ever since. 'Whenever you feel like criticizing anyone,' he told me, 'just remember that all the people in this world haven't had the advantages that you've had.'" — F. Scott Fitzgerald, *The Great Gatsby*

CHAPTER 1

Choosing the Form of Government: Theory and Evidence From Brazil

1.1. Introduction

The form of government is one of the most important features of the organization of a democracy. It establishes rules about how the government is to be appointed and removed from office. There are two major systems: (i) the presidential regime, where the executive is directly elected by voters and has a fixed term in office, and (ii) the parliamentary regime, where the executive is appointed by the parliament and may be removed if receives a vote of no confidence. The choice of the form of government is a recurrent and controversial issue in many societies and debates about it are expected to gain further relevance in the near future as more countries move to a democratic regime and as new democracies gradually consolidate.¹

Despite the existence of a large literature studying the differences between presidential and parliamentary systems, little attention has been devoted to the

¹The possibility of changes in the government regime has been recently considered in Argentina, Brazil, Chile, Colombia, Egypt, Indonesia, Mexico, Nigeria, Philippines, South Korea, Tunisia, Turkey, among other countries (Cheibub [2007]).

question of what determines the choice of the form of government. Furthermore, among the few papers that do examine this issue, the focus has been either on the historical context behind the choice (Persson and Tabellini [2003] and Cheibub [2007]) or on the interests of the elites to impose a particular regime (Lijphart [1992], Easter [1997] and Robinson and Torvik [2009]). However, the dilemmas posed by constitutional reform in modern societies make it crucial that we understand how this issue is viewed by citizens, particularly because such decisions are likely to depend increasingly on the population's consent, either informally (through protests and public manifestations) or formally (through a referendum).

This paper studies the main factors that determine the constitutional preferences of citizens over the form of government. We focus on the case of Brazil, where a referendum in 1993 allowed the population to choose between a presidential and a parliamentary system. In doing so, we rely on a novel data set consisting of the results of the referendum at municipal level as well as several opinion polls conducted at that time.² This information provides a unique opportunity to observe the constitutional preferences of different population groups and allow us to approach the question of the choice of the form of government directly from the perspective of citizens.

The analysis of the data reveals an interesting new fact. While the Brazilian population in general voted more for the presidential system, there is a strong

²In Brazil, a municipality is defined as the smallest administrative subdivision to have its own democratically elected leadership, a mayor and a local assembly.

positive relationship between income per capita and the percentage of votes cast for the parliamentary regime in the cross-section of municipalities. That is, the poor (rich) groups of the population voted more for the presidential (parliamentary) system. Using detailed survey data, we show that this evidence cannot be explained by the fact that the poor individuals simply lacked knowledge about the referendum and, therefore, voted more for the presidential system merely because it represented the status quo. Moreover, the correlation between income per capita and vote in the referendum is shown to be robust to controlling for several socioeconomic and political characteristics of municipalities, such as population size, income inequality, illiteracy and vote for the main political parties.

We further document that among the electorate a common reason to reject the parliamentary system was the absence of direct elections for the executive in connection with the lack of confidence in congress. The general perception was that corruption was widespread among legislators and that a parliamentary system would further exacerbate the problem. As in many developing countries, corruption was (and still is) a major concern in Brazil. The magnitude of the problem is enormous: it is estimated that, every year, at least US\$ 3.5 billions are diverted through corruption only from the federal funds transferred to municipal governments for investment in basic education, health and infrastructure.³

³These estimates are based on audit reports published by the Controladoria-Geral da Uniao (CGU) (Folha de Sao Paulo, 9/4/2011).

Why did the Brazilian population, especially the poor, vote more for the presidential system? We propose a model to explain the general pattern of the referendum results. The analysis focuses on a fundamental difference between presidential and parliamentary systems. On the one hand, direct elections for president allow voters to hold the executive leader directly accountable, but imply that the president may not be removed from office before elections. On the other hand, the vote of no confidence transfers to parliament the responsibility to check the executive, but provides a mechanism to replace the prime-minister before the end of his term.

The model emphasizes that the bargaining power of legislators is higher under parliamentary systems. This enables them to push for larger transfers to constituencies, which in turn expands their own capacity to extract rents. Intuitively, these funds are intended to finance the provision of local public goods (e.g. investment in education), but are also subject to expropriation by legislators. Since the quality of the local accountability institutions (e.g. local media and courts) is heterogeneous across regions, and lower in poor constituencies, the burden of corruption falls disproportionately on the poor population.^{4,5} As a result, the parliamentary system tends to be less attractive to the poor than to the rich.

⁴In Brazil, the quality of local institutions displays considerable regional variation. For instance, Pinheiro and Cabral (1999) report that members of the judiciary tend to be less prepared in poorer regions, citing the case of a judge who still used old and revoked legislation to base his decisions.

⁵This implication of the model is consistent with Ferraz and Finan (2008, 2011) who find that the presence of local media (i.e. a radio station or a local newspaper) reduces the incidence of corruption in Brazilian municipalities.

In a presidential system, on the other hand, the bargaining power of legislators is diminished, which limits the size of transfers and the amount of political rents that they are able to obtain. Now, it is the executive leader who is in a stronger position to extract rents, which he does by deviating resources from the federal budget. These funds are constituted by the tax revenue collected from citizens, over which the executive has administrative authority.⁶ At the national level, the executive leader is subjected to the control of institutions such as large media companies (especially newspapers), federal prosecutors and investigative agencies, which provide common protection to the general population.⁷ As a result, the burden of corruption imposed by the executive leader is shared equally among voters.

The model also generates other interesting results. We examine how the form of government influences the choice of a national public policy (e.g. a reform of the social security system) in an environment where the policy preference of voters and office-holders (the executive leader and legislators) may become misaligned

⁶The model captures the idea that the corruption practices of executive leaders tend to be more centralized and broader in scope, impacting larger sectors of the population at once. This notion is consistent with several corruption cases uncovered recently in Latin America and other countries. For instance, presidents Fernando Collor de Mello (Brazil), Arnaldo Aleman (Nicaragua), Alberto Fujimori (Peru) and Carlos Andres Perez (Venezuela) were all charged of running vast corruption schemes, often involving outright expropriation of public funds (e.g. Fujimori was found guilty of giving US\$ 15 million out of the Peruvian treasury to his former intelligence service chief) and large scale influence-peddling schemes (e.g. Collor de Mello run through his campaign treasurer a vast scheme that sold "government favours" all around the country).

⁷The distinction between national and local institutions is a feature of the model which is also emphasized by the literature on fiscal decentralization (Prud'homme [1995], Tanzi [1995] and Oates [1999]).

after elections, due to the occurrence of a "preference shock". We show that the parliamentary system leads to comparatively better policies for the population as long as the likelihood that each office-holder remains aligned with his voters is large enough. Intuitively, this condition requires that the quality of political representation in the society be sufficiently high.

The traditional argument in favor of parliamentarism is that it allows for the possibility of replacing an unpopular or incompetent government prior to elections.⁸ Indeed, at the time of the referendum, many political analysts in Brazil defended the parliamentary regime as the most "modern" and "flexible" alternative, often referring to the fact that most developed countries adopt it. However, our analysis suggests that the parliamentarism is also the regime that is most "intensive" in political institutions in that it requires a strong system of protection against expropriation, particularly at the local level, and a class of politicians that can be trusted to represent well the interests of voters.

This paper is related to a growing literature on endogenous political institutions, which includes Acemoglu and Robinson (2000), Aghion and Bolton (2003),

⁸In a recent article entitled "Does Egypt Need a Pharaoh?", Alfred Stepan and Juan Linz argued for the adoption of a parliamentary system in Egypt on the basis that "to elect a president is to commit to one person, generally for at least four years. But it is very uncertain that any person elected today in Egypt would have the support in even a year. (...) It is also possible that a new president turns out to be incompetent, or is in a permanent minority position and unable to pass legislation".

Aghion, Alesina and Trebbi (2004), Barbera and Jackson (2004), Lizzeri and Persico (2004), Maggi and Morelli (2006), Trebbi, Aghion and Alesina (2008), Robinson and Torvik (2009), Ticchi and Vindigni (2010) and Acemoglu, Robinson and Torvik (2011). Among these papers, Robinson and Torvik (2009) is the one most closely related to ours. They also study the question of the choice of the form of government, although their main focus is on the interests of the political elites. They argue that presidentialism is prevalent in Africa and Latin America because it is the system that generates most rents to its leaders. It should be noted, however, that the type of presidential regime considered by these authors is one with very little checks and balances, where the executive leader has extremely dominant powers (like Joseph Mobutu in Zaire and Robert Mugabe in Zimbabwe).

Although the argument put forward by Robinson and Torvik (2009) may well apply to a number of historical contexts, our analysis suggests that it cannot be taken as a general explanation for the predominance of presidential systems among developing countries, especially in Latin America. With this respect, the present paper sheds new light on the question of the endogenous choice of the form of government by focusing specifically on the interests of citizens. We also contribute to the literature by providing novel evidence about the constitutional preferences of voters in Brazil. To the best of our knowledge, the present study is the first to use referendum data to investigate this important issue.

The results of this paper are also related to Acemoglu and Johnson (2005) who emphasize the fact that different institutions are often closely linked to each other.

This feature makes it particularly difficult to isolate the effect of specific aspects of the institutional environment (i.e. the issue of "unbundling institutions"). Interestingly, our model shows that the choice of the form of government depends on the quality of the accountability institutions in a country. This result has important implications for empirical and policy-oriented research. For instance, several recent papers have argued that presidentialism leads to more corruption (e.g. Lederman, Loayza and Soares [2005], Kunicova and Rose-Ackerman [2005]). However, our analysis of the Brazilian experience suggests that causality might run in the opposite direction, that is, it is possible that countries more prone to corruption may self-select into presidential systems.

This paper is also connected to a number of studies in comparative politics that have examined the differences between presidential and parliamentary systems. An influential view in this literature is that presidential democracies are inherently less stable and more prone to coups. This notion has been argued by Linz (1978, 1990) and Stepan and Skach (1993), among others, based on the fact that the relationship between executive and legislative tends to be more conflicted under presidential regimes. However, many scholars, including Shugart and Carey (1992), Mainwaring and Shugart (1997) and Cheibub (2007), have challenged this view. According to Cheibub (2007), the problem is not that presidential systems are fundamentally flawed, but rather that "they tend to exist in societies where democracies of any type are likely to be unstable". Thus, in order to fully comprehend the political and economic consequences associated with each system, one

must understand, in the first place, the reasons behind its adoption. The present study provides a contribution in this direction.

In the political economy literature, Persson, Roland and Tabellini (2000) were the first to propose a formal model to study the comparative performance between presidential and parliamentary regimes.⁹ They show that presidential systems are associated with less political rents, while parliamentary systems have more redistribution towards broad population groups and higher provision of public goods. Their model, however, assumes that all voters are homogeneous and does not allow for direct elections for president, a feature which we show to be of particular importance for citizens in Brazil. As such, their framework is unable to account for the stylized facts presented in this paper, particularly the evidence that the poor groups of the population voted more for the presidential regime.

The remainder of this paper is organized as follows. Section 1.2 provides a brief historical background of the Brazilian referendum and presents the main stylized facts emerging from our empirical analysis. Section 1.3 introduces the basic setup of the model and discusses its main assumptions. Section 1.4 solves for a subgame perfect Nash equilibrium of the model and section 1.5 presents our main comparative results, providing a characterization of the constitutional preferences of the various groups of the population. Section 1.6 concludes.

⁹In related work, Persson and Tabellini (2003, 2004) provide cross-country evidence that presidential systems have smaller governments, while parliamentary regimes have more persistent fiscal outcomes (i.e. increases in government spending during downturns are not reversed during booms).

1.2. Brazil's Referendum of 1993

1.2.1. Historical Background

In April 1993, the Brazilian population voted on a referendum to choose between a presidential and a parliamentary system of government.¹⁰ The decision to hold the referendum had been agreed upon five years earlier, during the discussions that led to the democratic constitution of 1988. The proposal for its realization received strong support among members of the constitutional assembly and served as a compromise solution for the controversial issue of the choice of the form of government to be adopted.¹¹ It was, then, decided that a presidential system would be adopted provisionally until the realization of the referendum in 1993.

The period between the early 80's and the mid 90's, often referred to as Brazil's "lost decade", was marked by a series of economic difficulties, beginning with the debt crisis of the 80's and followed by a long period of stagflation. At the same time, the country faced important problems related to its fragmented party system and widespread corruption in both the executive and the congress. Indeed,

¹⁰Figure A.1 depicts the actual ballot used in the referendum. In addition to the question regarding the decision between "parliamentarism" and "presidentialism", voters were also asked to choose between "monarchy" and "republic" – the republican regime was ultimately adopted with 66% of total votes.

¹¹The presidential regime received active support from the government of president Jose Sarney (1985-1990), who hoped to stay in office for the remainder of his term. It also received the adherence of parties with strong candidates in the next presidential elections, including the PT (Luis Inacio Lula da Silva) and the PDT (Leonel Brizola). For more historical details, see Silva (1990) and Bonavides and Andrade (2004).

the first popularly elected president after the military regime, Fernando Collor de Mello, was impeached in 1992 amid accusations of running a vast influence-peddling scheme. Around the same time, a massive corruption scandal was uncovered involving at least forty three members of the congress, several public officials and a cartel of construction firms that controlled the procurement of public works in several parts of the country.¹²

The debates around the referendum concentrated broadly on two main themes: the issue of governability, i.e. the ability of government to respond efficiently to crisis and changes in the political environment, and the lack of confidence in the political institutions.¹³ On the one hand, it was argued that a parliamentary system would help to create the necessary conditions for the approval of social and economic reforms, given the requirement that the government be supported by a majority in parliament. On the other hand, it was argued that only under a presidential system would the population be able to directly choose its leaders and, as a result, to have more influence on politics.

For approximately two months prior to the referendum, daily programs on TV and radio were broadcasted to present and explain the various arguments in favour and against each alternative.¹⁴ The parliamentary system received great support

¹²See Fleischer (1997) for more details.

¹³See Lamounier (1992) for an overview of the main topics involved in the discussions.

¹⁴The Brazilian electoral law obliges all TV and radio stations to broadcast campaign advertisements free of charge. The time on TV and radio was divided equally between the two campaigns.

among legislators. A survey conducted in 1991 showed that 74% of the members of the congress were favorable to this alternative, although some parties with strong candidates in the upcoming elections ended up backing the presidentialism.¹⁵

As shown in Figure 1.1, the parliamentary regime started ahead in the polls. However, this advantage quickly faded as the campaigns on TV and radio began in mid-February, after which one observes a marked shift in preferences towards the presidentialism. Many political analysts attributed this change to an increase in voters' perception that the parliamentary system was, in fact, the "government of congress". Indeed, one of the ads of the pro-presidentialism campaign invited the viewer to imagine "what would happen if we put the country in the hands of the deputies".

The final result of the referendum is reported in Table 1.1. The presidential system was the alternative chosen by the population with 55% of the votes. Note that a considerable fraction of individuals, approximately 20%, cast a null or blank vote. The turnout was around 75%.¹⁶ Overall, the parliamentary regime received more votes in the rich states of the southeast, such as Sao Paulo (34.5%) and Rio de Janeiro (26.6%), and less votes in the poor states of the northeast, such as Piaui (11.2%) and Paraiba (12.7%).

¹⁵The survey was conducted by the Instituto de Estudos Economicos, Sociais e Politicos de Sao Paulo (IDESP), an independent research institute (Jornal da USP, 12/07/1992).

¹⁶Vote is mandatory in Brazil.

After the referendum, many explanations for the defeat of the parliamentary system were suggested by analysts and politicians involved in the campaigns. The congress and the political parties were among the most blamed. According to a newspaper article, "The supporters of the parliamentarism agree that the image of the congress and the recent scandals involving the institution did not help. 'What you hear the most among the public is: not with this congress, not with this congress', laments Jose Serra [one of the leaders of the pro-parliamentarism campaign]" (Folha de Sao Paulo, 04/18/1993). Luis Inacio Lula da Silva, president of the country during 2002-2010 and at that time leader of the Labor Party, explained the result of the referendum in the following terms: "The Brazilian congress is an institution that does not have the trust of the population." (Isto É, 04/28/1993).¹⁷ Almost fifteen years later, Fernando Henrique Cardoso, president during 1994-2002 and a strong supporter of the parliamentary alternative, admitted: "After my experience as president and in retrospect, I have many doubts. In reality, the parliamentary regime would have required a much stronger party system." (Agencia Brasil, 10/03/2008).

¹⁷Interestingly, the impeachment process of president Collor de Mello (Jan/1991-Oct/1992), which occurred in a relatively orderly fashion and counted with an active involvement of the population, seems to have had the actual effect of strengthening the voters' beliefs in their ability to hold the government accountable. This idea was, in fact, explored by the pro-presidentialism campaign, which used to emphasize the fact that in a presidential system "you choose (the president), and you can remove".

1.2.2. Empirical Evidence: New Facts

This subsection presents new facts about the results of the Brazilian referendum of 1993.¹⁸ Figure 1.2 plots the relationship between income per capita and the percentage of votes cast for the parliamentary system, with each municipality represented as a circle proportional to its population. The graph shows the existence of a strong positive correlation between income per capita and the percentage of votes for the parliamentary system across Brazilian municipalities. Remarkably, the R^2 of this simple regression is 0.63. Observe that this relationship is not systematically driven by population size, despite the fact that larger municipalities do tend to be richer on average. Furthermore, in Figures 1.3 and 1.4, we show respectively that this result cannot be accounted by (i) the percentage of null and blank votes in the referendum and (ii) political ideology, as measured by the percentage of votes for Luis Inacio da Lula da Silva (PT) in 1994.¹⁹

One explanation for this evidence could be attributed to the fact that poor individuals simply lacked knowledge about the referendum and, therefore, voted more for the presidential system merely because it represented the status quo. In order to investigate this possibility, we use information on an opinion survey which asked individuals to point out at least two differences between presidential and parliamentary regimes. Since the answers to this question were spontaneous, they allow

¹⁸See appendix A.1 for a description of the data.

¹⁹Lula was the most prominent left-wing candidate in the presidential elections of 1989 and 1994.

us to identify a subgroup of people who can be considered to be "knowledgeable" enough about the referendum.

Out of 2,607 subjects interviewed, 1,059 (40.6%) were able to correctly identify two or more differences between both alternatives.²⁰ Table 1.2 provides a summary of the voting intentions for subjects in the full sample and in the subsample of "informed individuals". Surprisingly, voters with more knowledge about the referendum were comparatively more likely to vote for the presidential rather than the parliamentary system. Figure 1.5, then, plots the voting intentions of informed and uninformed individuals for different classes of income. Observe that, contrarily our initial expectation, informed poor individuals were actually more likely to vote for the presidential system.²¹ We, therefore, conclude that information about the referendum does not seem to account for the stylized fact presented above.

We further investigate the determinants of the constitutional preferences of voters in Brazil by performing a detailed regression analysis. Table 1.3 presents

²⁰Common answers to this question were: "the prime-minister is elected by the parliament", "the president is chosen by the population", "the congress is in charge" and "the power belongs to the president".

²¹Observe that the voting intention for the parliamentary system increases sharply among uninformed individuals as one moves from "less than 2 minimum wages" to "between 2 and 5 minimum wages". We conjecture that part of this increase is driven by the fact that the very poor individuals may have had a harder time articulating their answers to this relatively complex question. As a result, some of them may have ended up being classified as "uninformed", even though they actually knew the difference between the two systems.

the results of OLS regressions in which the percentage of votes cast for the parliamentary system is regressed on four main socio-economic variables, i.e. logarithm of income per capita, logarithm of population, illiteracy rate and the gini coefficient (income inequality), as well as other municipal characteristics.²² Following Ferraz and Finan (2008, 2011) and Litschig and Zamboni (2011), we also include the number of AM radio stations and a dummy for the presence of federal judges and prosecutors in each municipality. These authors have shown that the local media and judiciary play an important role in restraining corruption at the municipal level in Brazil, so that we use these variables as proxies for the presence of local accountability institutions.

We restrict the sample to municipalities with less than 500,000 citizens in order to exclude large outliers from the analysis. The regressions reported in columns [1] and [4] include state fixed-effects, while those in the remaining columns include a set of 440 micro-region fixed-effects, which control for very particular characteristics of the economic and social environment.²³ Furthermore, in order to capture specific aspects of the local politics, we add dummies for the party

²²The municipal characteristics considered in the analysis are: percentage of the population living in rural areas, population density (inhabitants/km²), state capital dummy, distance to the state capital, percentage of abstention, percentage of null votes and percentage of votes cast for the PMDB, the PSDB and the PT candidates in the 1994 presidential elections.

²³A micro-region is defined as a group of contiguous municipalities in a given state that share an urban center and have similar demographic, economic, and agricultural characteristics.

affiliation of mayors in columns [3] and [6]. All standard errors are clustered at the micro-region level.

Overall, the estimates reveal a consistent pattern. The vote for the parliamentary system is positively correlated with income per capita and population, while negatively correlated with inequality (gini) and illiteracy. Interestingly, the estimates for the number of AM radio stations and the presence of federal judges and prosecutors are positive and statistically significant across all specifications, suggesting that the local institutional environment is indeed relevant for the decisions of voters. Altogether, our results provide robust evidence for the existence of a strong relationship between the socio-economic and institutional characteristics of municipalities and the results of the referendum.

Why not a parliamentary system? We now proceed to examine the main reasons behind the vote of Brazilian citizens in the referendum. Figure 1.6 presents the results of a survey which asked subjects why they would not vote for the parliamentary system. The most common reason mentioned was that "citizens do not have the right to elect the leader and/or the members of the parliament are the ones who choose", which amounts to 28% of the individuals who reported not voting for this alternative. Furthermore, when the sample is restricted to the subgroup of informed voters, following the same criteria defined above, the percentage of individuals dissatisfied with the lack of direct elections increases to

41%, while the fact that "the congress is corrupt" was pointed out by 12% as the main reason to reject this alternative.

As discussed before, the sense of dissatisfaction with congress and the political class in general was generalized among the population. We provide further evidence on this issue by exploring a detailed survey which asked citizens about their degree of confidence in congress. Specifically, we focus on two particular questions, namely "What is your level of trust in congress?" and "Do you think that the members of the congress represent the interests of the population?", in order to create two dummy variables for those subjects who responded, respectively, "very low trust" and "no, the legislators do not represent our interests". We, then, estimate the impact of these variables on the probability that an individual votes for the parliamentary system.

Table 1.4 presents the estimation results. The analysis controls for several important variables, including household income, level of schooling, a measure of political ideology and the candidate voted in the second round of the 1989 presidential elections, among other individual characteristics.²⁴ We also include a set of municipal fixed-effects in order to control for the place of residence of each subject. This implies that the identification is based solely on variations across individuals living in the same municipality. Columns [1] and [4] report the

²⁴The individual characteristics included in the regressions are: gender, age, age squared, two dummy variables indicating whether the person knows the name of the president and the name of the state's governor and four dummy variables indicating whether the person is religious, favors abortion, favors death penalty and serves in local communities.

results of basic logit regressions. The estimates for both variables of our interest are negative and statistically significant, implying that holding an unfavorable view of the congress reduces the probability with which a person votes for the parliamentary system.

As shown in columns [2] and [5], our estimates are robust to controlling for the frequency with which an individual follows the political news and whether he or she thinks that elections are an important mechanism to influence the government. Furthermore, as reported in columns [3] and [6], the results remain unchanged when the regressions are estimated by OLS. It is interesting to observe that individuals who follow political news frequently and are ideologically more inclined towards the "left" tend to vote more for the parliamentary system, while those who believe that elections are a "very important" mechanism to control the government tend to vote more for the presidential regime. Overall, our results are consistent with the anecdotal evidence from Brazil and provide compelling evidence that the support for the parliamentary system depends importantly on the image of the congress among voters.

1.2.3. Discussion

Our analysis of the Brazilian referendum has established the existence of important and systematic differences in voting patterns across population groups. From a theoretical point of view, however, it is unclear why different people would have distinct preferences over the form of government and, in particular, why the poor

voters should be more inclined towards the presidential system. While there have been several related studies in the recent political economy literature (Persson, Roland and Tabellini [1997, 2000] and Robinson and Torvik [2009]), none of them are able to fully account for the stylized facts presented above. In a sense, the evidence from Brazil is quite puzzling. For instance, many critics of the presidentialism have pointed out that this system is inherently less stable (Linz [1978] and Stepan and Skach [1993]), while Persson, Roland and Tabellini (2000) have argued that redistribution is larger under parliamentarism. From this perspective, and particularly after a long period of military dictatorship (1964-85), it would have been to expect that the Brazilian population, especially the poor, would have been more supportive of the adoption of a parliamentary regime in order to decentralize power and restrict the authority of the central government.

1.3. Model

This section proposes a model to compare the performance of presidential and parliamentary systems of government. The analysis focuses on the fundamental difference between these two regimes: while in presidential systems the executive leader is directly elected by voters and has a fixed term in office, in parliamentary systems the executive leader is appointed by the parliament and may be replaced if receives a vote of no confidence. The model highlights the main trade-offs involved in the choice between these two forms of government. We use this framework to

investigate the factors that influence the preferences of different population groups over these alternatives.

1.3.1. Basic Setup

We consider a moral hazard model with a single period. Following Acemoglu and Robinson (2001, 2006), the society is composed of two groups of voters, the "poor" and the "rich", indexed respectively by superscripts p and r . The population is distributed over n constituencies or localities, each consisting of a continuum of agents of the same group (i.e. citizens are either all poor or all rich) with measure 1. The number of poor and rich constituencies is given by n^p and n^r , with $n^p > n^r$. We use the term "constituency" to broadly refer to a group of voters, distinguished by its geographical location, which serves as an electoral base for a representative. This structure applies naturally to the case where a majoritarian system ("winner-take-all") is in place, but also captures essential features of a proportional representation system with open party lists, given that candidates usually target specific groups of voters in a certain region.^{25,26}

²⁵The geographic concentration of votes for legislators is a well documented phenomenon in many countries that adopt multi-member district systems, e.g. Brazil (Fleischer [1976] and Ames [1995, 2001]), Colombia (Crisp and Ingall [2002] and Crisp and Desposato [2004]) and Japan (Hirano [2006]). Formally, Myerson (1993) shows that such systems encourage candidates to cater to narrow sub-constituencies ("favored minorities"). The intuition for this result is that appealing to larger fractions of the electorate makes the candidate "vulnerable" to an opponent who is only targeting the minimum number of voters required to win elections.

²⁶Ames (1995), in his analysis of the Brazilian electoral system, remarks that "legally, candidates may seek votes everywhere in their states, but in reality many concentrate their campaigns geographically, finding most of their support in one or more contiguous regions, regions popularly

The utility function of each individual i is given by:

$$(1.1) \quad U_i = (1 - \tau) y_i + \frac{1}{\alpha} \ell_i^\alpha - \frac{1}{2} (x - \theta_i)^2,$$

where $\tau \in [0, 1]$ is a common tax rate, y_i is the income level, $\ell_i \geq 0$ represents the provision of a local public good in individual i 's constituency (e.g. investment in education), $x \in \mathbb{R}$ is the position of a national public policy (e.g. a reform of the social security system) in the ideological space and $\theta_i \in \{\theta_L, \theta_H\}$ denotes the agent's preference over x , with $\theta_H - \theta_L = \Delta > 0$. The parameter α is such that $0 < \alpha < 1$, which guarantees that the utility function is increasing and concave in ℓ_i .

We suppose that the members of each group are identical in all respects. The poor voters have income y^p and preference $\theta^p \in \{\theta_L, \theta_H\}$, while the rich have income y^r , with $y^r > y^p$, and preference $\theta^r \in \{\theta_L, \theta_H\}$. The average income is normalized to one, $\bar{y} = \frac{1}{n} (n^p y^p + n^r y^r) = 1$, so that $y^p < 1 < y^r$.

The population is represented by $n + 1$ elected officials, one executive leader, e , and n legislators, $l \in \{1, \dots, n\}$, elected in their respective constituencies. The utility function of each office-holder j (executive leader or legislator) is given by:

$$(1.2) \quad V_j = s_j - \frac{1}{2} (x - \theta_j)^2,$$

referred to as "electoral strongholds" (*redutos eleitorais*). Why concentrate in a specific area? For diverse reasons: the candidates' families have long held power in the region; a party leader sent them to the area; they appeal to its voters; they make a deal with a local political leader."

where $s_j \geq 0$ represents the amount of rents expropriated by office-holder j and $\theta_j \in \{\theta_L, \theta_H\}$ denotes his preference parameter.

The vector of policies is given by $(x, (\tau, \varphi, s_e), \{(\ell_i, s_i)\}_{i=1}^n)$ and consists of a set of variables determined through the political process. The public policy x and the budget policy (τ, φ, s_e) are decided at the national level and must satisfy the aggregate budget constraint:

$$(1.3) \quad n\varphi + s_e \leq n\tau,$$

where φ represents a lump-sum transfer common to all constituencies and s_e is the amount of rents expropriated by the executive leader.²⁷ At the local level, transfers are allocated between the provision of local public goods, ℓ_i , and political rents to the local legislator, s_i , subject to the following budget constraint:²⁸

$$(1.4) \quad \ell_i + s_i \leq \varphi$$

We assume that the politicians cannot commit to policy platforms prior to elections. This creates a moral hazard problem in that once in office they will have an incentive to implement the best policies for themselves. As in Persson, Roland and Tabellini (1997, 2000), voters are able to discipline their representatives only

²⁷Observe that the aggregate tax revenue is given by $n^p \tau y^p + n^r \tau y^r$, which equals to $n\tau$ under the normalization that $\bar{y} = 1$.

²⁸With a slight abuse of notation, we use the subscript i to refer both to constituencies and their members.

"retrospectively" by threatening not to reelect them at the end of the period. The executive leader and the legislators are assumed to receive, respectively, exogenous rewards $\omega_E \geq 0$ and $\omega_L \geq 0$ when reelected. These parameters capture, in a reduced form fashion, the benefits associated with continuing in office and remaining popular with voters, which include "ego rents", legacy motives and future rents.

1.3.2. Preference Structure

We assume that the preference of the poor citizens is always given by $\theta^p = \theta_L$. At the beginning of the period, the rich voters' type is realized with $\Pr(\theta^r = \theta_L) = \rho$, where the parameter ρ can be interpreted as a measure of social homogeneity. After that, the government is formed with all office-holders aligned with the preference of their respective constituencies. The executive leader has the same type as the median (poor) voter, $\theta_e = \theta_L$, and all legislators have the same preference as their constituents, i.e. the legislators representing the poor have type θ_L , while those representing the rich have type θ^r .

A preference shock, then, occurs with probability $\xi \in (0, 1)$ and may change the preferences of all office-holders. Each politician, executive leader or legislator, remains aligned with their constituencies with probability $\pi \in (0, 1)$, where the parameter π can be interpreted as a measure of the quality of political representation in the society. After the occurrence of the shock, there are four possible scenarios relevant to the analysis, two in which the preferences of the executive leader and the median legislator are the same, $\theta_e = \theta_{lm}$, and two in which they

are different, $\theta_e \neq \theta_{lm}$. We suppose that the office-holders' new types are drawn independently from each other and that the preferences of the executive leader and the median legislator are observed by everyone. Note that, since all shocks are independent, nothing would change in the model if we allowed for a shift in the voters' preferences, provided that, after the shock, $\Pr(\theta^p = \theta^r) = \rho$ and the office-holders are still aligned with probability π .

This structure is intended to capture an environment in which the relevant policy issue (e.g. international relations or fiscal policy) becomes known only after the government is formed, due to uncertainty about the future state of the world. The preference shock, thus, reflects the possibility of changes in current economic and political conditions combined with the fact that elected officials may not be aligned with the interests of their constituencies in every policy dimension. The assumption that the preferences of the executive leader and the median legislator are observed after the shock captures the idea that their stance on main political issues are known from public speeches, debates and interviews as well as from their past career and background.

1.3.3. Political Structure

The government is divided into two branches, the executive and the legislative, each responsible for a distinct but complementary role in the policy-making process. The legislative assembly is composed of n members elected in their constituencies, while the executive is composed of a single member whose appointment process

depends on the form of government. Specifically, in a presidential system the president is elected and held accountable directly by voters, while in a parliamentary system the prime-minister is appointed and held accountable by the members of the parliament, who can remove him through a vote of no confidence.

After the uncertainty over preferences is resolved, the executive leader is called upon to make a proposal $\tilde{\mathbf{q}} = (\tilde{x}, (\tilde{\tau}, \tilde{\varphi}, \tilde{s}_e))$, which consists of a public policy \tilde{x} and a budget policy $(\tilde{\tau}, \tilde{\varphi}, \tilde{s}_e)$. The proposal is, then, submitted to the legislative, where representatives vote separately on \tilde{x} and $(\tilde{\tau}, \tilde{\varphi}, \tilde{s}_e)$. This structure captures both the *de jure* and the *de facto* agenda-setting powers held by the executive leader under each regime.²⁹ Furthermore, the assumption of a separate vote on each issue is consistent with the common practice in most legislatures, where distinct bills, such as a budget proposal and a reform of the health care system, are discussed and voted independently.

The legislative process differs across the two systems. In the presidential regime, each element of the proposal is approved if supported by a majority of legislators. Otherwise, a default public policy $x^o = \frac{\theta_L + \theta_H}{2}$ is implemented when \tilde{x}

²⁹Indeed, the majority of the bills in parliamentary systems are initiated by the cabinet, while many presidential democracies, particularly those in Latin America, provide substantial agenda-setting powers to their governments (Mainwaring and Shugart [1997]). Furthermore, even in the United States, where the president has only limited authority to propose bills, the executive often plays a fundamental role in shaping legislation. An example of this can be found in the conduct of the Obama administration during the negotiations over the health care reform. According to an article in the New York Times, "in pursuing his proposed overhaul of the health care system, President Obama has consistently presented himself as aloof from the legislative fray, merely offering broad principles. (...) Behind the scenes, however, Mr. Obama and his advisers have been quite active, sometimes negotiating deals with a degree of cold-eyed political realism potentially at odds with the president's rhetoric." (New York Times, 08/13/2009).

is rejected, while a default budget $(\tau^o, \varphi^o, s_e^o)$ is adopted when $(\tilde{\tau}, \tilde{\varphi}, \tilde{s}_e)$ is rejected. In the parliamentary regime, on the other hand, after observing the proposal, the members of the parliament vote on a motion of no confidence on the executive. Intuitively, in this case, the policy vector $\tilde{\mathbf{q}}$ can be interpreted as the leader's "program of government". If the vote of no confidence is rejected, the prime-minister remains in office and the proposal is implemented. Otherwise, a new executive leader e' is appointed and given the chance to make another policy proposal $\tilde{\mathbf{q}}'$, which is then voted against the status quo, as in a presidential system.

We assume that the new prime-minister is chosen among a pool of candidates from outside the parliament and that the majority of legislators is able to select an agent with the same preference as their own.³⁰ As we shall discuss below, the cases in which the vote of no confidence can make a difference are those where the preferences of the executive leader and the median legislator are misaligned, $\theta_e \neq \theta_{lm}$. The new prime-minister is not subject to a confidence procedure, but is held accountable by legislators who decide, by majority rule, whether to reappoint him or not at the end of the period.³¹ The assumption of a single vote of no confidence is in line with the fact that many parliamentary democracies impose a

³⁰The assumption that the new prime-minister is selected from outside the parliament is in line with the notion of a caretaker technocratic government taking office after the fall of the cabinet. Recent examples of this include the governments lead by Lucas Papademos in Greece and Mario Monti in Italy.

³¹Allowing the parliament to replace the government a finite number of times would not change any of the results of the model.

limit on the number of censure motions that can be proposed in a given period. It also captures the idea that most political issues require that a decision be reached in a timely manner in order to avert an imminent crisis or so that the policy itself does not lose its effectiveness.

After the legislative process is completed, a vector of policies $(x, (\tau, \varphi, s_e))$ is adopted under both systems and each legislator decides how to allocate the transfers received by his constituency between the provision of local public goods, ℓ_i , and expropriation of rents, s_i . Voters observe the policies $(x, (\tau, \varphi, s_e))$ and (ℓ_i, s_i) as they are implemented. At the end of the period, they decide, by majority rule, whether to reelect or not their representatives and the president based on their acts during the period.

A strategy for citizens is a "retrospective voting rule", which specifies the conditions under which an incumbent will receive their electoral support at the time of elections. We impose that, in equilibrium, any voting rule must be credible (i.e. satisfy subgame perfection) in the sense that voters would not want to reoptimize their strategies in later stages of the game, as additional information becomes available. It is also assumed that a prime-minister who receives the confidence of the parliament is always reappointed, while the "second" prime-minister is held accountable by legislators and depends on their support at the end of the period to remain in office. Intuitively, the new prime-minister has his proposal voted only against the status quo and, as a consequence, does not receive the "full" confidence of the parliament.

1.3.4. Institutional Quality

When a legislator i is not reelected, voters are able to recover the expropriated resources with probability $\lambda_i \in (0, 1)$, where the parameter λ_i can be interpreted as a measure of the quality of local accountability institutions. We assume that the level of institutional protection in poor and rich constituencies is distinct, with $\lambda^r > \lambda^p$. This heterogeneity generates a variation in the ability of voters to constraint expropriation at the local level, so that corruption imposes a greater burden on the poor. Similarly, when the executive leader is not reappointed, the expropriated resources are recovered with probability $\bar{\lambda} \in (0, 1)$, where the parameter $\bar{\lambda}$ captures the quality of national accountability institutions. The assumption that the protection provided by institutions operates only when an office-holder is ousted from power is consistent with the fact that a thorough investigation of a corruption scandal may be hindered either because the politician, while in office, is in a privileged position to manipulate evidence or because of the constitutional immunities that are often granted to office-holders.

1.3.5. Timing

To summarize, the timing of the events under a presidential system is as follows:

- (1) The preference shock occurs with probability ξ .
- (2) The president makes a policy proposal $\tilde{\mathbf{q}} = (\tilde{x}, (\tilde{\tau}, \tilde{\varphi}, \tilde{s}_e))$.

- (3) The congress votes separately on \tilde{x} and $(\tilde{\tau}, \tilde{\varphi}, \tilde{s}_e)$. Each element of the proposal is approved if supported by a majority in congress. Otherwise, a default public policy $x^o = \frac{\theta_L + \theta_H}{2}$ is implemented when \tilde{x} is rejected, while a default budget $(\tau^o, \varphi^o, s_e^o)$ is adopted when $(\tilde{\tau}, \tilde{\varphi}, \tilde{s}_e)$ is rejected.
- (4) Each constituency i receives a transfer φ and the local legislator decides how to allocate it between local public goods, ℓ_i , and political rents, s_i .
- (5) Elections are held and voters decide whether to reelect their representatives and the president.

The timing of the events under a parliamentary system is similar, except that stages (3) and (5) are replaced by:

- (3') The parliament votes on a motion of no confidence on the executive. If the vote of no confidence is rejected, the prime-minister remains in office and the proposal is implemented. Otherwise, a new executive leader e' is appointed and given the chance to make another proposal $\tilde{\mathbf{q}}'$, which is then voted against the status quo.
- (5') Elections are held and voters decide whether to reelect their representatives. A prime-minister who receives the confidence of the parliament is automatically reappointed, while the "second" prime-minister depends on the support of legislators to stay in office.

1.4. Equilibrium

This section solves for a subgame-perfect Nash equilibrium of the model. We proceed by backward induction, starting in subsection 1.4.1 with an analysis of the final subgame, which is common to both systems of government. The presidential regime is, then, discussed in subsection 1.4.2 and the parliamentary regime in subsection 1.4.3.

1.4.1. Local Politics

After the vector of policies $\mathbf{q} = (x, (\tau, \varphi, s_e))$ is approved and observed by all, each constituency receives a transfer φ and the local legislator decides how to allocate it between the provision of local public goods and expropriation of rents. When the legislator decides not to pursue reelection, his optimal strategy is to expropriate all resources, in which case he obtains $(1 - \lambda_i)\varphi$ in expected utility. Therefore, given the size of transfers φ , voters in each constituency formulate their reelection rules so as to minimize the amount of rents expropriated by legislator i according to the following problem:

$$(1.5) \quad \min_{s_i \geq 0} s_i$$

subject to:

$$\begin{cases} l_i + s_i \leq \varphi & (BC_i) \\ s_i + \beta\omega_L \geq (1 - \lambda_i)\varphi & (IC_i) \end{cases}$$

where $\beta \in (0, 1)$ is the discount factor. The incentive compatibility constraint (IC_i) guarantees that the legislator prefers to pursue reelection rather than to implement his outside option. At the optimum, both the budget and the incentive constraint must bind, so that:

$$(1.6) \quad s_i(\varphi) = \max \{(1 - \lambda_i)\varphi - \beta\omega_L, 0\}$$

and

$$(1.7) \quad l_i(\varphi) = \varphi - \max \{(1 - \lambda_i)\varphi - \beta\omega_L, 0\}$$

Intuitively, equation (1.7) determines the minimum amount of local public goods demanded by voters in order to reelect their representatives. In equilibrium, policies are always adopted according to these expressions and all legislators are reappointed.

Observe that political rents are equal to zero when:

$$\varphi \leq \frac{\beta\omega_L}{1 - \lambda_i}$$

In order to simplify the analysis, and to avoid uninteresting cases, we assume that the status quo transfer is such that $\varphi^o > \frac{\beta\omega_L}{1 - \lambda^p}$, which guarantees that the amount of rents extracted by any legislator representing the poor is always strictly positive. Observe that this condition can be re-expressed as $\omega_L < \frac{1}{\beta}(1 - \lambda^p)\varphi^o$, which requires that the reelection rewards of legislators are not too high.

Assumption 1.1 $\omega_L < \frac{1}{\beta} (1 - \lambda^p) \varphi^o$.

An important feature of the present model is that legislators are held accountable for their behavior at the local level, despite the fact that they also perform other actions prior to this stage. Note that any subgame perfect equilibrium requires that, once transfers φ are observed, the optimal reelection strategy of voters must be characterized according to problem (1.5). This renders any other voting rule non-credible, as voters would always have an incentive to deviate from it after transfers become known. The idea that representatives are held accountable by their local behavior is particularly reasonable in an environment where citizens do not have access to the individual voting record of their representatives, either due to a low degree of political awareness or lack of congressional transparency.³²

1.4.2. Presidential System

This subsection characterizes the policies implemented under a presidential system of government, taking as given that the rents expropriated by legislators and the provision of local public goods are determined, respectively, by equations (1.6) and (1.7).

³²These conditions are very likely to hold in new democracies and developing countries. According to Ames (1995), "Brazilian citizens exert pressure for pork-barrel programs, but on broader issues they have little control over their representatives. This should come as no surprise, because no one observing a Brazilian election would feel confident that many voters know anything at all about the positions of their deputies". Moreover, even in the case of a highly developed country such as Japan, several studies have documented that a considerable fraction of the electorate vote exclusively on the basis of local and parochial interests (Richardson [1997]).

1.4.2.1. Legislative Process. Suppose that a proposal $\tilde{\mathbf{q}} = (\tilde{x}, (\tilde{\tau}, \tilde{\varphi}, \tilde{s}_e))$ has been submitted to the congress. Observe that it is dominant for each legislator to vote in favor of the budget proposal $(\tilde{\tau}, \tilde{\varphi}, \tilde{s}_e)$ if, and only if, $s_l(\tilde{\varphi}) \geq s_l(\varphi^o)$. Under assumption 1.1, we have that $s^p(\varphi^o) > 0$, so that the amount of rents extracted by the poor legislators is positive and strictly increasing in transfers. Thus, the condition for the approval of $(\tilde{\tau}, \tilde{\varphi}, \tilde{s}_e)$ is:

$$(AP_1) \quad \tilde{\varphi} \geq \varphi^o$$

Similarly, the public policy \tilde{x} is approved in congress if, and only if, a majority of legislators prefers it to the status quo, $x^o = \frac{\theta_L + \theta_H}{2}$, which requires that:

$$(AP_2) \quad -\frac{1}{2}(\tilde{x} - \theta_{l^m})^2 \geq -\frac{1}{2}(x^o - \theta_{l^m})^2 = -\frac{\Delta^2}{8},$$

where θ_{l^m} denotes the the preference of the median legislator l^m . We refer to these conditions as the "approval constraints".

1.4.2.2. Incentive Constraint on the President. After the occurrence of the preference shock, the executive leader is called upon to make a proposal $\tilde{\mathbf{q}}$. The president is held accountable by voters, but has always the option to give up reelection and propose a policy that maximizes his utility subject to the budget constraint and the conditions for congressional approval, (AP_1) and (AP_2) . In this

case, the president sets $\tau = 1$ and $\varphi = \varphi^o$, which gives him $n(1 - \bar{\lambda})(1 - \varphi^o)$ in expected utility. Furthermore, when $\theta_e = \theta_{lm}$, he is able to approve his preferred reform $x = \theta_e$, while when $\theta_e \neq \theta_{lm}$ he can obtain at most $x = \frac{\theta_L + \theta_H}{2}$, due to the opposition of the congress.

Therefore, in order to induce the president to pursue reelection, voters must satisfy the following incentive compatibility constraint:

$$(IC_e) \quad s_e - \frac{1}{2}(x - \theta_e)^2 + \beta\omega_E \geq n(1 - \bar{\lambda})(1 - \varphi^o) - 1_{\{\theta_e \neq \theta_{lm}\}} \frac{\Delta^2}{8},$$

where $1_{\{\theta_e \neq \theta_{lm}\}}$ is an indicator function that equals to one when the preferences of the president and the median legislator are misaligned. In order to concentrate on the interesting cases, we assume that $\kappa \equiv n(1 - \bar{\lambda})(1 - \varphi^o) - \beta\omega_E > 0$, which guarantees that the amount of rents extracted by the executive leader is always strictly positive, $s_e > 0$. Intuitively, this condition requires that the reelection rewards of the president are not too high.

Assumption 1.2 $\omega_E < \frac{n}{\beta}(1 - \bar{\lambda})(1 - \varphi^o)$.

1.4.2.3. Equilibrium. We assume that the poor voters coordinate their reelection strategies, so that they are decisive for the reappointment of the president. This assumption is reasonable in the present context, since all members of this group are identical. Thus, conditional on θ_e and θ_{lm} , the poor citizens formulate

their voting rules so as to maximize their utility according to the following problem:

$$(1.8) \quad \max_{x \in \mathbb{R}, (\tau, \varphi) \in [0, 1]^2} (1 - \tau) y^p + \frac{1}{\alpha} \ell^p (\varphi)^\alpha - \frac{1}{2} (x - \theta_L)^2$$

subject to

$$\begin{cases} n\varphi + s_e \leq n\tau & (BC) \\ (IC_e), (AP_1), (AP_2) \end{cases}$$

The main properties of the equilibrium are summarized in the next lemma.³³

Lemma 1.1 *The equilibrium under a presidential system is characterized by the following properties:*

- i. The tax rate may be lower than one, $\tau \leq 1$.*
- ii. The size of transfers is (weakly) increasing in the quality of institutions available to the poor, λ^p , and (weakly) decreasing in the poor voters' income, y^p . Furthermore, transfers are always such that $\varphi \leq 1 - \frac{\kappa}{n}$.*
- iii. The amount of rents extracted by the executive leader is such that $s_e \geq \kappa$, with strict inequality when $\theta_e \neq \theta_L$.*
- iv. Given the median legislator's type, the distance $|x - \theta_L|$ is largest when the president is misaligned with the preference of the poor voters, $\theta_e = \theta_H$.*

³³All proofs of this paper are collected in appendix A.2.

In a presidential system, the existence of direct elections for the executive provides an institutional mechanism for the poor to influence policies according to their interests. In particular, the size of the taxes and transfers "demanded" by them depend on the cost of taxation and on how effectively the resources can be converted into local public goods. Formally, the optimal transfers are such that:

$$\varphi = \max \{ \varphi^o, \widehat{\varphi} \},$$

where, assuming that the constraint $\tau \leq 1$ does not bind, $\widehat{\varphi}$ is implicitly determined by:

$$(1.9) \quad \underbrace{\ell^p(\widehat{\varphi})^{\alpha-1} \lambda^p}_{\text{marg. utility}} = \underbrace{y^p}_{\text{marg. cost}}$$

Therefore, in equilibrium, transfers are: (i) (weakly) increasing in the quality of institutions available to the poor, λ^p , which reduces the expropriation of rents at the local level, and (ii) (weakly) decreasing in the poor voters' income, y^p , which raises the cost of taxation for the members of this group.

An important drawback associated with direct elections is that they impose a limit on the frequency with which voters are able to check the government, so that a misaligned president, $\theta_e = \theta_H$, can never be removed from office before the end of his term. The executive leader is, therefore, in a strong position to push for policies that are favorable to himself and, as a consequence, is able to extract more rents and to distort the public policy towards his preferred position.

Observe that, from the incentive compatibility constraint, it follows that political rents are given by:

$$(1.10) \quad s_e = \kappa + \Psi(\tilde{x}; \boldsymbol{\theta}),$$

where $\Psi(\tilde{x}; \boldsymbol{\theta}) = \frac{1}{2}(\tilde{x} - \theta_e)^2 - 1_{\{\theta_e \neq \theta_{lm}\}} \frac{\Delta^2}{8}$ is the amount of rents that must be paid above κ in order to incentivize the president to propose a public policy \tilde{x} . When the executive leader is aligned with voters, $\theta_e = \theta_L$, the equilibrium entails $x = \theta_L$ when $\theta_{lm} = \theta_L$ and $x = \frac{\theta_H + \theta_L}{2}$ when $\theta_{lm} = \theta_H$, so that $\Psi(x; \boldsymbol{\theta}) = 0$ in both cases. A misaligned executive leader, on the other hand, must be paid additional rents in order to propose a policy that is closer to the voters' preference. The size of these rents is given by:

$$(1.11) \quad \Psi(\tilde{x}; \boldsymbol{\theta}) = \frac{1}{2}(\tilde{x} - \theta_H)^2 - 1_{\{\theta_e \neq \theta_{lm}\}} \frac{\Delta^2}{8}$$

At the optimum, voters choose \tilde{x} in order to equalize the marginal benefit of reducing the distance $|\tilde{x} - \theta_L|$ and the marginal cost of providing extra rents to the president. Therefore, $s_e \geq \kappa$, with strict inequality when $\theta_e \neq \theta_L$, and, from the budget constraint, it follows that $\varphi \leq 1 - \frac{\kappa}{n}$.

1.4.3. Parliamentary System

We now proceed to characterize the vector of policies implemented under a parliamentary system of government. As before, the rents expropriated by legislators

and the provision of local public goods are determined, respectively, by equations (1.6) and (1.7).

1.4.3.1. Legislative Process. Suppose that a "program of government" $\tilde{\mathbf{q}} = (\tilde{x}, (\tilde{\tau}, \tilde{\varphi}, \tilde{s}_e))$ has been proposed by the prime-minister. The members of the parliament vote on a motion of no confidence on the executive. If the vote of no confidence is rejected, the prime-minister remains in office and the proposal is implemented, in which case each legislator obtains:

$$(1.12) \quad V_l = s_l(\tilde{\varphi}) - \frac{1}{2}(\tilde{x} - \theta_l)^2$$

If, on the other hand, the motion of no confidence is approved, a new prime-minister e' is selected, with preference equal to the median legislator, $\theta_{e'} = \theta_{l^m}$, and given the chance to make another proposal $\tilde{\mathbf{q}}'$, which is then voted against the status quo. The new executive leader is not subjected to the confidence of the parliament, but legislators are able to hold him accountable through retrospective voting, by threatening not to reappoint him at the end of the term. Specifically, the median legislator formulates his voting strategy according to the following problem:

$$(1.13) \quad \max_{x \in \mathbb{R}, (\tau, \varphi) \in [0,1]^2} s_{l^m}(\varphi) - \frac{1}{2}(x - \theta_{l^m})^2$$

$$s.t. \begin{cases} n\varphi + s_{e'} \leq n\tau & (BC) \\ s_{e'} - \frac{1}{2}(x - \theta_{e'})^2 \geq \kappa & (IC_{e'}) \end{cases}$$

where $\kappa \equiv n(1 - \bar{\lambda})(1 - \varphi^o) - \beta\omega_E > 0$ under assumption 1.2. As before, the incentive compatibility constraint ($IC_{e'}$) guarantees that the executive leader prefers to pursue reelection rather than adopting his outside option. Observe that there is no conflict associated with the public policy decision in this case, since both the median legislator and the "second" prime-minister have identical preferences.

The optimal solution to this problem involves setting $x = \theta_{l^m}$ and $s_{e'} = \kappa$. Moreover, since the amount of rents expropriated by legislators is increasing in transfers, and strictly so for any legislator representing the poor (under assumption 1), the reappointment rule specifies $\tau = 1$ and $\varphi = 1 - \frac{\kappa}{n}$, i.e. taxes and transfers are set as high as possible. Therefore, the utility obtained by the median legislator after a vote of no confidence is:

$$(1.14) \quad V_{l^m} = s_{l^m} \left(1 - \frac{\kappa}{n}\right)$$

1.4.3.2. Confidence Requirement. From equations (1.12) and (1.14), it follows that it is dominant for the median legislator to support the government in a vote

of confidence if, and only if, the initial proposal $\tilde{\mathbf{q}}$ satisfies the following condition:

$$(CR) \quad s_{lm}(\tilde{\varphi}) - \frac{1}{2}(\tilde{x} - \theta_{lm})^2 \geq s_{lm} \left(1 - \frac{\kappa}{n}\right),$$

where we refer to this condition as the "confidence requirement" constraint.

1.4.3.3. Equilibrium. Proceeding by backward induction, after the occurrence of the preference shock, the prime-minister is called upon to make a proposal $\tilde{\mathbf{q}}$ subject to the confidence requirement of the parliament. Formally, he proposes a policy that maximizes his utility according to the following problem:

$$(1.15) \quad \max_{\tilde{x} \in \mathbb{R}, (\tilde{\tau}, \tilde{\varphi}) \in [0,1]^2} \tilde{s}_e - \frac{1}{2}(\tilde{x} - \theta_e)^2$$

$$s.t. \quad \begin{cases} n\tilde{\varphi} + \tilde{s}_e \leq n\tilde{\tau} & (BC) \\ (CR) \end{cases}$$

When the preferences of the prime-minister and the median legislator are the same, $\theta_e = \theta_{lm}$, the optimal solution is given by: $x = \theta_{lm}$, $s_e = \kappa$, $\tau = 1$ and $\varphi = 1 - \frac{\kappa}{n}$. That is, the executive leader simply announces the exact same policies that would have been proposed by his successor had he been defeated in the vote of no confidence. When, on the other hand, the prime-minister is not aligned with the parliament, $\theta_e \neq \theta_{lm}$, the optimal solution involves a distortion of the reform away from the median legislator's preference in exchange for an increase in the size of transfers to constituencies.

Observe that the "relevant" median legislator for this problem is always a representative of the poor. The executive leader always prefers to seek the support of legislators from this group, since they are "cheaper" to buy. Intuitively, a poor representative is able to extract more rents out of the same amount of transfers and, therefore, requires less resources in order to support the government whenever $x \neq \theta_{lm}$. Furthermore, by obtaining the support of a median poor legislator, the prime-minister automatically guarantees the votes of all other poor representatives. This is because the members of the parliament with median preference are always the ones whose support is most difficult to obtain, given that they control the appointment of the next government.

The main properties of the equilibrium are summarized in the next lemma.

Lemma 1.2 *The equilibrium under a parliamentary system is characterized by the following properties:*

- i. The tax rate is always equal to one, $\tau = 1$.*
- ii. The size of transfers is such that $\varphi \geq 1 - \frac{\kappa}{n}$, with strict inequality when $\theta_e \neq \theta_{lm}$.*
- iii. The amount of rents extracted by the executive leader is such that $s_e \leq \kappa$, with strict inequality when $\theta_e \neq \theta_{lm}$.*
- iv. When the executive leader has type $\theta_e = \theta_H$, the distance $|x - \theta_L|$ is smallest when the median legislator is aligned with the preference of the poor voters, $\theta_{lm} = \theta_L$.*

In a parliamentary system, the ability to check the executive is delegated to legislators, who hold the prime-minister accountable through the confidence procedure. This implies that the members of the parliament are in a strong position to push for higher transfers, which expands their expropriation opportunities at the local level. The executive leader, in turn, sets the tax rate to its maximum, both in order to satisfy the demands of legislators and to raise his own rents.

At the same time, the vote of no confidence adds flexibility to the parliamentary system by providing an institutional mechanism to remove the prime-minister before the end of the term. A misaligned leader, $\theta_e \neq \theta_{lm}$, must always satisfy the demands of the parliament to stay in office and is forced to accept a reduction in rents whenever the public policy is distorted away from the median legislator's preference. Formally, the confidence requirement imposes that:

$$(1.16) \quad s^p(\tilde{\varphi}) = s^p \left(1 - \frac{\kappa}{n} \right) + \frac{1}{2} (\tilde{x} - \theta_{lm})^2,$$

where $s^p(\cdot)$ is the amount of rents expropriated by a poor legislator. Observe that when $\tilde{x} \neq \theta_{lm}$, we must have that $\tilde{\varphi} > 1 - \frac{\kappa}{n}$ and $\tilde{s}_e < \kappa$.

Overall, the confidence procedure strengthens the bargaining power of the parliament considerably. Thus, an important requirement for the parliamentary system to perform in accordance with the interests of voters is that the legislators represent their preferences with high likelihood. In particular, observe that the vote of no confidence works in favor of the poor voters whenever $\theta_e = \theta_H$ and

$\theta_{Im} = \theta_L$. Indeed, this is the only case where the confidence procedure is actually used to protect their interests.

1.5. Main Results

This section presents the main results of our analysis. The first proposition compares the size of taxes, transfers and political rents under both systems of government.

Proposition 1.1. *From lemmas 1.1 and 1.2, it follows that:*

i. The tax rate is higher under parliamentary systems:

$$\tau^{pres} \leq \tau^{parl} = 1$$

ii. The size of transfers and the provision of local public goods are higher under parliamentary systems:

$$\varphi^{pres} \leq \varphi^{parl} \quad \text{and} \quad \ell_i^{pres} \leq \ell_i^{parl},$$

with $\mathbb{E}(\varphi^{pres}) < \mathbb{E}(\varphi^{parl})$ and $\mathbb{E}(\ell_i^{pres}) < \mathbb{E}(\ell_i^{parl})$.

iii. The expected amount of rents extracted by legislators is larger under parliamentary systems:

$$\mathbb{E}(s_i^{pres}) \leq \mathbb{E}(s_i^{parl}),$$

with strict inequality if the legislator represents a poor constituency, while the expected amount of rents obtained by the executive leader is larger under presidential systems:

$$\mathbb{E}(s_e^{pres}) > \mathbb{E}(s_e^{parl})$$

Intuitively, the threat of a vote of no confidence allows the members of the parliament to obtain larger transfers to constituencies and, as a result, more rents for themselves. The existence of direct elections, on the other hand, increases the ability of voters to influence policies, which limits the size of transfers, while at the same time allowing the executive leader, who is given a fixed term in office, to extract more rents.

The conclusion that taxes and transfers are smaller under presidential systems is in line with the theoretical results obtained by Persson, Roland and Tabellini (2000) as well as with the empirical evidence provided by Persson and Tabellini (2003, 2004). A novel implication of our analysis is that the size of transfers under presidential systems is increasing in the quality of institutions available to the poor. Intuitively, additional transfers are only worth to voters if a reasonable fraction of the resources is expected to translate into local public goods. This idea is consistent with Olken (2006) who studied the performance of an anti-poverty program in Indonesia, showing that the losses from corruption may actually have

outweighed the intended benefits of the transfers. Finally, the result about the amount of rents expropriated by the executive leader and legislators is similar to the one obtained by Robinson and Torvik (2009).

The next proposition concerns the quality of the public policies approved under each regime.

Proposition 1.2 *If the number of poor and rich constituencies is such that $n^p > n^r + 1$ and $\Delta = \theta_H - \theta_L$ is large enough, then there exists a threshold $\bar{\pi}$ such that if $\pi \geq \bar{\pi}$ the expected distance between the public policy and the poor voters' preference is lower under parliamentary systems, $\mathbb{E}[(x^{pres} - \theta_L)^2] > \mathbb{E}[(x^{parl} - \theta_L)^2]$.*

The vote of no confidence provides additional flexibility to the parliamentary system by allowing legislators to replace a misaligned leader before elections. The above result shows that the confidence procedure translates into better policies for the poor provided that the probability of post-shock congruence, π , is sufficiently large. The intuition is simple. Observe that the median legislator's type is determined by aggregating across many representatives. Thus, when $\frac{1}{2} < \pi < 1$, the likelihood that the median legislator is aligned with the poor is larger than that of any single politician, as "negative shocks" can be cancelled out in the aggregation process. In this case, the parliament is expected to better represent the interests of voters than the executive. Finally, to guarantee that the quality of the public

policies is indeed higher under parliamentary systems, π must be sufficiently larger than $\frac{1}{2}$, so that the median legislator is aligned with enough frequency.

While it is difficult to characterize the precise conditions under which the rich voters would prefer one regime over the other, it is instructive to analyze two particular cases. When $\rho = 1$, the preferences of the rich and the poor are always the same, so that the result discussed above applies to both groups. On the other hand, when $\rho = 0$, preferences of the rich and the poor are always different, so that they have exactly opposite views about the quality of public policies under each system.³⁴ Intuitively, then, it should be difficult to reach a consensus about the form of government in societies where the degree of heterogeneity is very high.

1.5.1. Constitutional Choices

This subsection studies the preferences of voters and politicians over the form of government. A hypothetical constitutional stage is introduced at the beginning of the period, before all uncertainty over preferences is realized. It is assumed that every aspect of the model is common knowledge and that agents know their future social status or political role in the society. Following Buchanan and Tullock (1962), we study the issue of constitutional design from a positive point of view. Our main goal is to investigate the reasons behind the institutional choices of the various population groups, assuming that, at least in the medium term, citizens

³⁴Formally, we have that $\mathbb{E}[(x^{pres} - \theta_L)^2] \geq \mathbb{E}[(x^{parl} - \theta_L)^2] \leftrightarrow \mathbb{E}[(x^{pres} - \theta_H)^2] \leq \mathbb{E}[(x^{parl} - \theta_H)^2]$.

(poor and rich) and office-holders (executive leader and legislators) remain in their respective social and political positions.

The next proposition characterizes the constitutional preferences of office-holders.

Proposition 1.3 *With respect to the constitutional preferences of office-holders:*

i. The executive leader's expected utility is always higher under presidential systems:

$$\mathbb{E}(V_e^{pres}) > \mathbb{E}(V_e^{parl})$$

ii. There exists η such that if $\Pr(\theta_l = \theta_{lm}) \geq \eta$, then the expected utility of legislator l is higher under parliamentary systems:

$$\mathbb{E}(V_l^{pres}) < \mathbb{E}(V_l^{parl})$$

Our analysis underlines the fact that the balance of powers between executive and legislative is markedly different under each regime of government. The executive leader prefers a presidential system, where the certainty of a fixed term in office provides an insulation against the checks of voters and the congress. The legislators, on the other hand, tend to prefer a parliamentary system, where the vote of no confidence allows them to exert a more active role in the political process. Each representative is able to extract more rents and, conditional on belonging to

the winning coalition, to obtain a better public policy. Therefore, the parliamentary regime is preferred by a legislator if the probability of being aligned with the median type is sufficiently large, $\Pr(\theta_l = \theta_{lm}) \geq \eta$, where the exact threshold μ depends on how much more rents he is able to extract under this system.

We now turn to the constitutional preferences of voters. The next results are derived under the assumptions required for proposition 1.2. We start by characterizing the conditions under which the poor would prefer each alternative.

Proposition 1.4 (Poor voters) *For any given level of income $0 < y^p < 1$, we have that:*

- i. If λ^p and π are small enough, then the expected utility of the poor voters is higher under presidential systems.*
- ii. If λ^p and π are large enough, then the expected utility of the poor voters is higher under parliamentary systems.*

The poor voters prefer a presidential system of government whenever the quality of local institutions, λ^p , is weak and the probability of post-shock congruence, π , is low. In this case, a large fraction of the transfers is diverted by legislators due to the lack of institutional protection at the local level. Furthermore, public policies are expected to be worse under parliamentary systems given that the median legislator cannot be trusted to represent the voters' preferences with high likelihood. In this circumstance, it is best for the poor to have the ability to check

the executive leader through direct elections. This allows them to impose a limit on the size of taxes and transfers and to demand policies that are more in line with their own preferences.

Conversely, the parliamentary system is preferred whenever the quality of local institutions and the probability of post-shock congruence are both large enough. Overall, our results emphasize that the parliamentarism is the regime that is most "intensive" in political institutions in that it requires a strong system of protection against expropriation, particularly at the local level, and a congress that can be trusted to represent well the interests of voters.

Finally, we compare the constitutional preferences of rich and poor voters, focusing on the following difference:

$$(1.17) \quad \Omega \equiv \mathbb{E}(U^{r,parl} - U^{r,pres}) - \mathbb{E}(U^{p,parl} - U^{p,pres}),$$

where $U^{j,k}$ represents the utility of group $j \in \{p, r\}$ under the regime $k \in \{pres, parl\}$. Intuitively, Ω provides a measure of how the relative preference for the parliamentary system differs across rich and poor voters. For instance, if $\Omega > (<) 0$, then the rich prefer the parliamentary regime more (less) than the poor. Furthermore, in order to avoid uninteresting cases, we assume that the incentive compatibility constraint on legislators from rich districts is always binding, which guarantees that they obtain strictly positive rents in equilibrium. The next proposition summarizes our main conclusions.

Proposition 1.5 (Rich voters)

i. As λ^r increases, the rich prefer the parliamentary system more than the poor voters:

$$\frac{\partial \Omega}{\partial \lambda^r} > 0$$

ii. As y^r increases, the rich prefer the parliamentary system less than the poor voters:

$$\frac{\partial \Omega}{\partial y^r} \leq 0,$$

with strict inequality when $\mathbb{E}(\tau^{pres}) < 1$.

The burden of corruption imposed by legislators is not equally distributed across the population. The better quality of the local institutions available to the rich, $\lambda^r > \lambda^p$, allow them to obtain more benefits out of the larger transfers received under parliamentary systems, which skews their relative preference towards these regimes. At the same time, the rich voters are also more affected by the higher taxes levied under parliamentary systems, since $y^r > y^p$, which makes the presidential regime more attractive to them. Interestingly, our results suggest that income per se cannot account for the fact that the rich citizens in Brazil voted more for the parliamentary system. Instead, the model highlights that an important reason behind this evidence can be attributed to differences in the quality of local accountability institutions across the population.

1.6. Conclusion

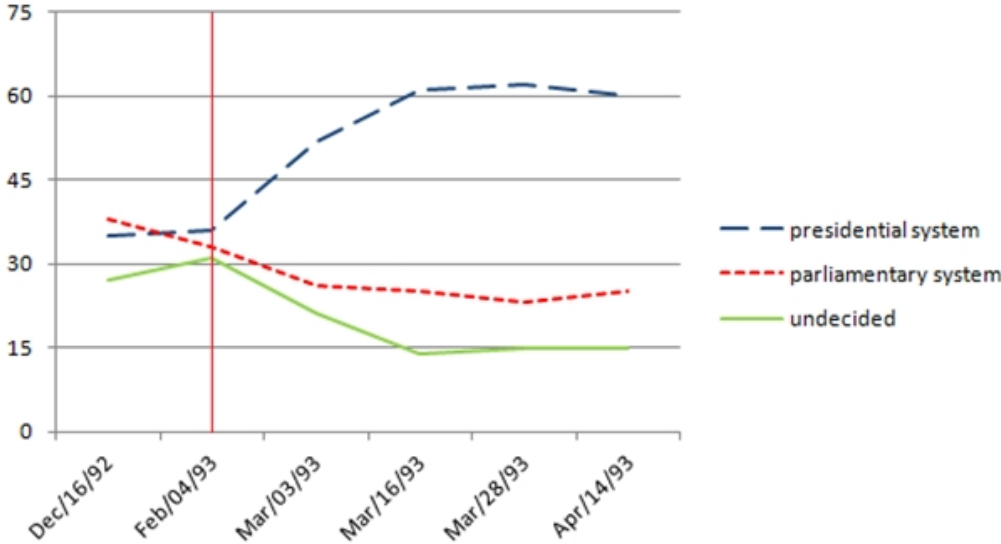
This paper has studied the main factors that determine the constitutional preferences of citizens over the form of government. We focus on the case of Brazil, where a referendum in 1993 allowed the population to choose between a presidential and parliamentary system of government. Using a unique data set consisting of the results of the referendum, we show that, while the Brazilian population in general voted more for the presidential system, there exists a strong positive correlation between income per capita and the percentage of votes cast for the parliamentary regime in each municipality. We also document that a common reason to reject the parliamentary system was the absence of direct elections for the executive in connection with the lack of confidence in the congress.

We propose a model to explain the general pattern of the results of the referendum in Brazil. The analysis is based on a fundamental difference between the two regimes of government: while in presidential systems the executive leader is directly elected by voters and has a fixed term in office, in parliamentary systems the executive leader is appointed by the parliament and may be replaced if receives a vote of no confidence. We show that the parliamentary regime requires a strong system of protection against expropriation, particularly at the local level, and a class of politicians that can be trusted to represent well the interests of voters. It is also shown that the poor groups of the population prefer the presidential system

because the low quality of their local accountability institutions makes them more vulnerable to expropriation of rents by legislators.

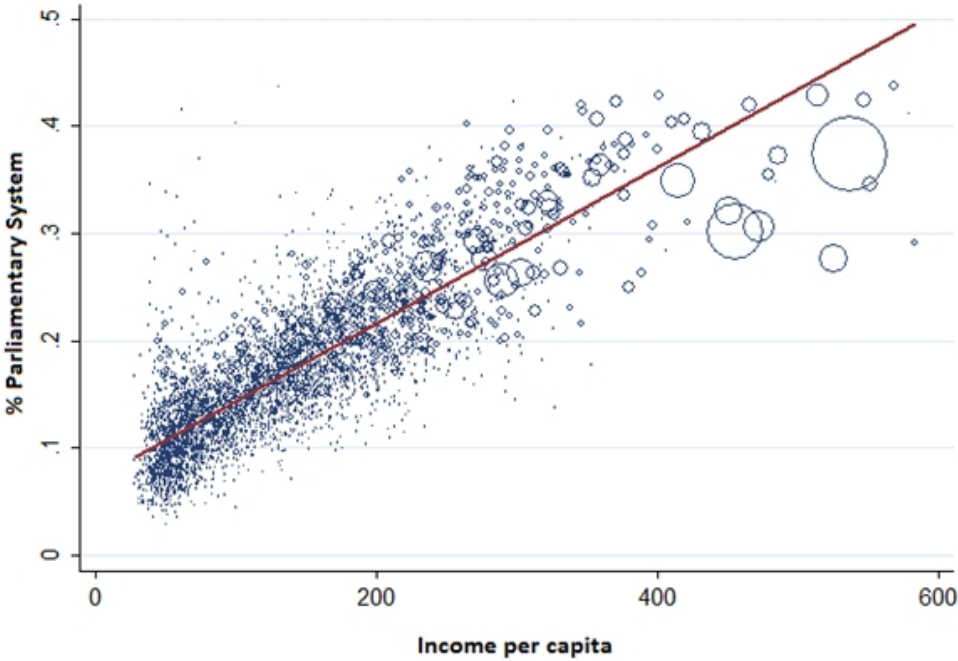
This paper contributes to the literature on endogenous political institutions by studying on a particular case of constitutional reform. While we do not contend that the results of our analysis apply irrespective of the political and institutional context, we believe that the model highlights some of the key factors involved in the choice of a regime of government. As pointed out by North (1990), the study of historical events provides an useful way to identify the main elements behind the process of institutional change. This paper proposes the use of referendum data as a valuable source of information about the preferences of citizens on certain political issues. We believe that a similar approach could be fruitfully applied to other political institutions given the existence of a vast amount of data on several, potentially interesting, questions.

1.7. Figures and Tables



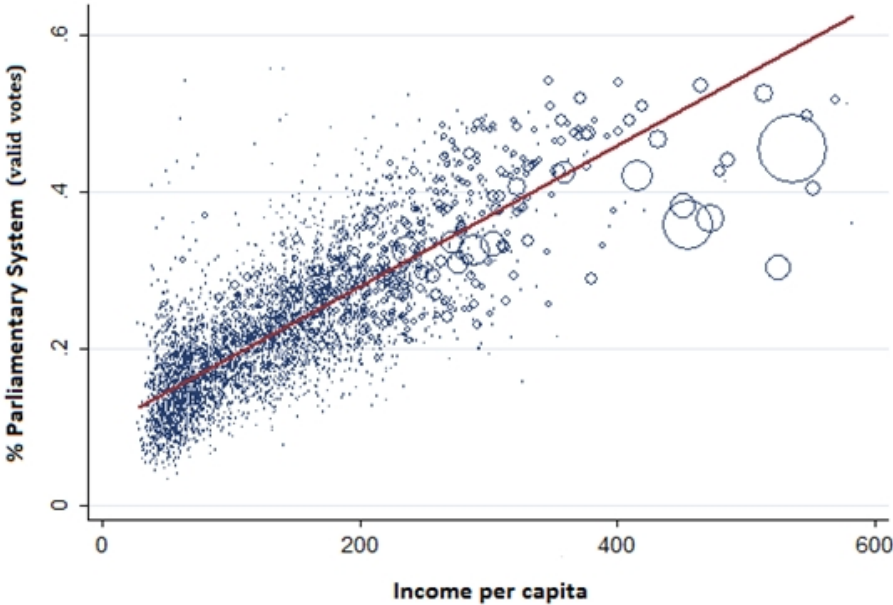
Note. This figure plots the evolution of voting intentions during the months preceding the referendum. The vertical line marks the beginning of the campaigns on TV and radio. Source: Datafolha Institute.

Figure 1.1: Evolution of Voting Intentions



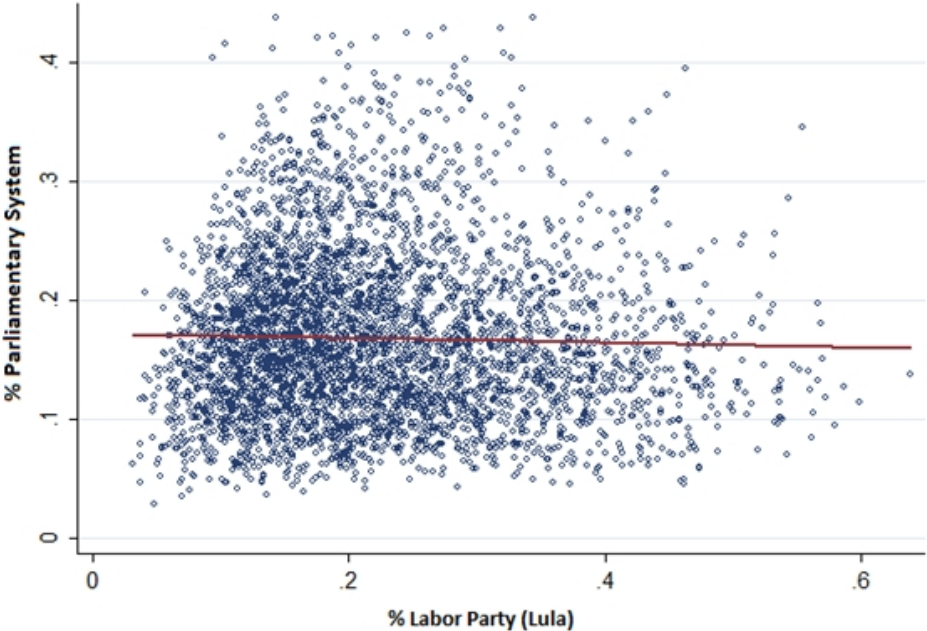
Note. This figure plots the relationship between income per capita and the percentage of votes cast for the parliamentary system. Each municipality is represented as a circle proportional to its population. The graph displays a linear regression line, with $R^2= 0.63$.

Figure 1.2: % of Votes for the Parliamentary System versus Income per Capita



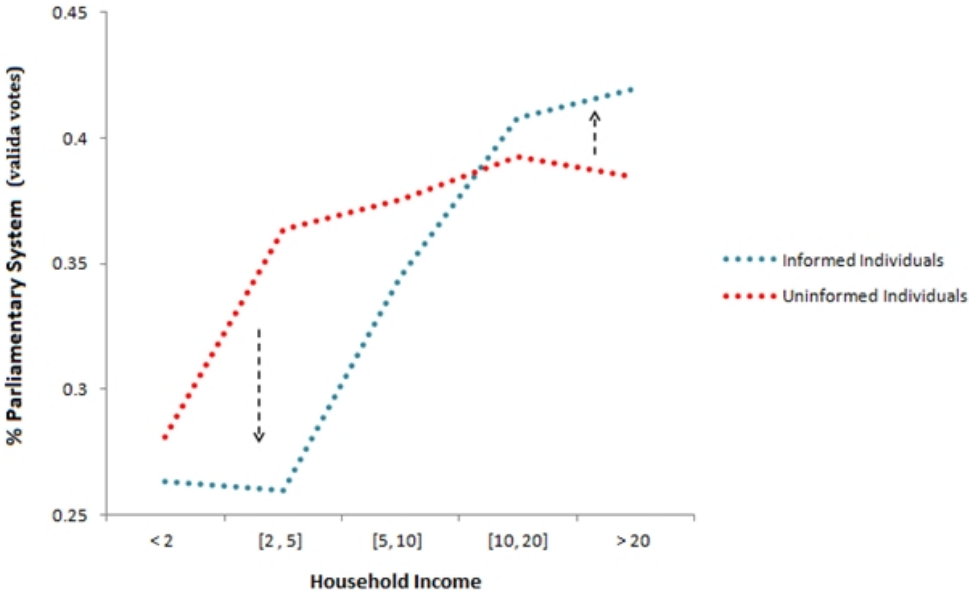
Note. This figure plots the relationship between income per capita and the percentage of votes cast for the parliamentary system among the valid votes, i.e. excluding null and blankvotes. Each municipality is represented as a circle proportional to its population. The graph displays a linear regression line, with $R^2= 0.56$.

Figure 1.3: % of Votes for the Parliamentary System (Valid Votes)



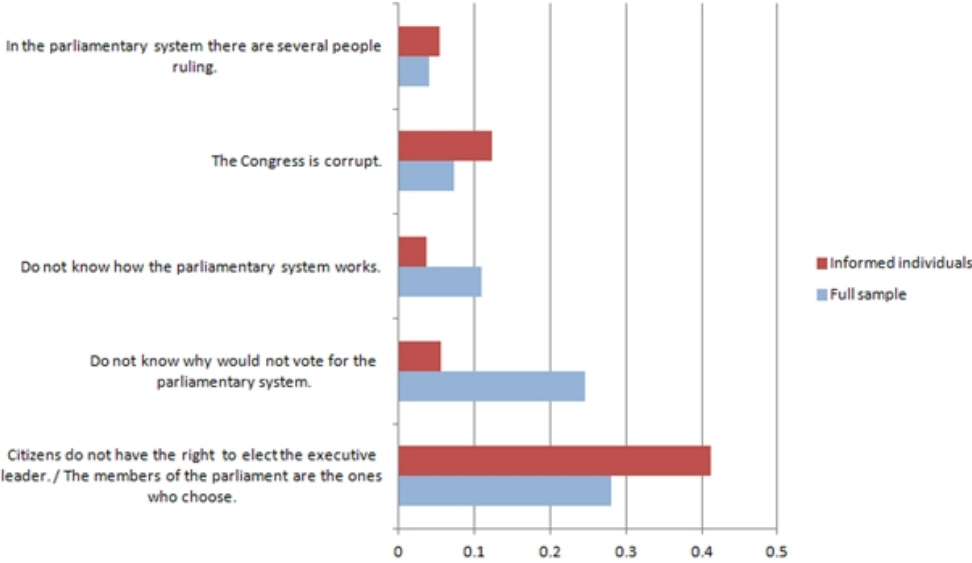
Note. This figure plots the relationship between the percentage of votes received by the Labor Party of Luis Inacio Lula da Silva in 1994 and the percentage of votes cast for the parliamentary system. The graph displays a linear regression line, with $R^2=0$.

Figure 1.4: % of Votes for the Parliamentary System versus % of Votes for the Labor Party



Note. This figure plots the voting intentions of informed and uninformed voters for different classes of household income (as measured in numbers of minimum wages). The informed individuals consist of those subjects who were able to correctly identify (in spontaneous answers) at least two differences between presidential and parliamentary systems of government. The data refers to an opinion survey conducted by the Datafolha Institute in March 3rd, 1993.

Figure 1.5: Lack of Information Does Not Account for Stylized Facts



Note. This figure reports the most common reasons mentioned by voters when asked why they would not vote for the parliamentary system. The subsample of informed individuals consists of those subjects who were able to correctly identify (in spontaneous answers) at least two differences between presidential and parliamentary systems. The data refers to an opinion survey conducted by the Datafolha Institute in March 3rd, 1993.

Figure 1.6: Why not a Parliamentary System? Common Reasons.

| Form of Government | % |
|----------------------|------|
| Parliamentary system | 55.5 |
| Presidential system | 24.5 |
| Null or blank votes | 20.0 |

Table 1.1: Referendum: Final Result

| | Full Sample | Informed Individuals |
|------------------------|-------------|----------------------|
| % parliamentary system | 25.7 | 28.1 [+2.4%] |
| % presidential system | 51.9 | 58.7 [+6.8%] |
| % undecided | 22.3 | 13.1 [-9.2%] |
| observations | 2,607 | 1,059 |

Notes. This table provides a summary of the voting intentions for subjects in the full sample and in the subsample of informed individuals. The subgroup of informed individuals consists of those voters who were able to correctly identify (in spontaneous answers) at least two differences between presidential and parliamentary systems. The numbers in brackets correspond to the difference (in terms of percentage points) between the voting intentions of the two groups. The data refers to an opinion survey conducted by the Datafolha Institute in March 3rd, 1993.

Table 1.2: Information about the Referendum

| | [1] | [2] | [3] | [4] | [5] | [6] |
|--|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Dependent Variable: % parliamentary system | | | | | | |
| number of AM radio stations | 0.005 *** [.001] | 0.005 *** [.001] | 0.005 *** [.001] | | | |
| presence of federal judges and prosecutors | | | | 0.014 *** [.003] | 0.013 *** [.002] | 0.013 *** [.002] |
| log(income per capita) | 0.043 *** [.004] | 0.038 *** [.004] | 0.039 *** [.004] | 0.044 *** [.004] | 0.038 *** [.004] | 0.039 *** [.004] |
| log(population) | 0.008 *** [.001] | 0.009 *** [.001] | 0.009 *** [.001] | 0.009 *** [.001] | 0.010 *** [.001] | 0.011 *** [.001] |
| illiteracy rate | -0.018 [.015] | -0.031 * [.017] | -0.034 * [.017] | -0.020 [.015] | -0.033 * [.017] | -0.036 ** [.017] |
| gini coefficient (income) | -0.057 *** [.017] | -0.049 *** [.015] | -0.049 *** [.015] | -0.054 *** [.017] | -0.044 *** [.015] | -0.044 *** [.016] |
| municipal characteristics | Y | Y | Y | Y | Y | Y |
| state fixed effects | Y | N | N | Y | N | N |
| micro-region fixed effects | N | Y | Y | N | Y | Y |
| mayor's party fixed-effects | N | N | Y | N | N | Y |
| observations | 4,144 | 4,144 | 4,095 | 4,148 | 4,148 | 4,098 |
| R ² | 0.73 | 0.81 | 0.82 | 0.73 | 0.81 | 0.82 |

Notes. This table reports OLS estimates for regressions where the dependent variable is the percentage of votes cast for the parliamentary system in each municipality. Municipal characteristics include: percentage of the population living in rural areas, population density (inhabitants/km²), state capital dummy, distance to the state capital, percentage of abstention, percentage of null votes and percentage of votes cast for the PMDB, the PSDB and the PT candidates in the 1994 presidential elections. The regressions reported in columns [1] and [4] include state fixed-effects, while those in the remaining columns include 440 micro-region fixed-effects. Additionally, the regressions reported in columns [3] and [6] include dummies for the mayor's party affiliation. The sample comprehends all municipalities with population less than 500,000 citizens. Standard errors clustered at the micro-region level are reported in brackets. ***, ** and * denote significance at 10%, 5% and 1%, respectively.

Table 1.3: OLS Regressions: Cross-section of Municipalities

| Dependent variable: parliamentary system (0/1) | method: | | | | | |
|---|---------------------|---------------------|---------------------|----------------------|---------------------|---------------------|
| | Logit [1] | Logit [2] | OLS [3] | Logit [4] | Logit [5] | OLS [6] |
| Trust in the congress: Very low | -0.243 ** [.115] | -0.251 ** [.116] | -0.045 ** [.019] | | | |
| Do you think that the members of the congress represent the interests of the population? No. | | | | -0.268 * [.144] | -0.258 * [.145] | -0.046 * [.023] |
| Do you follow the political news? Yes, frequently. | | 0.398 *** [.117] | 0.071 *** [.021] | | 0.410 *** [.117] | 0.074 *** [.021] |
| Do you think that elections are important to allow the population to have a say in what the government does? Yes, very important. | | -0.209 * [.125] | -0.039 * [.022] | | -0.182 [.125] | -0.034 [.022] |
| Ideology: from left to right (scale 0 -10) | -0.059 ** [.022] | -0.052 ** [.022] | -0.008 ** [.003] | -0.059 *** [.022] | -0.052 ** [.022] | -0.008 ** [.003] |
| Schooling: secondary | 0.371 *** [.132] | 0.338 ** [.133] | 0.057 ** [.023] | 0.381 *** [.132] | 0.345 *** [.133] | 0.058 ** [.023] |
| Schooling: superior | 0.619 *** [.179] | 0.499 *** [.184] | 0.099 *** [.037] | 0.627 *** [.179] | 0.504 *** [.184] | 0.100 *** [.037] |
| Household income: 2 - 5 min. wages | -0.056 [.156] | -0.052 [.158] | -0.013 [.022] | -0.037 [.157] | -0.034 [.158] | -0.009 [.022] |
| Household income: 5 - 10 min. wages | 0.282 * [.158] | 0.274 * [.160] | 0.043 [.026] | 0.297 * [.160] | 0.285 * [.161] | 0.045 * [.026] |
| Household income: 10 - 20 min. wages | 0.253 [.190] | 0.239 [.192] | 0.038 [.035] | 0.251 [.190] | 0.232 [.193] | 0.038 [.035] |
| Household income: > 20 min. wages | 0.448 ** [.226] | 0.376 [.229] | 0.076 * [.045] | 0.483 ** [.226] | 0.405 * [.229] | 0.082 * [.045] |
| municipality fixed-effects | Y | Y | Y | Y | Y | Y |
| individual characteristics | Y | Y | Y | Y | Y | Y |
| observations | 2,242 | 2,235 | 2,313 | 2,247 | 2,240 | 2,322 |
| pseudo-R2 | 0.05 | 0.05 | 0.06 | 0.05 | 0.05 | 0.05 |

Notes. This table reports logit and OLS regressions where the dependent variable is a dummy indicating whether the person intends to vote for the parliamentary system. The data used in the analysis refers to an opinion survey conducted by the Datafolha Institute in March 28th, 1993. Individual characteristics include: gender, age, age squared, two dummy variables indicating the candidate voted in the second round of the 1989's presidential elections (Fernando Collor de Mello or Luis Inacio Lula da Silva), two dummy variables indicating whether the person knows the name of the president and the name of the state's governor and four dummy variables indicating whether the person is religious, favors abortion, favors death penalty and serves in local communities. All regressions include municipal fixed-effects controlling for the place of residence of each subject. ***, ** and * denote significance at 10%, 5% and 1%, respectively.

Table 1.4: Survey Data

CHAPTER 2

Checks and Balances and Political Transparency

2.1. Introduction

The principle of checks and balances is a cornerstone of modern democracy. Originally proposed by Montesquieu in his "The Spirit of Laws", it establishes the idea that the state should be organized in such a way as to allow the different interests represented in it to control and check each other. According to Madison, an effective system of checks and balances works by so contriving "the interior structure of the government as that its several constituent parts may, by their mutual relations, be the means of keeping each other in their proper places" (Federalist Papers, LI, 1788). A well designed structure of checks and balances provides protection against the abuse of power by office-holders and prevents any single group of the society from unilaterally imposing its interests on others.

However, in spite of the classical arguments in favor of the principle, many examples can be found where this framework does not seem to perform as well as it would be to expect. For instance, Linz (1978) and Stepan and Skach (1993) attribute the institutional instability experienced by many Latin American countries to the political tensions generated by the system of separation of powers adopted

in these societies. Acemoglu, Robinson and Torvik (2011) also note that recent proposals to dismantle constitutional checks and balances on the executive have received strong popular support in several weakly-institutionalized societies such as Bolivia, Ecuador and, most notably, Venezuela.

Why do checks and balances work well in some cases but not in others? This paper studies the conditions under which a system of checks and balances is beneficial to citizens. In particular, we focus on the fundamental role played by political transparency, here defined as the ability of voters to observe the proposals submitted to congress during the legislative process. Our analysis shows that transparency is a necessary, but not sufficient, condition for the creation of an effective system of checks and balances and we identify the circumstances under which it leads to better policies in equilibrium. The model yields the surprising result that transparency may be harmful to voters depending on the characteristics of the social and political environment.

The main intuition is that political transparency allows voters to push their representatives to oppose any policy that is contrary to their interests. This increases the checks on the agenda setter, who is now faced with a stronger opposition in congress. There are two ways in which this tension may be resolved. First, the agenda setter may choose to obtain the necessary support for his proposal by satisfying the demands of the opposition, in which case the system of checks and balances leads to better policies in equilibrium (i.e. less political rents and better distribution of transfers). Alternatively, the agenda setter may simply choose to

push his proposal through congress by using political rents to "buy" the support of legislators against the interests of their constituencies, in which case the system of checks and balances leads to a "perverse" equilibrium, where the welfare of voters is diminished as a result of massive corruption.

The present paper builds on Persson, Roland and Tabellini (2000), henceforth PRT, who combine a legislative bargaining game in the style of Baron and Ferejohn (1989) with retrospective voting as in Barro (1973) and Ferejohn (1986). Their framework constitutes an attractive starting point for this study due to its simplicity and tractability. Our analysis identifies a particular aspect of their model's structure which can be interpreted as relying on a condition that voters do not observe the proposals made during the legislative bargaining process. By relaxing this assumption, we show that under certain circumstances a well functioning system of checks and balances can be created even without the division of the agenda-setting powers.

We consider a model with three groups of voters, each represented in congress by one legislator. At the beginning of every period, an agenda setter is selected among representatives to make a policy proposal specifying a common tax rate, transfers to each group of citizens and political rents to each legislator. The notion of a formal system of checks and balances is captured by the simple requirement that policies be approved by a majority of congress. Note that our concept of checks and balances is different than the one adopted by Persson, Roland and Tabellini (1997, 2000) in that we do not require that the agenda-setting power to

be split among different agents. At the end of the period, voters decide whether to reelect or not their representatives based on their performance in office, as in traditional models of retrospective voting (e.g. Ferejohn [1986]).

We solve the model under two alternative informational regimes. Under no political transparency, the equilibrium involves all transfers being targeted to the agenda setter's group. As shown by PRT, this remarkable result is a consequence of the fact that voters in non-agenda-setting constituencies engage in a Bertrand-style competition to be selected to the winning coalition, which leads both groups to accept zero transfers in equilibrium. As a result, the agenda setter and his group of voters are able to approve their policies with little opposition in congress. Indeed, we show that this equilibrium is similar to one which would have been obtained in a model without any checks and balances, where the agenda setter was allowed to directly implement policies, without being required to obtain congressional approval for his proposals.

Under political transparency, on the other hand, voters are able to observe the agenda setter's proposal once it is submitted to congress. This allows citizens in non-agenda-setting groups to compare the proposed policy with the status quo and, accordingly, to incentivize their legislators to either approve or reject it. Formally, the optimal voting rule of citizens in these groups is to reelect their representatives if, and only if, they approve (reject) a policy that is better (worse) than the status quo. As a consequence, the agenda setter and his voters face a stronger opposition

in congress and are now required to make some policy concessions, in the form of transfers or political rents, in order to get their desired legislation through congress.

Our analysis leads to an important insight about the nature of legislative bargaining. Note that, before the proposal is presented to congress, voters in the non-agenda-setting groups are engaged in a direct competition for a place in the majority coalition, so that all bargaining power is concentrated in the hands of the agenda setter. This mechanism is emphasized by Ferejohn (1986) and Persson, Roland and Tabellini (2000). However, as soon as the proposal is made, and assuming that it is observed by everyone, these same voters move to a bargaining position which allows them to decide whether to support or not the proposal depending on how it fares against the status quo. This mechanism is in the foundation of traditional models of legislative bargaining such as Baron and Ferejohn (1989). The present study provides a reconciliation between these two extreme views of the legislative process by highlighting the important role played by transparency in a representative democracy.

Our model shows that political transparency in connection with a formal system of checks and balances may lead to two different types of equilibria depending on how the disputes among citizens are resolved in society. The increased checks on the agenda setter and his group of voters may, on the one hand, induce a more balanced distribution of transfers and a reduction in the amount of political rents extracted by legislators. On the other hand, it may also lead to an equilibrium where transfers remain concentrated in the agenda setter's group, while political

rents increase as a result of its use as "grease" to facilitate the approval of policies. Our analysis shows that this "perverse" equilibrium is more likely to occur when the status quo is attractive to voters in the opposition, in which case the size of transfers required to obtain their support is very large, and when legislators do not place a high value in staying in office (i.e. when their discount factor is low), in which case it is very cheap to "buy" their support against the interests of their constituencies. Moreover, we argue that any factor that exacerbates the distributional conflict among social groups (e.g. ethnic and religious heterogeneity) is conducive to such an equilibrium.

The present paper is related to a number of studies that analyze the effect of the system checks and balances on political and institutional performance. The notion that checks and balances leads to a reduction in corruption is prevalent in the political economy literature (Persson, Roland and Tabellini [1997, 2000], Glaeser and Goldin [2004] and Besley, Persson and Reynal-Querol [2011]). Indeed, several papers provide support for the existence of such a relationship in the data, both across countries (La Porta et al. [2004]) and across states within a country (Alt and Lassen [2008] and Alston et. al. [2010]). The present paper adds to this literature by providing a formal framework to study the conditions under which a well functioning system of checks and balances is to be expected.

Our result that checks and balances may lead to an increase in the size of political rents in equilibrium may be viewed as surprising in some senses. Nonetheless, it is consistent with the observation that such systems often do not work well in

practice. Acemoglu, Robinson and Torvik (2011), for instance, argue that constitutional checks and balances may result in worse policies for voters by making politicians "cheaper" to be bribed by the members of an organized elite. The present paper provides an alternative view on this issue, emphasizing the importance of the interaction between transparency and the political environment on the way in which checks and balances operate in practice.

Our study is also connected to a literature on the effect of transparency on political outcomes. A number of recent papers have highlighted the fact that more information is not always beneficial to voters (Canes-Wrone, Herron and Shotts [2001], Maskin and Tirole [2004], Prat [2005] and Fox and Van Weelden [2011]). The main idea is that transparency may induce politicians to pander to the public, in which case they simply ignore potentially valuable private information in order to choose policies that are in accordance with the voters' prior beliefs. The present analysis adds to this literature by showing that political transparency, in the context of a model of representative democracy with checks and balances, is not necessarily optimal for voters. The mechanism behind our result is novel and emphasizes the fact that information about the legislative process exacerbates existing conflicts in the society, which may lead to an increase in corruption whenever political rents are used to push legislation through congress.

The remainder of this paper is organized as follows. Section 2.2 introduces the basic setup of the model and discusses its main assumptions. Section 2.3 solves for the subgame perfect Nash equilibrium of the model with and without political

transparency. Section 2.4 presents the main results of the paper and section 2.5 concludes.

2.2. Model

The basic set-up follows Persson, Roland and Tabellini (2000). Their framework combines legislative bargaining in the style of Baron and Ferejohn (1989) with a model of infinitely repeated elections, where voters hold their representatives accountable for their past performance, as in Ferejohn (1986). We consider a society with three groups (or districts), $i = 1, 2, 3$, each composed of a continuum of identical agents with measure one. The preference of a member of group i in period k is given by:

$$(2.1) \quad u_k^i = \sum_{t=k}^{\infty} \delta^{t-k} U^i(\mathbf{q}_t),$$

where $0 < \delta < 1$ is the discount factor and \mathbf{q}_t is the vector of policies implemented in period t . The per period utility of voters is:

$$(2.2) \quad U^i(\mathbf{q}_t) = 1 - \tau_t + f_t^i,$$

where τ_t is a common tax rate and f_t^i is the amount of transfers received by members of i .

Each group is represented in congress by one legislator, $l = i = 1, 2, 3$, with preference in period k given by:

$$(2.3) \quad v_k^l = \sum_{t=k}^{\infty} \delta^{t-k} V^l(\mathbf{q}_t) \phi_t^l,$$

where ϕ_t^l is an indicator variable that equals to unity if the agent holds office in period t and zero otherwise. The per period utility of legislators is:

$$(2.4) \quad V^l(\mathbf{q}_t) = s_t^l,$$

where s_t^l denotes the amount of political rents expropriated by l .

The policy vector is given by $\mathbf{q}_t = [\tau_t, \{f_t^i\}, \{s_t^l\}]$ and must satisfy the budget constraint:

$$(2.5) \quad f_t + s_t \leq 3\tau_t,$$

where $f_t \equiv \sum_{i=1}^3 f_t^i$ and $s_t \equiv \sum_{l=1}^3 s_t^l$.

Each representative is held accountable by members of his own group. It is assumed that legislators cannot commit to policy platforms prior to elections. This creates a moral hazard problem in that, once elected, they will have an incentive to expropriate rents as much as possible. In this context, voters are able to discipline their representatives only "retrospectively", by threatening not to reelect them at the end of the period. We assume that an incumbent who does not receive

the support of a majority of citizens in his group is replaced by a candidate with identical preferences and may never return to office again.

In each period, an agenda setter a is selected with equal probability among legislators and given the responsibility to make a proposal $\tilde{\mathbf{q}} = [\tilde{\tau}, \{\tilde{f}^i\}, \{\tilde{s}^l\}]$, specifying all elements of the policy vector. The proposal is, then, submitted to congress, where it can be either approved or rejected. A proposal is implemented if supported by at least one legislator other than the agenda setter; otherwise, a default policy \mathbf{q}^o is put in place, with $\tau^o = f^o + s^o$, $f^o \geq 0$ and $s^o = \sigma \geq 0$. Voters observe the role of each legislator in congress as well as the vector of implemented policies. At the end of the period, they decide whether to reelect or not their representatives.

The notion of a formal system of checks and balances is captured by the requirement that policies be approved by a majority of legislators in order to be implemented. This structure prevents any representative from unilaterally imposing his interests on others, as policy-making requires joint agreement among them. Observe that this view of checks and balances is different from the one adopted by Persson, Roland and Tabellini (1997, 2000) in that we do not require that the agenda-setting power be split among different legislators. Indeed, the condition that the agenda setter approves legislation in congress is compatible with any distribution of authority over the agenda.

To summarize, the timing of the events is as follows:

- (1) Nature randomly selects an agenda setter a among legislators.
- (2) The agenda setter proposes a vector of policies $\tilde{\mathbf{q}}$.
- (3) Congress votes. If at least one legislator other than the agenda setter supports the proposal, then it is implemented. Otherwise, a default policy \mathbf{q}^o is adopted, with $f^o \geq 0$ and $s^o = \sigma \geq 0$.
- (4) Elections are held.

A strategy for citizens is a retrospective voting rule, which specifies the conditions under which an incumbent legislator will receive their support at the time of elections. Persson, Roland and Tabellini (2000) suppose that citizens in each group commit to a voting strategy at the beginning of the period, after the institutional role of their representatives is realized and observed by all. Specifically, it is assumed that voters are unable to re-optimize their strategies at any subsequent stage of the game, even after new information about policies becomes available. The implicit assumption is that all actions taken during the legislative period, i.e. stages (2) and (3), are not observed by citizens, which guarantees that there is no incentive for them to re-optimize their strategies at these points. Furthermore, note that, once policies have been implemented, voters are indifferent between re-electing their representative or substituting him for another candidate, since both are identical by assumption. Therefore, they have no reason to re-optimize their strategies just before elections as well.

The present analysis highlights the importance of information about the legislative process, particularly the ability of voters to observe the agenda setter's proposal. We consider the impact of two informational regimes on the effectiveness of the system of checks and balances. First, under no political transparency, voters are unable to observe what occurs inside congress and the legislative process is a "black box". This situation corresponds to the case studied by PRT (section III) and serves as a benchmark for our analysis. Second, under political transparency, voters observe the agenda setter's proposal and are allowed to re-optimize their strategies conditional on this new information. Intuitively, the notion of transparency adopted in our model captures, in a reduced-form fashion, the formal rules regulating the policy-making process, the presence of a free press as well as the degree of political awareness of the population. Our main goal is to compare the quality of the implemented policies under these two cases.

2.3. Equilibrium

This section characterizes the equilibrium of the model under the two informational regimes described above. The analysis focuses on the set of stationary equilibria, where players are restricted to condition their strategies only on information available in the same period. Subsection 2.3.1 studies the case without political transparency, while subsection 2.3.2 analyzes the case with political transparency.

2.3.1. No Political Transparency

We start by characterizing the equilibrium of the model when the office-holders' actions are not observed. In this case, the reelection strategies formulated by voters at the beginning of the period are credible, given that no additional information is released until the vector of implemented policies is observed. Under no political transparency, the voting rules of citizens are made contingent on the institutional role of their representatives and specify reappointment if, and only if, the utility associated with the policy outcome \mathbf{q} exceeds a certain threshold b_i :

$$(2.6) \quad \phi_i(\mathbf{q}) = 1 \quad \text{iff } U_i(\mathbf{q}) \geq b_i$$

where b_i is set simultaneously by voters in each group.

We solve the stage game of the model for a subgame perfect Nash equilibrium. Proceeding by backward induction, we start by characterizing the optimal strategies of legislators. First, representatives m and n observe the agenda setter's proposal $\tilde{\mathbf{q}}$ and decide whether to approve or reject it, taking into account the strategies of voters in their groups. Formally, it is (weakly) dominant for them to approve a proposal $\tilde{\mathbf{q}}$ if, and only if,

$$(2.7) \quad \tilde{s}_i + \phi_i(\tilde{\mathbf{q}})\delta W \geq \sigma + \phi_i(\mathbf{q}^o)\delta W,$$

where W is the expected continuation value of legislators.¹

¹Observe that this is a strictly dominant strategy conditional on the legislator being pivotal.

The agenda setter, then, takes as given the optimal strategies of legislators m and n and decides which policy to propose. Observe that it is optimal for him to form a minimum winning coalition, setting $f_e = s_e = 0$ for the excluded group e , and to seek the support of the legislator whose approval is cheapest to obtain. Formally, the agenda setter proposes a policy $\tilde{\mathbf{q}}$ that maximizes his utility according to the following problem:

$$(2.8) \quad \max_{\tilde{\tau}, \{\tilde{f}_i\}, \{\tilde{s}_i\}} \tilde{s}_a + \phi_a(\tilde{\mathbf{q}})\delta W$$

$$s.t. \quad \begin{cases} \tilde{f} + \tilde{s} \leq 3\tilde{\tau} & (BC) \\ \tilde{s}_i + \phi_i(\tilde{\mathbf{q}})\delta W \geq \sigma + \phi_i(\mathbf{q}^o)\delta W & (IC_i) \end{cases}$$

Next, voters simultaneously choose their reelection strategies. For any voting rule of citizens in the agenda setter's group, members of m and n compete with each other to be part of the winning coalition. PRT show that this competition leads to an equilibrium where both groups demand zero transfers, $f_m = f_n = 0$, and their reservation utilities are set at $b_m = b_n = 1 - \tau$. The intuition for this result is akin to the Bertrand model of price competition: each groups' desire to be included in the winning coalition leads voters to undercut each other up to the point where transfers to both districts are zero.

Lemma 2.1 (PRT) *In equilibrium, $f_m = f_n = 0$ and $b_m = b_n = 1 - \tau$.*

Hence, the agenda setter is indifferent between which representative to choose as coalition partner. Suppose that m is selected. Notice that when $b_m = 1 - \tau$, the legislator is always reelected, even when the status quo is implemented. Therefore, it follows from (2.7) that it is a dominant strategy for him to approve a proposal $\tilde{\mathbf{q}}$ if, and only if:

$$(IC_m) \quad \tilde{s}_m \geq \sigma$$

Finally, voters in the agenda setter's group choose their reservation utility b_a , taking as given the optimal strategies of legislators and voters in other districts. Observe that the agenda setter has always the option to give up reelection and propose a policy that maximizes his own utility subject to the approval of legislator m , in which case we have $\tau' = 1$, $s'_m = \sigma$ and $s'_a = 3 - \sigma$. Thus, the incentive compatibility constraint on a must be such that:

$$(IC_a) \quad \tilde{s}_a + \delta W \geq 3 - \sigma,$$

which guarantees that, in equilibrium, the agenda setter always prefers to pursue reelection rather than to implement his outside option. Hence, voters in group a choose their reelection strategies so as to maximize their utility according to the following problem:

$$(2.9) \quad b_a \equiv \max_{\tau, \{f_i\}, \{s_i\}} 1 - \tau + f_a$$

$$s.t. \begin{cases} f + s \leq 3\tau & (BC) \\ s_a + \delta W \geq 3 - \sigma & (IC_a) \\ s_m \geq \sigma & (IC_m) \end{cases}$$

where the continuation value of legislators is defined recursively as:

$$(2.10) \quad W = \frac{s}{3} + \delta W$$

From (IC_a) and (IC_m) , it follows that the aggregate incentive compatibility constraint on office-holders is given by:

$$(2.11) \quad s \geq 3 - \delta W$$

At the optimum, this expression must hold with equality, so that the continuation value of legislators is given by $W = \frac{3}{3-2\delta}$ and the total amount of rents expropriated is:

$$(2.12) \quad s = 3 \frac{3 - 3\delta}{3 - 2\delta}$$

Furthermore, it is optimal for voters in a to set taxes to its maximum level, $\tau = 1$, with all transfers targeted to their own district:

$$(2.13) \quad f_a = \frac{3\delta}{3 - 2\delta}$$

The next proposition summarizes the main properties of the equilibrium under no political transparency.

Proposition 2.1 *Without political transparency, the unique stationary equilibrium is characterized by the following policies:*

$$\tau^{NT} = 1$$

$$s^{NT} = 3 \frac{3 - 3\delta}{3 - 2\delta}$$

$$f_a^{NT} = \frac{3\delta}{3-2\delta} \quad \text{and} \quad f_m^{NT} = f_n^{NT} = 0$$

$$b_a^{NT} = \frac{3\delta}{3-2\delta} \quad \text{and} \quad b_m^{NT} = b_n^{NT} = 0$$

All legislators are reelected.

Observe that these results are the same as those that would have been obtained in a model without checks and balances, where the agenda setter was allowed to directly implement policies, without being required to get congressional approval for his proposals. Notice that, in this case, the incentive compatibility constraint on legislator a would be given by:

$$(2.14) \quad s_a + \delta W \geq 3,$$

which captures the fact that the agenda setter is now able to keep all resources for himself when he decides not to pursue reelection. Moreover, observe that

representatives m and n would always get zero rents in equilibrium, $s_m = s_n = 0$, since they do not perform any role in this case. Thus, voters in the agenda setter's district would choose their reelection strategies so as to maximize their utility subject to the budget and the incentive compatibility constraint on legislator a :

$$(2.15) \quad b_a \equiv \max_{\tau, \{f_i\}, \{s_i\}} 1 - \tau + f_a$$

$$s.t. \quad \begin{cases} f + s \leq 3\tau & (BC) \\ s_a + \delta W \geq 3 & (IC_a) \end{cases}$$

This problem yields the same results as those derived in proposition 2.1, except that all rents are expropriated by the agenda setter, i.e. $s = s_a = 3\frac{3-\delta}{3-2\delta}$. Therefore, under no political transparency, the requirement that policies be approved in congress is inconsequential for the equilibrium and the system of checks and balances is ineffective in this case. Observe that this result follows from the agenda setter's ability to play the members of m and n against each other, so that he is, in effect, able to get policies through congress without any opposition. The next proposition summarizes this novel insight of our analysis.

Proposition 2.2 *The system of checks and balances is ineffective without political transparency.*

Persson, Roland and Tabellini (1997, 2000) argued that an effective system of checks and balances can be created by separating the agenda setting power among

different agents. This paper complements their analysis by focusing, instead, on the informational aspect of the problem. In particular, we show that political transparency may, under certain circumstances, lead to a well functioning system of checks and balances.

2.3.2. Political Transparency

We now proceed to analyze the model under political transparency. The main difference in this case is that voters are able to re-optimize their strategies after the agenda setter's proposal $\tilde{\mathbf{q}}$ is observed. This feature "breaks" the Bertrand competition between voters in districts m and n , given that the strategies required to support it as an equilibrium are no longer credible. As a consequence, political transparency increases the opposition faced by the agenda setter and voters in his district. Intuitively, citizens in m and n are now able to condition their strategies on the proposal $\tilde{\mathbf{q}}$, which allows them to push their representatives to oppose any policy that is worse than the status quo, \mathbf{q}^o .

We solve the stage game of the model for a subgame perfect Nash equilibrium. Proceeding by backward induction, we start by analyzing the optimal strategies of legislators m and n , after a policy $\tilde{\mathbf{q}}$ is proposed and observed by all. Each representative $i = m, n$ is subjected to a voting rule, $\phi_i(\tilde{\mathbf{q}}, v_i) \in \{0, 1\}$, which specifies whether he is reelected or not conditional on his vote on the proposal, $v_i \in \{0, 1\}$. In order to rule out some uninteresting cases where both legislators approve a policy against their own interests, we assume that office-holders always

behave as if they were pivotal. Thus, given voters' reelection strategies, it is dominant for legislator i to support the proposal, $v_i = 1$, if, and only if:

$$(2.16) \quad \tilde{s}_i + \phi_i(\tilde{\mathbf{q}}, 1) \delta W \geq \sigma + \phi_i(\tilde{\mathbf{q}}, 0) \delta W$$

After observing the agenda setter's proposal $\tilde{\mathbf{q}}$, voters in districts $i = m, n$ simultaneously choose their reelection strategies, $\phi_i(\tilde{\mathbf{q}}, v_i)$. Notice that it is in their interest to have a proposal implemented if, and only if, $U_i(\tilde{\mathbf{q}}) \geq U_i(\mathbf{q}^o) = 1 - \sigma$, in which case it is optimal for them to incentivize their representatives to approve it. A similar reasoning applies to the opposite situation, where $U_i(\tilde{\mathbf{q}}) < U_i(\mathbf{q}^o) = 1 - \sigma$, in which case voters would want their representatives to reject the proposal. The optimal reelection strategy of citizens in district i is, therefore, given by:

$$(2.17) \quad \begin{aligned} \phi_i(\tilde{\mathbf{q}}, 1) = 1 \text{ and } \phi_i(\tilde{\mathbf{q}}, 0) = 0 & \quad \text{if } U_i(\tilde{\mathbf{q}}) \geq 1 - \sigma \\ \phi_i(\tilde{\mathbf{q}}, 1) = 0 \text{ and } \phi_i(\tilde{\mathbf{q}}, 0) = 1 & \quad \text{if } U_i(\tilde{\mathbf{q}}) < 1 - \sigma \end{aligned}$$

that is, a legislator i is reelected if, and only if, he (i) votes in favor of a proposal that is better than the status quo (from the point of view of his voters) or (ii) rejects a proposal that is worse than the status quo.

Moving backwards, the agenda setter anticipates the optimal behavior of voters and legislators in districts m and n and proposes a policy $\tilde{\mathbf{q}}$ that maximizes his utility subject to the budget constraint and the approval of at least one legislator, say m , taking as given the reelection strategies of voters in his own district, $\phi_a(\tilde{\mathbf{q}}) \in$

$\{0, 1\}$. Formally, we have:

$$(2.18) \quad \tilde{\mathbf{q}} \in \arg \max_{\{\tilde{s}_i\}, \{\tilde{f}_i\}, \tilde{\tau}} \tilde{s}_a + \phi_a(\tilde{\mathbf{q}}) \delta W$$

$$s.t. \quad \begin{cases} \tilde{f} + \tilde{s} \leq 3\tilde{\tau} & (BC) \\ \tilde{s}_m + \phi_m(\tilde{\mathbf{q}}, 1) \delta W \geq \sigma + \phi_m(\tilde{\mathbf{q}}, 0) \delta W & (IC_m) \end{cases}$$

Observe that the agenda setter has two ways in which to satisfy the incentive compatibility constraint on legislator m :

A. First, he may propose a policy $\tilde{\mathbf{q}}$ such that $U_m(\tilde{\mathbf{q}}) = 1 - \sigma$, in which case $\phi_m(\tilde{\mathbf{q}}, 1) = 1$ and $\phi_m(\tilde{\mathbf{q}}, 0) = 0$, i.e. legislator m is reelected if, and only if, he approves the proposal, so that the incentive constraint on m can be re-expressed as:

$$(IC_m^A) \quad \tilde{s}_m + \delta W \geq \sigma$$

B. Second, he may propose a policy $\tilde{\mathbf{q}}$ such that $U_m(\tilde{\mathbf{q}}) = 0$, in which case $\phi_m(\tilde{\mathbf{q}}, 1) = 0$ and $\phi_m(\tilde{\mathbf{q}}, 0) = 1$, i.e. legislator m is reelected if, and only if, he rejects the proposal, so that the incentive constraint on m can be re-expressed as:

$$(IC_m^B) \quad \tilde{s}_m \geq \sigma + \delta W$$

Accordingly, there are two basic options available to the agenda setter when he decides not to pursue reelection: he may either (1) propose a policy \mathbf{q}'^1 such that $U_m(\mathbf{q}'^1) = 0$, with $\tau'^1 = 1$, $f'_m = 0$, $s'_m = \sigma + \delta W$ and $s'_a = 3 - (\sigma + \delta W)$, or (2) propose a policy \mathbf{q}'^2 such that $U_m(\mathbf{q}'^2) = 1 - \sigma$, with $\tau'^2 = 1$, $f'_m = 1 - \sigma$, $s'_m = \sigma - \delta W$ and $s'_a = 2 + \delta W$. As a result, the incentive compatibility constraint on the agenda setter may assume one of the following forms:

$$(IC_a^1) \quad s_a + \delta W \geq \underbrace{3 - (\sigma + \delta W)}_{s'_a}$$

or

$$(IC_a^2) \quad s_a + \delta W \geq \underbrace{2 + \delta W}_{s'_a} \rightarrow s_a \geq 2$$

depending on which of the alternatives turns out to be best for him.

Finally, voters in the agenda setter's district choose their reelection strategies, taking as given the optimal behavior of legislators and citizens in other districts. The voting rule is made conditional on the agenda setter's proposal $\tilde{\mathbf{q}}$ and is given by:

$$(2.19) \quad \phi_a(\tilde{\mathbf{q}}) = 1 \quad \text{iff } U_a(\tilde{\mathbf{q}}) \geq b_a$$

As before, the utility threshold b_a is chosen so as to maximize the voters' utility subject to the incentive compatibility constraint on the agenda setter and the

condition for congressional approval. At the optimum, voters choose between two types of strategies:

- i.* First, they may design their voting rules so as to induce the agenda setter to propose a policy $\tilde{\mathbf{q}}$ such that $U_m(\tilde{\mathbf{q}}) = 1 - \sigma$, in which case the incentive constraint on legislator m is $\tilde{s}_m + \delta W \geq \sigma$, as expressed above in (IC_m^A) .
- ii.* Second, they may design their voting rules so as to induce the agenda setter to propose a policy $\tilde{\mathbf{q}}$ such that $U_m(\tilde{\mathbf{q}}) = 0$, in which case the incentive constraint on legislator m is $\tilde{s}_m \geq \sigma + \delta W$, as expressed above in (IC_m^B) .

Formally, the equilibrium may fall in one of four different categories, each characterized by:

$$(2.20) \quad b_a \equiv \max_{\{s_i\}, \{f_i\}, \tau} 1 - \tau + f_a$$

$$s.t. \quad f + s \leq 3\tau \quad (BC)$$

subject to the following additional constraints:

- Case A.1 :

$$\left\{ \begin{array}{l} s_m + \delta W \geq \sigma \quad (IC_m^A) \\ s_a + \delta W \geq 3 - (\sigma + \delta W) \quad (IC_a^1) \\ U_m(\tilde{\mathbf{q}}) \geq 1 - \sigma \end{array} \right.$$

- Case *A.2* :

$$\begin{cases} s_m + \delta W \geq \sigma & (IC_m^A) \\ s_a \geq 2 & (IC_a^2) \\ U_m(\tilde{\mathbf{q}}) \geq 1 - \sigma \end{cases}$$

- Case *B.1* :

$$\begin{cases} s_m \geq \sigma + \delta W & (IC_m^B) \\ s_a + \delta W \geq 3 - (\sigma + \delta W) & (IC_a^1) \end{cases}$$

- Case *B.2* :

$$\begin{cases} s_m \geq \sigma + \delta W & (IC_m^B) \\ s_a \geq 2 & (IC_a^1) \end{cases}$$

Intuitively, voters in district *a* face a trade-off between transferring resources to citizens in *m* (cases *A.1* and *A.2*) and providing extra rents to legislator *m* (cases *B.1* and *B.2*), taking into account that representative *m* is not be reelected in the latter case. The next proposition characterizes the stationary subgame-perfect equilibrium for all possible parameter values.

Proposition 2.3 *Under political transparency, the unique stationary equilibrium is characterized by the following policies:*

- i. If $\delta \leq \frac{3-3\sigma}{7-\sigma}$, then the equilibrium falls into case B.1 and is characterized by the following policies:

$$\tau^{B.1} = 1$$

$$s^{B.1} = 3 \frac{3-2\delta}{3-\delta}$$

$$f_a^{B.1} = \frac{3\delta}{3-\delta} \quad \text{and} \quad f_m^{B.1} = f_n^{B.1} = 0$$

The continuation value of legislators is given by $W^{B.1} = \frac{3}{3-\delta}$ and only the representatives from districts a and n are reelected.

- ii. If $\frac{3-3\sigma}{7-\sigma} \leq \delta \leq \frac{1}{2} \left(\frac{17-5\sigma}{9} - \sqrt{\left(\frac{17-5\sigma}{9}\right)^2 - \frac{8(1-\sigma)}{3}} \right)$, then the equilibrium falls into case B.2 and is characterized by the following policies:

$$\tau^{B.2} = 1$$

$$s^{B.2} = (2 + \sigma) \frac{3-2\delta}{3-3\delta}$$

$$f_a^{B.2} = 3 - (2 + \sigma) \frac{3-2\delta}{3-3\delta} \quad \text{and} \quad f_m^{B.2} = f_n^{B.2} = 0$$

The continuation value of legislators is given by $W^{B.2} = \frac{2+\sigma}{3-3\delta}$ and only the representatives from districts a and n are reelected.

- iii. If $\frac{1}{2} \left(\frac{17-5\sigma}{9} - \sqrt{\left(\frac{17-5\sigma}{9}\right)^2 - \frac{8(1-\sigma)}{3}} \right) \leq \delta \leq \frac{1-\sigma}{2}$, then the equilibrium falls into case A.1 and is characterized by the following policies:

$$\tau^{A.1} = 1$$

$$s^{A.1} = 3(1 - \delta)$$

$$f_a^{A.1} = 3\delta - (1 - \sigma) \quad \text{and} \quad f_m^{A.1} = 1 - \sigma, \quad f_n^{A.1} = 0$$

The continuation value of legislators is given by $W^{A.1} = 1$ and all representatives are reelected.

iv. If $\delta \geq \frac{1-\sigma}{2}$, then the equilibrium falls into case A.2 and is characterized by the following policies:

$$\tau^{A.2} = 1$$

$$s^{A.2} = 3(1 - \delta) \frac{2 - \sigma}{3 - 2\delta}$$

$$f_a^{A.2} = \delta \frac{2+\sigma}{3-2\delta} \quad \text{and} \quad f_m^{A.2} = 1 - \sigma, \quad f_n^{A.2} = 0$$

The continuation value of legislators is given by $W^{A.2} = \frac{2+\sigma}{3-2\delta}$ and all representatives are reelected.

Figure 2.1 illustrates the region of the parameters where each class of equilibria can be obtained. Observe that the equilibrium of "type A" occurs when the values of σ (status quo rents) and δ (discount factor) are sufficiently large. This corresponds to a situation where the default policy is not attractive to citizens, i.e. $U_i(\mathbf{q}^o) = 1 - \sigma$ is low, in which case it is relatively cheap for the agenda setter to obtain the support of voters in the opposition. Moreover, when δ is large,

legislators place a significant value in staying in office, so that it is expensive to buy their vote against the interests of their constituents.

The next proposition shows that the aggregate amount of rents is smaller and the distribution of transfers more equitable when the equilibrium falls into cases A.1 and A.2.

Proposition 2.4 *Under political transparency, we have that:*

- i. The aggregate amount of rents is smaller when the equilibrium belongs to cases A.1 and A.2:*

$$s^A < s^B$$

- ii. The size of transfers received by voters in district m is larger when the equilibrium belongs to cases A.1 and A.2:*

$$f_m^A > f_m^B = 0$$

Figures 2.2 and 2.3 illustrate these results graphically by showing how the amount of rents expropriated in equilibrium vary as a function of the parameters σ and δ , respectively. Observe the existence of a sharp drop in political rents as one moves from a "type-B" to a "type-A" equilibrium. At this point, voters in the agenda setter's district are exactly indifferent between these two alternatives,

since the observed reduction in rents is offset by an equivalent increase in the size of transfers to citizens in m .

2.4. Main Results

This section compares the equilibria of the model with and without political transparency. Our goal is to derive conditions under which transparency is welfare improving for citizens. The main result is stated in the next proposition.

Proposition 2.5. *From the results derived in propositions 2.1 and 2.3, it follows that:*

- i. If, under political transparency, the equilibrium belongs to cases A.1 and A.2, then:*

$$s^T < s^{NT} \quad \text{and} \quad f_m^T > f_m^{NT} = 0$$

- ii. If, under political transparency, the equilibrium belongs to cases B.1 and B.2, then:*

$$s^T > s^{NT} \quad \text{and} \quad f_m^T = f_m^{NT} = 0$$

That is, political transparency leads to an improvement in the quality of policies, i.e. less rents and better distribution of transfers, provided that the equilibrium falls into category "A". Our analysis underlines the fact that the interaction

between transparency and checks and balances may result in two markedly different outcomes. While political transparency always leads to an increase in the opposition faced by the agenda setter and his group of voters, the mechanism through which this conflict is resolved depends on the political and social environment.² Intuitively, voters in the agenda setter's district may obtain the necessary support for their policies by either reaching a compromise with citizens in the opposition or by simply using political rents to push legislation through congress.

The first result is in line with the classical notion that checks and balances are always beneficial to the society, as argued by Montesquieu and Madison. Giving veto power to the opposition makes it more difficult for any particular group to impose their interests on others and, at the same time, restricts the ability of officeholders to extract rents. Our analysis complements this traditional view by showing that, under some circumstances, checks and balances and political transparency may actually lead to a "perverse" equilibrium, where political rents increase and transfers remain concentrated on a minority of voters. We show that this situation is more likely to occur in societies where (*i*) the status quo is favorable to voters in the opposition and (*ii*) legislators do not attach much value to staying in office.

²Interestingly, our result is related to Dahl (1956)'s argument on the importance of "social checks and balances", i.e. consensus on certain norms and values, for the performance of institutional checks and balances. According to him, "in the absence of certain social prerequisites, no constitutional arrangements can produce a non-tyrannical republic".

Proposition 2.6. *Voters are better off (in expected terms) under political transparency if, and only if, the equilibrium belongs to cases A.1 and A.2.*

Observe that, under an equilibrium of type "B", voters would actually benefit from a transition to a regime without political transparency or, equivalently, to a system without checks and balances (as discussed in proposition 2.2). This would, at least, make the support of legislators "cheaper" to buy, thus leading to a reduction in the overall political rents. Interestingly, our results provide an alternative explanation to Acemoglu, Robinson and Torvik (2011) as to why voters would want to dismantle a system of constitutional checks and balances.

2.5. Conclusion

This paper has studied the conditions under which a system of checks and balances is beneficial to citizens. We analyze this question in the context of a formal model where the notion of checks and balances is captured by the requirement that policies be approved by a majority of congress. Our study emphasizes the important role played by political transparency, here defined as the ability of voters to observe the proposals that are submitted to congress during the legislative process.

We show that, without political transparency, voters in the non-agenda-setting groups engage in a Bertrand-style competition in order to be included in the "winning coalition". As a result, the agenda setter and his group of voters are able to

obtain approval for their policies with little opposition in congress. Under political transparency, on the other hand, citizens observe the agenda setter's proposal and are able to decide whether to support it or not depending on how it compares with the status quo. As a consequence, the agenda setter and his voters face a stronger opposition in congress and are now required to make some policy concessions in order to get their legislation approved.

Intuitively, political transparency exacerbates the conflict among different social groups by increasing the checks on the agenda setter. There are two ways in which this tension may be resolved in the society. First, the agenda setter and his group of voters may choose to obtain the necessary support for their policies by satisfying the demands of the opposition, in which case the system of checks and balances leads to a better distribution of transfers and to less political rents in equilibrium. Alternatively, the agenda setter and his voters may simply choose to push their proposal through congress by using political rents to "buy" the support of legislators against the interests of their constituencies, in which case transfers remain concentrated with the agenda setter's group and political rents increase. We show that such "perverse" equilibrium is more likely to occur when the status quo is attractive to the opposition and when legislators do not place a high value in staying in office.

The present analysis could be extended in a number of directions. First, it would be interesting to consider the implications of the model in an environment

where heterogeneity across social groups (e.g. income inequality and ethnic conflict) was explicitly incorporated into the framework (Bandiera and Levy [2011]). Second, the basic model could be used to analyze whether the introduction of certain constitutional measures, e.g. a restriction on how transfers should be distributed across groups, would help to improve the effectiveness of checks and balances. Third, the analysis could be made more realistic by exploring the role of pork barrel spending, instead of political rents, as the means of obtaining legislative support in congress (Drazen and Ilzetzki [2011]). Fourth, it would be interesting to consider a dynamic version of the model where the status quo was allowed to be endogenously determined by previous policies (Baron [1996], Kalandrakis [2004], Bernheim, Rangel and Rayo [2006] and Nunnari [2011]). Fifth, our analysis leads to novel theoretical predictions that could be tested using appropriate data. We plan to explore these possibilities in our future research.

2.6. Figures

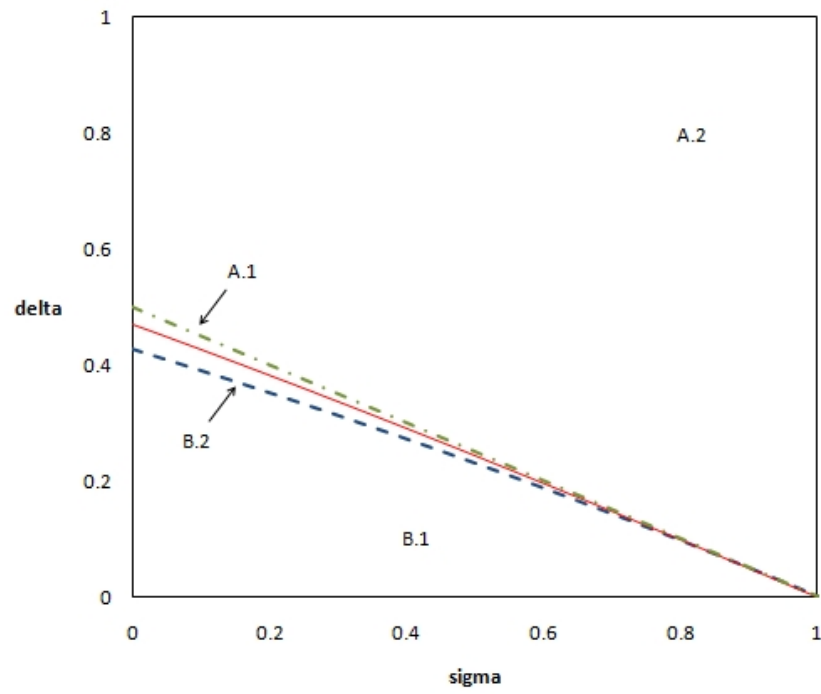
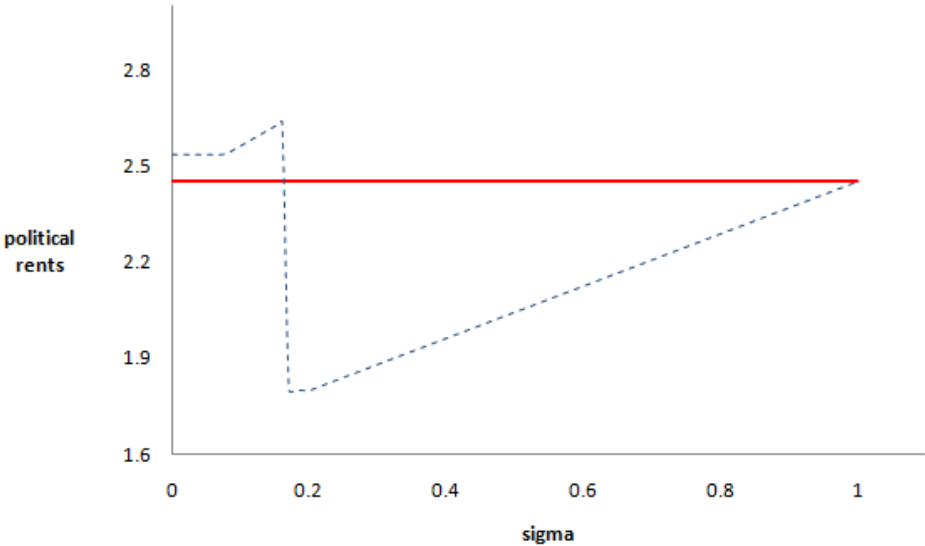
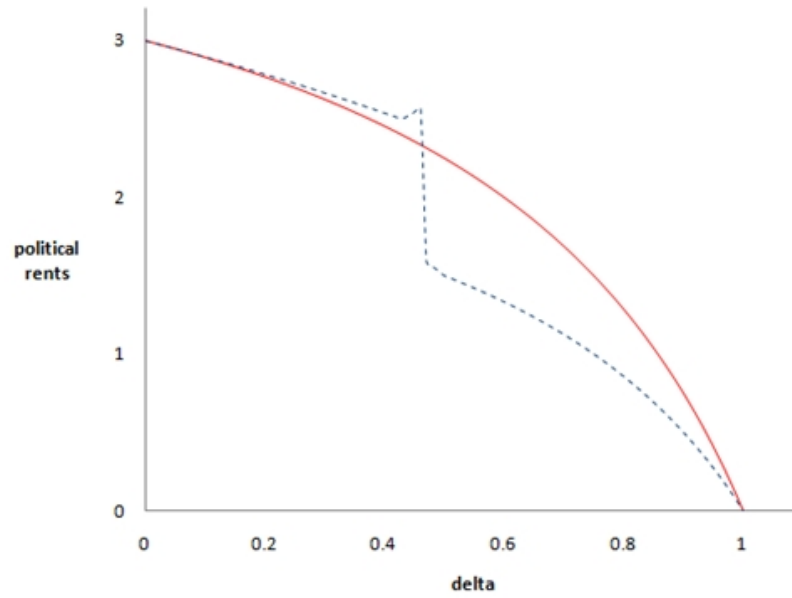


Figure 2.1: Classes of Equilibria



Note. This figure depicts the total amount of political rents expropriated in equilibrium as a function of σ . It is assumed that $\delta = 0.4$. The dotted line represents the equilibrium under political transparency, while the solid line represents the equilibrium under no political transparency.

Figure 2.2: Political Rents as a Function of σ



Note. This figure depicts the total amount of political rents expropriated in equilibrium as a function of δ . It is assumed that $\sigma = 0.1$. The dotted line represents the equilibrium under political transparency, while the solid line represents the equilibrium under no political transparency.

Figure 2.3: Political Rents as a Function of δ

CHAPTER 3

Public versus Secret Voting in Committees**3.1. Introduction**

Committee decision-making is a central element of many political and economic organizations, including governments, legislative bodies and private companies. A common view in the literature is that group decision-making provides an efficient way to aggregate disperse information and to mitigate the interference of individual biases in the decision.¹ The issues confronted by committees are often complex and involve a variety of specific interests. Moreover, there are many situations in which the interests of its members may not be aligned with the goals of the organization as a whole. Consider, for instance, the case of a company deciding whether to downsize a particular division, legislators voting on an electoral reform (which may be harmful or beneficial to some of them) or an academic department deciding which candidate to hire.

This paper studies a committee decision-making problem with career-oriented agents who may be biased towards one of the available alternatives. We focus,

¹See Li and Suen (1999) and Gerling et al. (2005) for reviews of this literature.

in particular, on the impact of transparency on the decisions made by the committee. Our main question is whether the individual votes of members should be made public or not, i.e. whether voting should be transparent or secret. A number of papers in the literature have shown that transparency may lead to worse outcomes by creating an incentive for agents to distort their behavior in order to convey information about their types (see, for instance, Morris [2001], Maskin and Tirole [2004] and Prat [2005]). Stasavage (2004), Levy (2007) and Gersbach and Hahn (2008) obtain similar results in the context of decision-making in committees. Specifically, Levy (2007) shows that transparency induces agents to vote too much against the prior (i.e. the ex-ante more likely alternative) in order to signal that they have accurate information about the state of the world.

The main innovation of our paper with respect to the previous literature is to consider an environment where agents are heterogenous in two dimensions, competence and preferences. We investigate how the interaction between career concerns and bias affects the behavior of members and how this effect depends on transparency. Our analysis highlights that the desire to accumulate reputation for making correct decisions leads to qualitatively different implications depending on the agent's competence level and the magnitude of the bias term relative to the common value. Specifically, we show that, for high degrees of bias, reputation concerns act to "correct" the vote of competent members who otherwise would have simply voted according to their personal interests; while, for low degrees of bias, these same concerns induce the incompetent members to vote for their biases,

even though they would otherwise have preferred to abstain. Intuitively, when the common value is sufficiently large, it is optimal for the uninformed members to abstain, since by doing so they "delegate" the decision to the competent agents. Note, however, that such behavior affects their reputation negatively, since abstentions are always viewed as evidence of low ability. This creates an incentive for the incompetent members to vote and, when they do so, they always choose the alternative towards which they are biased. Interestingly, therefore, our model generates the result that career concerns may actually exacerbate the pre-existing biases of incompetent members.

We, therefore, show that public voting may lead to better results when the magnitude of the bias is large relative to the common value, in which case transparency helps to mitigate the influence of private interests on the decisions. Conversely, secret voting perform may better when the intensity of the bias is relatively small, in which case the non-observability of individual votes reduces the incentives for uninformed members to vote just in order to avoid revealing their incompetence. The model generates detailed predictions about the parameter regions where secret and public voting are expected to lead to different outcomes and how transparency should affect the behavior of each of type agent, even though more work is still needed in order to ascertain how the existence of multiple equilibria affects our results. We also discuss possible ways in which these theoretical implications could be tested in a laboratory experiment, which we plan to conduct in future work.

The present paper is related to a number of studies in the literature that have compared the performance between public and secret voting in committees. Levy (2007) and Gersbach and Hahn (2008a) examine models where agents care about acquiring a reputation for competence. They show that secret voting leads to better decisions by reducing distortions arising from signaling considerations. Gersbach and Hahn (2004) and Stasavage (2004), on the other hand, analyze a setting where committee members may be misaligned with the interests of society, but also care about being perceived as "unbiased" to the extent that this enhances their reelection prospects. They show that transparency is optimal in this case, since it induces agents to act in accordance with the public interest. The main distinction of our analysis with respect to these papers is that we consider a model where agents are both biased and care about building a reputation for high ability. We study how these elements interact with each other without imposing that individual biases per se are punished by the principal.

Other interesting papers in the committee decision-making literature include Gersbach and Hahn (2008b), who show that transparency induces agents to exert more effort in order to improve their chances of reappointment, Dal Bo (2007) and Felgenhauer and Gruner (2008), who argue that public voting makes the committee more vulnerable to the influence of special interest groups, and Visser and Swank (2007), who point out that reputational concerns create an incentive for committees to conceal internal disagreements and show a united front in public.

The remainder of this paper is organized as follows. Section 3.2 describes the model and its main assumptions. Section 3.3 solves for the equilibrium under public and secret voting and section 3.4 presents the main results of the paper. Section 3.5 discusses some implications for a laboratory experiment, while section 3.6 considers possible extensions and directions for future research. Section 3.7 concludes. All formal proofs are collected in appendix C.

3.2. Model

We consider a committee of $n \geq 3$ members, $i \in \{1, \dots, n\}$ with $n \in \mathbb{Z}_+$ odd, which needs to decide between two alternatives, A and B . The state of the world is given by $\omega \in \{A, B\}$, with prior probability $\Pr(\omega = A) = \frac{1}{2}$. While the true state is unknown, members may receive an informative signal about it. An agent can either be *competent*, $t_i = \mathbf{c}$, in which case he receives a perfectly informative signal, or *incompetent*, $t_i = \mathbf{nc}$, in which case he does not receive any information at all. We assume that each member knows his own type t_i and that the distribution of agents' abilities is common knowledge and given by $\Pr(t_i = \mathbf{c}) = \sigma$. After observing their private signals, all members decide simultaneously whether to vote for A or B or to abstain, $v_i \in \{A, B, \emptyset\}$. The final choice, $x \in \{A, B\}$, is determined by majority rules and ties are broken randomly.

The committee members care about making the correct decision and they receive a common value $\alpha \geq 0$ when the final choice is consistent with the state of the world, i.e. $x = \omega$. Additionally, agents may also be biased towards one of the

alternatives. For simplicity, we assume that each member is either biased towards A or B with equal probability (that is, all members are biased in one way or another).² An agent biased towards $\theta \in \{A, B\}$, receives additional utility $\gamma \geq 0$ whenever alternative $x = \theta$ is selected, irrespective of the state of the world.

Moreover, the committee members are also concerned about being perceived as competent. Formally, we assume the existence of an additional agent, an external evaluator, who simply updates his beliefs about the competence level of each member, conditional on the state of the world, which is always revealed, and any other information that might be available to him. Specifically, we consider two possible institutional settings: (i) under *public voting*, the votes of each committee member are observed, while (ii) under *secret voting*, only the final voting outcome (i.e. the number of abstentions and votes for each alternative) is observed. The posterior probability that an agent i is competent is, thus, given by $r_i^\mu \equiv \Pr(t_i = c | \omega, \mathcal{I}^\mu)$, where ω is the state of the world and \mathcal{I}^μ represents the additional information available, depending on whether the committee is public or secret, $\mu \in \{\mathbf{p}, \mathbf{s}\}$.

The utility of each committee member i is, therefore, given by:

$$(3.1) \quad U_i^{\theta, \mu} = \phi r_i^\mu + \mathbb{I}_{\{x=\omega\}}\alpha + \mathbb{I}_{\{x=\theta\}}\gamma,$$

where $\theta \in \{A, B\}$ denotes the alternative towards which the agent is biased, $\mu \in \{\mathbf{p}, \mathbf{s}\}$ represents whether the committee is public or secret, ϕ is a parameter

²The main qualitative results of the model would remain unchanged even if we allowed for the existence of "independent" types among committee members.

that measures the importance associated with reputational concerns and $\mathbb{I}_{\{\cdot\}}$ is an indicator function which equals unity if the condition inside brackets is satisfied and zero otherwise.

3.3. Equilibrium

Given our interest in studying the conditions under which transparency leads to better decisions, our analysis focuses primarily on the following class of symmetric equilibrium, which we call competent equilibrium.

Definition 3.1 *A competent equilibrium is such that all competent members vote according to the state of the world.*

Thus, in a competent equilibrium all competent agents vote for the "correct" alternative, regardless of their biases. Observe that there are two possible subclasses of this equilibrium, namely: (i) *fully competent equilibrium*, where all incompetent members abstain and (ii) *partially competent equilibrium*, where all incompetent members vote for their preferred alternative. In the remainder of this section, we provide a characterization of the parameter region for which this equilibrium can be sustained under public (subsection 3.3.1) and secret voting (subsection 3.3.2). We, then, compare the performance of these two schemes in terms of their potential to generate correct decisions (section 3.4).

3.3.1. Public Voting

Suppose, first, that voting is public, so that the actions of every committee member, $v_i \in \{A, B, \emptyset\}$, are observable. Note that in a competent equilibria no informed member ever abstains or votes against the state of the world, so that $r_i^P(v_i \neq \omega) = 0$. Furthermore, the reputation associated with a correct vote depends on the incompetent types' behavior. If these members abstain in equilibrium, then $r_i^P(v_i = \omega) = 1$, i.e. a correct vote fully reveals competence, while if they vote for their preferred alternative, then $r_i^P(v_i = \omega) = \frac{\sigma}{\sigma + \frac{1}{2}(1-\sigma)}$, i.e. reputation is equal to the expected fraction of competent members among those who vote correctly. Table 3.1 summarizes the reputation levels associated with each possible strategy under both types of competent equilibria.

The necessary conditions for the existence of a fully competent equilibrium are that: (i) all competent members who are biased against the state of the world, $\theta \neq \omega$, prefer to vote correctly rather than to abstain or vote incorrectly and (ii) all incompetent members prefer to abstain rather than to vote for their preferred alternative.³ We show that, in equilibrium, these two conditions are given, respectively, by:⁴

$$(3.2) \quad \gamma \leq \alpha + \frac{1}{\left(1 + \frac{n-3}{2}\sigma\right) (1-\sigma)^{n-2}} \phi$$

³Note that the symmetric prior assumption, $\Pr(\omega = A) = \frac{1}{2}$, guarantees that, conditional on voting, all incompetent members prefer to vote according to their biases.

⁴See appendix C for the derivation of these conditions.

and

$$(3.3) \quad \gamma \leq \frac{(n-1)\sigma}{2+(n-3)\sigma} \alpha - \frac{1}{\left(1 + \frac{n-3}{2}\sigma\right) (1-\sigma)^{n-2}} \phi$$

Note that, since $\frac{(n-1)\sigma}{2+(n-3)\sigma} \leq 1$, the last constraint is always harder to satisfy, i.e. it is more difficult to induce the incompetent members to abstain rather than to make the competent members vote correctly. It, then, follows from condition (3.3) that a fully competent equilibrium can never be supported whenever the bias term is larger than the common value, $\gamma > \alpha$. Furthermore, it is interesting to observe that, as the importance attached to reputation concerns, ϕ , increases, it becomes less attractive for the uninformed agents to abstain, given that such behavior perfectly reveals their incompetence.

Next, we proceed to study the conditions for the existence of a partially competent equilibrium. In this case, the constraints that need to be satisfied are: (i) all competent members who are biased against the state of the world, $\theta \neq \omega$, must prefer to vote correctly rather than to abstain or vote incorrectly and (ii) all incompetent members must prefer to vote for their preferred alternative rather than to abstain. It is possible to show that the latter condition always holds in this case. Note that the main reason for an incompetent member to abstain is to avoid adding "noise" to the decision, which makes it less likely that the correct outcome is obtained.⁵ However, given that all other incompetent members are, in any case,

⁵This idea is in line with Feddersen and Pesendorfer (1996)'s *swing voter's curse*.

voting for their preferred alternatives, it becomes optimal for each one of them to vote as well.

The condition that guarantees that all competent types prefer to vote according to the state of the world is given by:

$$(3.4) \quad \gamma \leq \alpha + \frac{2^n \sigma}{\binom{n-1}{(n-1)/2} (1 + \sigma)^{\frac{n-1}{2}+1} (1 - \sigma)^{\frac{n-1}{2}}} \phi$$

As before, this constraint imposes that the bias term, γ , cannot be too large. Contrarily to the previous case, however, it is still possible to sustain a partially competent equilibrium even if $\gamma > \alpha$, provided that ϕ is sufficiently large. The intuition is that reputation concerns create an extra incentive for the competent, but biased, members to vote for the correct alternative. Thus, an increase in ϕ tends to make it easier to sustain this class of equilibrium.

The following proposition summarizes the main results of this subsection.

Proposition 3.1 *Under public voting, a fully competent equilibrium can be supported if and only if:*

$$(3.5) \quad \gamma \leq \bar{\gamma}_{full}^p = \frac{(n-1)\sigma}{2 + (n-3)\sigma} \alpha - \frac{1}{\left(1 + \frac{n-3}{2}\sigma\right) (1 - \sigma)^{n-2}} \phi,$$

while a partially competent equilibrium can be supported if and only if:

$$(3.6) \quad \gamma \leq \bar{\gamma}_{part}^p = \alpha + \frac{2^n \sigma}{\binom{n-1}{(n-1)/2} (1 + \sigma)^{\frac{n-1}{2}+1} (1 - \sigma)^{\frac{n-1}{2}}} \phi$$

Moreover, since $\frac{(n-1)\sigma}{2+(n-3)\sigma} \leq 1$, it follows that:

$$(3.7) \quad \bar{\gamma}_{full}^P < \bar{\gamma}_{part}^P$$

Therefore, whenever a fully competent equilibrium can be sustained, then a partially competent equilibrium can be sustained as well.

Figure 3.1 provides a characterization of the values of the parameters α and γ for which each type of competent equilibrium may occur under public voting, assuming $n = 3$, $\sigma = 0.5$ and $\phi = 2$. As derived above, note that the region where a fully competent equilibrium exists is contained in that where a partially competent equilibrium can be sustained. Furthermore, there is a mixed strategy equilibrium where the competent members vote correctly and the incompetent agents randomize between voting and abstaining if, and only if, both the fully and the partially competent equilibria can be supported.⁶ Finally, we observe that if the parameter values are such that a competent equilibrium does not exist, then it is always possible to sustain an equilibrium where all agents simply vote according to their biases. More generally, it is possible to show that such equilibrium, which we call *biased equilibrium*, can be sustained whenever $\gamma \geq \alpha$.

⁶Intuitively, the equilibrium structure in this region is similar to that of a simple coordination game, where all incompetent members either vote, abstain or mix between these two.

3.3.2. Secret Voting

Now, suppose that voting is secret, so that only the aggregate number of abstentions and votes for each alternative are observed. In this case, the reputation of each agent is identical across members and corresponds to the expected level of competence in the committee. As discussed above, in a competent equilibrium, no competent member ever abstains or votes against the state of the world, so that the observation of m incorrect votes or abstentions, i.e. $m = \sum_{i=1}^n \mathbb{I}_{\{v_i \neq \omega\}} + \sum_{i=1}^n \mathbb{I}_{\{v_i = \emptyset\}}$, perfectly reveals that there are at least m incompetent individuals in the committee. Thus, under a fully competent equilibrium, the expected reputation of each agents is given by:

$$(3.8) \quad r^s = \frac{1}{n} \sum_{i=1}^n \mathbb{I}_{\{v_i = \omega\}},$$

since all incompetent members abstain in this case, while in a partially competent equilibrium we have:

$$(3.9) \quad r^s = \frac{\sigma}{\sigma + \frac{1}{2}(1 - \sigma)} \frac{1}{n} \sum_{i=1}^n \mathbb{I}_{\{v_i = \omega\}},$$

since, in this case, the fraction of competent members among those who vote correctly is $\frac{\sigma}{\sigma + \frac{1}{2}(1 - \sigma)}$.⁷

⁷Observe that the unconditional expectation of r^s is always equal to σ , $\mathbb{E}(r^s) = \sigma$, since $\mathbb{E}(\mathbb{I}_{\{v_i = \omega\}}) = \Pr(v_i = \omega) = \sigma$ in a fully competent equilibrium and $\mathbb{E}(\mathbb{I}_{\{v_i = \omega\}}) = \Pr(v_i = \omega) = \sigma + \frac{1}{2}(1 - \sigma)$ in a partially competent equilibria.

Following a similar argument as before, it is possible to show that a necessary condition for the existence of a fully competent equilibria is given by:

$$(3.10) \quad \gamma \leq \frac{(n-1)\sigma}{2+(n-3)\sigma} \alpha - \frac{1}{\left(1 + \frac{n-3}{2}\sigma\right) (1-\sigma)^{n-2}} \frac{\phi}{n},$$

which guarantees that all incompetent members prefer to abstain rather than to vote for their preferred alternative. The main difference with respect to public voting (see expression (3.5) above) is that the term ϕ , which captures the importance associated with reputation, is now divided by the number of committee members, n . Intuitively, under secret voting, the impact of an agent's vote on his own reputation is diluted in proportion to the size of the committee, given that the evaluator is unable to observe the members' individual actions. Note that this effect makes it easier to sustain a fully competent equilibrium, since it reduces the incentive for an incompetent member to vote just in order to avoid being perceived as uninformed.

Next, we can show that a necessary condition for the existence of a partially competent equilibrium is given by:

$$(3.11) \quad \gamma \leq \alpha + \frac{2^n \sigma}{\binom{n-1}{(n-1)/2} (1+\sigma)^{\frac{n-1}{2}+1} (1-\sigma)^{\frac{n-1}{2}}} \frac{\phi}{n},$$

which guarantees that all competent members prefer to vote in accordance with the state of the world rather than to abstain or vote incorrectly. As before, the only difference with respect to public voting (see expression (6) above) is that the

term ϕ is now divided by n . Observe that, in this case, secrecy makes it harder to sustain a partially competent equilibrium, given that it reduces the agents' exposure to the "checks" of the evaluator. Specifically, a competent member who is biased against the current state of the world now has much less incentive to vote correctly, since the reputational gains of doing so are diluted across all agents.

The following proposition summarizes the main results of this subsection.

Proposition 3.2 *Under secret voting, a fully competent equilibrium can be supported if and only if:*

$$(3.12) \quad \gamma \leq \bar{\gamma}_{full}^s = \frac{(n-1)\sigma}{2+(n-3)\sigma}\alpha - \frac{1}{\left(1 + \frac{n-3}{2}\sigma\right)(1-\sigma)^{n-2}}\frac{\phi}{n},$$

while a partially competent equilibrium can be supported if and only if:

$$(3.13) \quad \gamma \leq \bar{\gamma}_{part}^s = \alpha + \frac{2^n\sigma}{\binom{n-1}{(n-1)/2}(1+\sigma)^{\frac{n-1}{2}+1}(1-\sigma)^{\frac{n-1}{2}}}\frac{\phi}{n}$$

Moreover, since $\frac{(n-1)\sigma}{2+(n-3)\sigma} \leq 1$, it follows that:

$$(3.14) \quad \bar{\gamma}_{full}^s < \bar{\gamma}_{part}^s$$

Therefore, whenever a fully competent equilibrium can be sustained, then a partially competent equilibrium can be sustained as well.

Figure 3.2 provides a characterization of the values of the parameters α and γ for which each type of competent equilibrium may occur under secret voting, assuming $n = 3$, $\sigma = 0.5$ and $\phi = 2$. As before, it is possible to show that there is a mixed strategy equilibrium where the competent members vote correctly and the incompetent agents randomize between voting and abstaining if, and only if, both types of competent equilibria can be supported. Moreover, it is always possible to sustain a biased equilibrium, where agents simply vote according to their biases, whenever $\gamma \geq \alpha$.

3.4. Main Results

We now present the main comparative results of our analysis, focusing on the parameter regions where each type of competent equilibria can be sustained under public and secret voting. The next proposition presents our main conclusions.

Proposition 3.3 *If $\gamma \geq \alpha$, then it follows that:*

- i. A fully competent equilibria can never be sustained.*
- ii. Whenever a partially competent equilibria exists under secret voting, then it is also exists under transparent voting, i.e. $\bar{\gamma}_{part}^p > \bar{\gamma}_{part}^s$.*

If, in turn, $\gamma < \alpha$, then it follows that:

- i. A partially competent equilibria can always be sustained.*
- ii. Whenever a fully competent equilibria exists under public voting, then it is also exists under secret voting, i.e. $\bar{\gamma}_{full}^p < \bar{\gamma}_{full}^s$.*

Our analysis shows that whenever the bias term is large relative to the common value, $\gamma \geq \alpha$, then the uninformed agents can never be expected to abstain in a competent equilibrium, given that voting allows them to both push the decision towards their preferred alternative and to obtain higher reputation rewards in expectation. Furthermore, in this case, the existence of reputation concerns help to counter-balance the effect of the bias term by inducing the competent agents to vote correctly in order to signal their ability. Thus, when $\gamma \geq \alpha$, the parameter region where a partially competent equilibrium can be sustained is larger under public voting, so that transparency can be expected to result in better decisions by the committee.

On the other hand, we also show that if the common value is large relative to the bias term, $\gamma < \alpha$, then it is always possible to support a partially competent equilibrium. Intuitively, in this case, it is advantageous for a competent member to vote according to the state of the world both because the common value is dominant and the reputation associated with a correct vote is larger. Furthermore, observe that even though all committee members agree that the best decision is $x = \omega$, the existence of reputation concerns creates an incentive for the incompetent agents to vote according to their biases, since abstaining perfectly reveals their type. As a result, the parameter region where a fully competent equilibrium can be sustained is smaller under public voting. It is interesting to note that, in this case, transparency acts in such a way as to exacerbate the incompetent agents' pre-existing biases, leading to worse decisions by the committee.

Figure 3.3 summarizes the main aspects of our results. It shows that the impact of transparency on the quality of committee decisions depends on the size of the bias relative to the common value. Specifically, a partially competent equilibrium can be sustained under public but not under secret voting in Region I, where $\gamma \geq \alpha$, while a fully competent equilibrium can be sustained under secret but not public voting in Region II, where $\gamma < \alpha$. Furthermore, it is possible to show that the effect of transparency gets amplified, for better or worse, as the importance of reputation, ϕ , increases. Figure 3.4 shows that Regions I and II get larger as ϕ increases. Formally, we have the following comparative static result:

$$(3.15) \quad \begin{cases} \bar{\gamma}_{part}^p - \bar{\gamma}_{part}^s > 0 \text{ and } \frac{\partial}{\partial \phi} \{ \bar{\gamma}_{part}^p - \bar{\gamma}_{part}^s \} > 0 & \text{when } \gamma \geq \alpha \\ \bar{\gamma}_{full}^p - \bar{\gamma}_{full}^s < 0 \text{ and } \frac{\partial}{\partial \phi} \{ \bar{\gamma}_{full}^p - \bar{\gamma}_{full}^s \} < 0 & \text{when } \gamma < \alpha \end{cases}$$

Our analysis yields some possibly interesting implications for the design of committee decision-making rules. The model emphasizes the idea that voting should be transparent in committees where the decisions are highly subjected to the influence of ideological or self-interested motives from the part of its members. This is often the case in congressional committees and board of directors of large organizations, where there is usually a diversity of specific interests involved in each decision. Another example is that of a hiring committee in an academic department, where members are sometimes biased towards candidates in their own field. Conversely, voting should be kept secret when the dissent among members,

due to individual biases, is relatively small, as in the case of a jury in a criminal case or a department considering changes in its undergraduate curriculum.

3.5. Testing the Theory: Implications for a Laboratory Experiment

This section discusses how the main implications of our theory could be tested in a laboratory experiment, which we plan to conduct in future work. A first basic result of our analysis is that the probability with which the correct decision is obtained depends on the parameter values. In particular, the likelihood of a correct outcome under a fully and a partially competent equilibrium is given, respectively, by:

$$(3.16) \quad P_{full} = 1 - \frac{1}{2}(1 - \sigma)^n$$

and

$$(3.17) \quad P_{part} = \sum_{i=\frac{n+1}{2}}^n \binom{n}{i} \left(\sigma + \frac{1}{2}(1 - \sigma)\right)^i \left(\frac{1}{2}(1 - \sigma)\right)^{n-i}$$

Furthermore, when all members simply vote according to their biases, we have:

$$(3.18) \quad P_{bias} = \frac{1}{2}$$

It is, then, possible to show that $P_{full} > P_{part} > P_{bias}$.⁸ Thus, from a welfare perspective, the best equilibrium is one in which all competent members vote correctly and all incompetent members abstain. Figure 3.5 depicts the probabilities with which we expect to obtain a correct decision for different regions of the parameters α and γ . Assuming that $n = 3$, $\sigma = 0.5$ and $\phi = 2$, we have $P_{full} = 0.94$, $P_{part} = 0.84$ and $P_{bias} = 0.5$. Our predictions are summarized in table 2. Note that, for a given voting rule, the probability of a correct outcome is (weakly) decreasing in γ and (weakly) increasing in α .

Another implication of our analysis is that there is a difference among the values of the parameter where each type of equilibrium can be supported under secret and public voting. In general, public voting is expected to perform better when $\gamma \geq \alpha$, while secret voting leads to better outcomes when $\gamma < \alpha$. Assuming that $n = 3$, $\sigma = 0.5$ and $\phi = 2$, it is possible to derive even sharper predictions. Figure 3.6 identifies the region of the parameters where the performance of public and secret voting can be expected to be different. Table 3.3 provides a summary of our main predictions: (i) the performance of both voting rules is expected to be the same in regions A , C , D and F ; (ii) public voting should lead to better outcomes in region B ; and (iii) secret voting is expected to perform better in region E .

Finally, we conclude this section with a brief discussion about the possible schemes that could be used to reward competence in an experimental setting. A

⁸See appendix C.4 for a proof of this claim.

first alternative would be to assign the role of external evaluator to a participant whose specific task would be to guess the competence level of each committee member based on the information available after voting takes place. This would probably correspond to the experimental design most closely related to our model. However, given that the task of rewarding competence is quite complex, it is likely that uncertainty about the evaluator's ability to process information could lead some agents to put less weight on reputation and, as a result, to vote more in accordance with their own biases.

Alternatively, we could explicitly announce the system of rewards to be applied, so that the participants could take it as given when choosing their strategies. There are, in fact, two different treatments that would be interesting to explore in this case. Suppose, as before, that $n = 3$, $\sigma = 0.5$ and $\phi = 2$. The first option captures the structure of incentives of a partially competent equilibrium: (i) under public voting, a participant receives 1.32 in case of a correct vote and zero otherwise; while (ii) under secret voting, he receives $\frac{1.32}{3}V^c$, where $V^c = \sum_{i=1}^n \mathbb{I}_{\{v_i=\omega\}}$ is the number of correct votes in the committee.⁹ The second treatment corresponds to the structure of rewards of a fully competent equilibrium: (i) under public voting, a participant receives 2 in case of a correct vote and zero otherwise; while (ii) under secret voting, he receives $\frac{2}{3}V^c$. This approach has the advantage of being simpler and easier to understand. Furthermore, it could help us to side-step some

⁹Assuming that $\sigma = 0.5$ and $\phi = 2$, we have $\phi \frac{\sigma}{\sigma + \frac{1}{2}(1-\sigma)} = 1.32$.

potential difficulties related to the existence of multiple equilibria in certain regions of the parameters.

3.6. Discussion and Extensions

In this section, we discuss the main assumptions of the model and possible directions in which to extend the current framework. Note, first, that the possibility of abstentions is an important element of our analysis, since it allows for more nuanced results about the impact of alternative voting rules on the behavior of incompetent agents. Observe that if abstentions were ruled out, then the non-informed members would simply vote according to their biases and our investigation would have to be restricted to the actions of the competent types.

Our basic framework also imposes two symmetry assumptions, namely, that the prior probability is equal across states and that agents are biased towards each option with the same probability. These restrictions are imposed for analytical convenience and guarantee that our conclusions hold regardless of the actual state of the world. It would be straightforward to extend the current framework in order to allow for more "asymmetry" and we plan to conduct this analysis in our future work.

The model could also be extended in order to allow for the occurrence of signals with intermediate levels of precision. Following Levy (2007), we could assume that each member i observes a signal $s_i \in \{A, B\}$, such that $\Pr(s_i = \omega | \omega) = t_i$, where $t_i \in (\frac{1}{2}, 1)$ represents the agent's competence level. Observe that the notion of

competent equilibria would no longer be applicable in this case. We could, instead, focus on a class of equilibria where at least some of the most competent members vote for the alternative which their posterior indicates to be the correct one. We conjecture that this equilibrium should involve a threshold $\bar{t} \in [\frac{1}{2}, 1]$ such that if $t_i \geq \bar{t}$, then agent i votes according to his signal, while otherwise he votes according to his bias. Similarly, we could also allow for different degrees of bias intensities in order to study, in more detail, how the interaction between competence and bias affects the committee's decisions.

There are other extensions to our basic framework that would be worth to pursue in future work. Throughout this paper, we have supposed that the external evaluator perfectly observes the state of the world, an assumption which could be viewed as extreme in many situations. It would, therefore, be interesting to study how our conclusions would change if the evaluator had access only to an imperfect signal about the current state. Furthermore, we could also consider a version of the model where voters were allowed to choose whether to reelect or not their representatives based on their perception about the members' competence levels and biases.

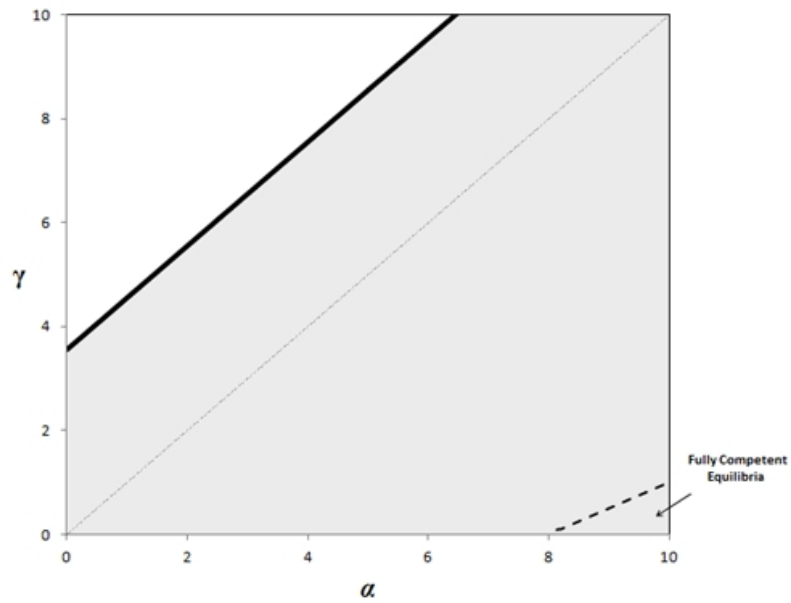
3.7. Conclusions

This paper has studied a committee decision-making problem with career oriented agents who may be biased towards one of the alternatives. Our analysis

highlights that the desire to accumulate reputation for high ability leads to different implications depending on the agent's competence and the magnitude of the bias term relative to the common value. Specifically, we show that: (i) for high degrees of bias, reputation concerns act to "correct" the vote of competent members who otherwise would have simply voted according to their personal interests, while (ii) for low degrees of bias, these same concerns induce the incompetent members to vote according to their biases, even though they would otherwise have preferred to abstain. We conclude that public voting leads to better decisions when the magnitude of the bias is large relative to the common value, while secret voting performs better otherwise.

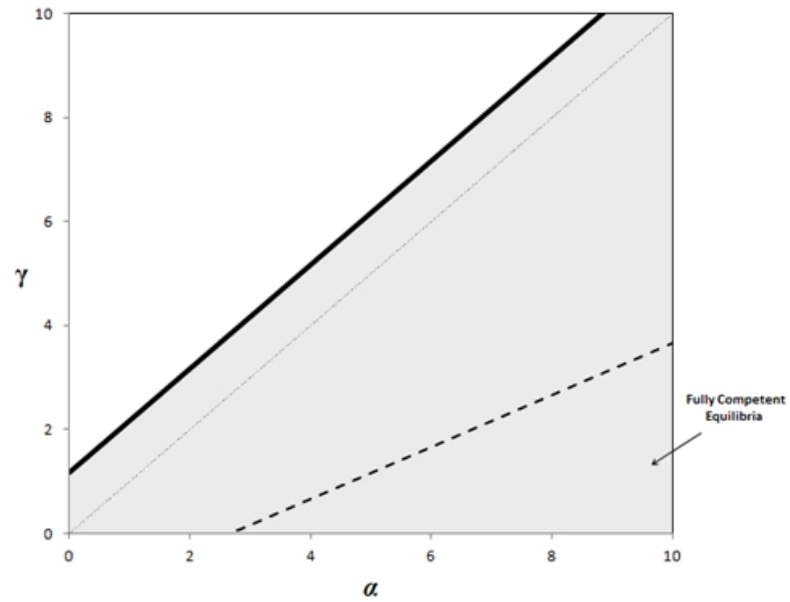
Our model generates detailed predictions about the parameter regions where secret and public voting are expected to lead to significantly different outcomes, as well as the specific ways in which transparency should affect the behavior of each type of agent. In our future work, we plan to conduct a laboratory experiment in order to test the main implications of our theory.

3.8. Figures and Tables



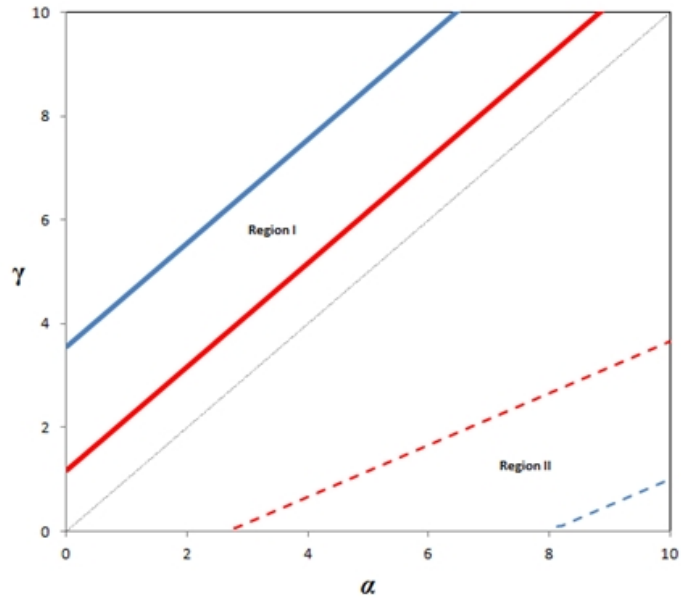
Note. A partially competent equilibrium can be supported anywhere in the colored region, while a fully competent equilibrium can occur only in the bottom-right corner, as indicated in the figure. In the region where no competent equilibrium exists (upper-left corner), there is always an equilibrium where all agents vote according to their biases. The 45-degree line is depicted as a small dotted line.

Figure 3.1: Public Voting



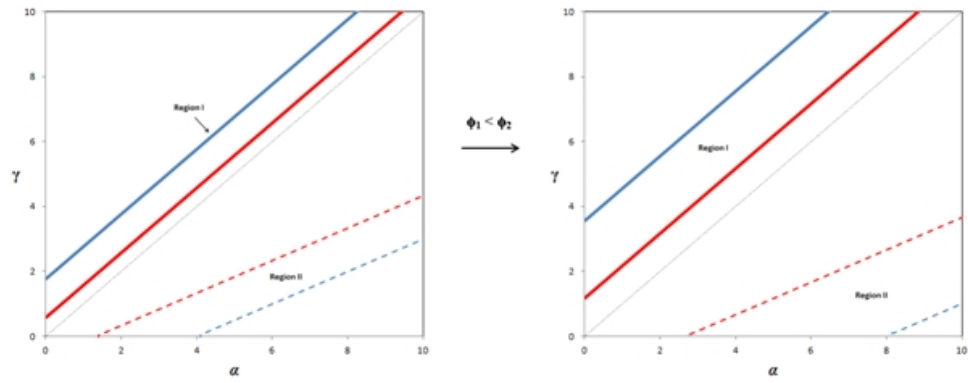
Note. A partially competent equilibrium can be supported anywhere in the colored region, while a fully competent equilibrium can occur only in the bottom-right corner, as indicated in the figure. In the region where no competent equilibrium exists (upper-left corner), there is always an equilibrium where all agents vote according to their biases. The 45-degree line is depicted as a small dotted line.

Figure 3.2: Secret Voting



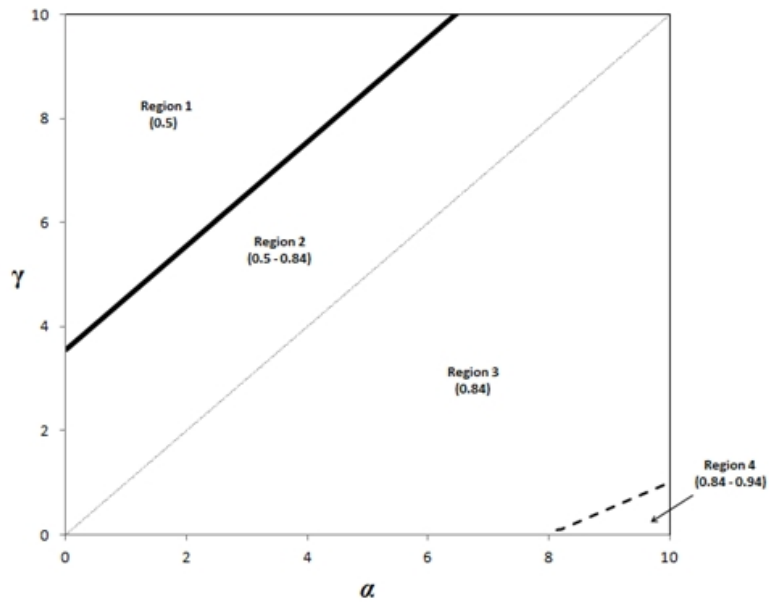
Note. The relevant thresholds for public and secret voting are depicted in blue and red, respectively. Region I represents the set of parameters where a partially competent equilibrium can be sustained under public but not under secret voting, while region II represents the set of parameters where a fully competent equilibrium can be sustained under secret but not under public voting.

Figure 3.3: Main Result



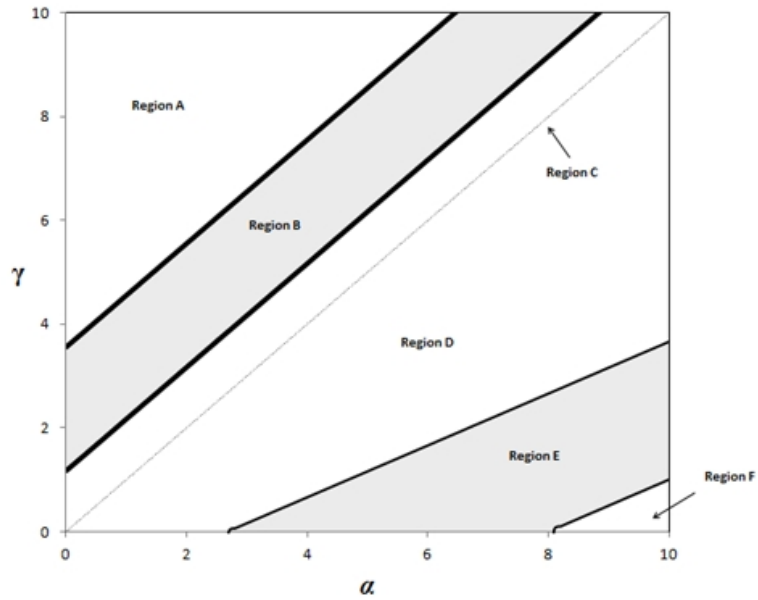
Note. This figure shows that Regions I and II get larger as the importance of reputation concerns, ϕ , increases. We have assumed $n=3$ and $\alpha=0.5$, with $\phi_1=1$ and $\phi_2=2$.

Figure 3.4: Comparative Statics with respect to ϕ



Note. This figure depicts, for the case of public voting, the probabilities with which we expect to obtain a correct decision in each region of the parameters. The probabilities are expressed inside parenthesis. We have assumed $n=3$, $\sigma=0.5$ and $\phi=2$.

Figure 3.5: Probability of a Correct Decision



Note. The performance of public and secret voting is expected to differ in the colored regions of the graph. In particular, public voting should lead to better outcomes in region B, while secret voting should perform better in region E. In all other regions, the performance of both voting rules is expected to be the same. We have assumed $n=3$, $\sigma=0.5$ and $\phi=2$.

Figure 3.6: Public versus Secret Voting

| | <i>fully competent equilibrium</i> | <i>partially competent equilibrium</i> |
|-------------------|------------------------------------|---|
| $v_i = \omega$ | 1 | $\frac{\sigma}{\sigma + \frac{1}{2}(1-\sigma)}$ |
| $v_i \neq \omega$ | 0 | 0 |

Table 3.1: Public Voting: Reputation

| region | type of equilibrium | | | Pr(x = ω) |
|--------|---------------------|---------------------|-----------------|-------------------|
| | biased | partially competent | fully competent | |
| 1 | × | | | 0.5 |
| 2 | × | × | | 0.5 - 0.84 |
| 3 | | × | | 0.84 |
| 4 | | × | × | 0.84 - 0.94 |

Note. This table makes reference to the regions identified in figure 4. It summarizes the theoretical predictions about the types of equilibrium that can be supported in each region as well as the probabilities with which a correct outcome is to be expected.

Table 3.2: Prediction: Probability of Correct Outcome

| region | type of equilibrium under <i>public voting</i> | | | type of equilibrium under <i>secret voting</i> | | | $\Pr(x^{\text{public}} = \omega) - \Pr(x^{\text{secret}} = \omega)$ |
|----------|--|---------------------|-----------------|--|---------------------|-----------------|---|
| | biased | partially competent | fully competent | biased | partially competent | fully competent | |
| A | x | | | x | | | 0 |
| B | x | x | | x | | | + |
| C | x | x | | x | x | | 0 |
| D | | x | | | x | | 0 |
| E | | x | | | x | x | - |
| F | | x | x | | x | x | 0 |

Note. This table makes reference to the regions identified in figure 5. It summarizes the theoretical predictions about the types of equilibrium that can be supported in each region under public and secret voting as well as the difference in the probabilities with which a correct outcome is to be expected under the two voting schemes.

Table 3.3: Prediction: Types of Equilibria

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APPENDIX A

Choosing the Form of Government: Theory and Evidence From Brazil

A.1. Main Data Sources

This paper explores three main sources of data. First, we use municipal level data on the results of the referendum obtained from the Supreme Electoral Court of Brazil (Tribunal Superior Eleitoral [TSE]) and several regional Electoral Courts. Although part of the information was missing or unavailable, we were still able to recover data for 4,178 municipalities, which amounts to 90% of the country's total population in 1993. Second, we use data from several opinion surveys conducted by the Datafolha, an independent research institute, from February to April 1993 containing detailed information about voting intentions and individual characteristics of a large number of subjects. Finally, data on social and economic characteristics of Brazilian municipalities referring to the year of 1991 were obtained from the Institute of Applied Economic Research (Instituto de Pesquisa Economica Aplicada [IPEA]).¹ Table A.1 reports basic descript statistics for the main variables used in the analysis.

¹This data is available at www.ipeadata.gov.br.

A.2. Proofs

A.2.1. Proof of Lemma 1.1

The Lagrangian for problem (1.8) can be expressed as:

$$\begin{aligned} \mathcal{L} = & (1 - \tau) y^p + \frac{1}{\alpha} \ell^p (\varphi)^\alpha - \frac{1}{2} (x - \theta_L)^2 - \psi (n\varphi + s_e - n\tau) \\ & - \zeta \left(\kappa - s_e + \frac{1}{2} (x - \theta_e)^2 - 1_{\{\theta_e \neq \theta_{lm}\}} \frac{\Delta^2}{8} \right) \\ & - \nu_1 (\varphi^o - \varphi) - \nu_2 \left(\frac{1}{2} (x - \theta_{lm})^2 - \frac{\Delta^2}{8} \right) - \mu (\tau - 1) \end{aligned}$$

where ψ , ζ , ν_1 , ν_2 , μ are the multipliers associated with (IC_e) , (AP_1) , (AP_2) and $\tau \leq 1$, respectively. The first-order conditions with respect to τ , φ , s_e and x yield:

$$(A.1) \quad \psi = \frac{y^p + \mu}{n}$$

$$(A.2) \quad \ell^p (\varphi)^{\alpha-1} \lambda^p = n\psi - \nu_1$$

$$(A.3) \quad \zeta = \psi$$

$$(A.4) \quad (x - \theta_L) + \zeta (x - \theta_e) + \nu_2 (x - \theta_{lm}) = 0$$

The optimal transfers are such that:

$$(A.5) \quad \varphi = \max \{ \varphi^o, \widehat{\varphi} \},$$

where $\widehat{\varphi}$ is implicitly determined by $\ell^p(\widehat{\varphi})^{\alpha-1} \lambda^p = n\psi$. The multiplier ψ measures the marginal cost of taxation. Note that, when the constraint $\tau \leq 1$ is not binding, we must have $\psi = \frac{y^p}{n}$, so that $\ell^p(\widehat{\varphi})^{\alpha-1} \lambda^p = y^p$.

Observe, from equation (A.4), that the public policy x is a weighted average of the preferences of voters and office-holders. The weight attached to the president's preference, $\zeta > 0$, measures the cost of providing him with additional rents, so that s_e and x are optimally chosen in order to equalize their marginal rates of return. From the incentive compatibility constraint, it then follows that political rents are given by:

$$(A.6) \quad s_e = \kappa + \Psi(x; \boldsymbol{\theta}),$$

where $\Psi(x; \boldsymbol{\theta}) \equiv \frac{1}{2}(x - \theta_e)^2 - 1_{\{\theta_e \neq \theta_{lm}\}} \frac{\Delta^2}{8} \geq 0$. Note that, when $\tau \leq 1$ is not binding, we have $\zeta = \frac{y^p}{n} < 1$ and the reform $x(\theta_e, \theta_{lm})$ is given by: $x(\theta_L, \theta_L) = \theta_L$, $x(\theta_L, \theta_H) = \frac{\theta_L + \theta_H}{2}$, $x(\theta_H, \theta_L) = \frac{\theta_L + (y^p/n)\theta_H}{1 + (y^p/n)}$ and $x(\theta_H, \theta_H) = \max \left\{ \frac{\theta_L + (y^p/n)\theta_H}{1 + (y^p/n)}, \frac{\theta_L + \theta_H}{2} \right\} = \frac{\theta_L + \theta_H}{2}$. Substituting these expressions into $\Psi(x; \boldsymbol{\theta})$, we obtain $\Psi(x(\theta_L, \theta_L)) = \Psi(x(\theta_L, \theta_H)) = 0$, $\Psi(x(\theta_H, \theta_L)) = \frac{1}{2} \left(\left(\frac{1}{1 + \frac{y^p}{n}} \right)^2 - \frac{1}{4} \right) \Delta^2 > 0$ and $\Psi(x(\theta_H, \theta_H)) = \frac{1}{8} \Delta^2 > 0$.

Finally, the tax rate is residually determined by $\tau = \varphi + \frac{1}{n}s_e$ and must satisfy $\tau \leq 1$. Observe that as $\Delta = \theta_H - \theta_L$ increases, the amount of rents required to incentivize a misaligned president goes up, so that the constraint $\tau \leq 1$ must eventually bind.² At this point, the marginal cost of taxation, ψ , rises, leading to a possible reduction in the size of transfers relative to the solution characterized in (A.5).³ The public policy is further distorted away from the voters' optimal position, as the weight attached to the executive leader's preference, ζ , increases. This, in turn, reduces the amount of rents that must be paid to the president and helps to relax the constraint $\tau \leq 1$. ■

A.2.2. Proof of Lemma 1.2

At the optimum, the budget constraint must be binding, so that $s_e = n(\tau - \varphi)$. The Lagrangian for problem (1.15) can be expressed as:

$$\begin{aligned} \mathcal{L} = n(\tau - \varphi) - \frac{1}{2}(x - \theta_e)^2 \\ - \mu \left(s^p \left(1 - \frac{\kappa}{n} \right) - s^p(\varphi) + \frac{1}{2}(x - \theta_{lm})^2 \right) - \nu n(\tau - \varphi), \end{aligned}$$

where μ and ν are the multipliers associated with (CR) and $s_e \geq 0$, respectively, and $s^p(\cdot)$ is the amount of rents obtained by a legislator from a poor constituency.

²Note that the expressions $\Psi(x(\theta_H, \theta_L))$ and $\Psi(x(\theta_H, \theta_H))$ are strictly increasing in Δ when $\tau < 1$.

³The actual reduction of transfers depends on whether the constraint $\varphi \geq \varphi^o$ is binding or not.

Observe that the optimal solution always involves setting $\tau = 1$. The first-order condition with respect to φ yields:

$$(A.7) \quad \mu = \frac{n(1 + \nu)}{1 - \lambda^p},$$

where the multiplier μ measures the marginal cost of raising additional rents for a poor legislator. The first-order condition with respect to x is given by:

$$(A.8) \quad (x - \theta_e) + \mu(x - \theta_{lm}) = 0,$$

so that the public policy is a weighted average of the preferences of the executive leader and the median legislator. From the confidence requirement constraint, it, then, follows that the size of transfers must be such that:

$$(A.9) \quad s^p(\varphi) = s^p \left(1 - \frac{\kappa}{n}\right) + \frac{1}{2}(x - \theta_{lm})^2,$$

which implies that $\varphi \geq 1 - \frac{\kappa}{n}$, with strictly inequality when $x \neq \theta_{lm}$. Finally, the rents extracted by the prime-minister are residually determined by the budget constraint, $s_e = n(1 - \varphi)$, and must satisfy $s_e \geq 0$.

Observe that when constraint $s_e \geq 0$ is not binding, the cost of raising additional rents for legislators is $\mu = \frac{n}{1 - \lambda^p}$, i.e. $\nu = 0$, and the implemented public policy is given by $x = \frac{\theta_e + (n/1 - \lambda^p)\theta_{lm}}{1 + (n/1 - \lambda^p)}$. In this case, the required transfers are such that $\varphi = 1 - \frac{\kappa}{n}$ when $\theta_e = \theta_{lm}$ and $s^p(\varphi) = s^p \left(1 - \frac{\kappa}{n}\right) + \frac{1}{2} \left(\frac{1}{1 + (n/1 - \lambda^p)}\right)^2 \Delta^2$ when $\theta_e \neq \theta_{lm}$. Note that as $\Delta = \theta_H - \theta_L$ increases, the amount of transfers required

to compensate legislators for a distortion in the public policy relative to $x = \theta_{lm}$ goes up, so that $s_e \geq 0$ must eventually bind. At this point, the marginal cost of raising rents for the poor legislators, μ , increases, which leads to a reduction in the distance between x and θ_{lm} . This, in turn, allows for a decrease in the size of transfers and helps to relax the constraint $s_e \geq 0$. ■

A.2.3. Proof of Proposition 1.1

The result that $\tau^{pres} \leq \tau^{parl} = 1$ follows from part *i* of Lemmas 1.1 and 1.2. Moreover, since $s_e^{pres} \geq s_e^{parl}$ (part *iii* of Lemmas 1.1 and 1.2), it follows from the budget constraint that $\varphi^{pres} \leq \varphi^{parl}$ and, given that $\ell_i(\varphi)$ is strictly increasing in φ , we must have $\ell_i^{pres} \leq \ell_i^{parl}$ for any constituency. Note that $\varphi^{pres} < \varphi^{parl}$ and $\ell_i^{pres} < \ell_i^{parl}$ whenever $\theta_e = \theta_H$ or $\theta_e \neq \theta_{lm}$, which implies that $\mathbb{E}(\varphi^{pres}) < \mathbb{E}(\varphi^{parl})$ and $\mathbb{E}(\ell_i^{pres}) < \mathbb{E}(\ell_i^{parl})$. The result that $\mathbb{E}(s_e^{pres}) > \mathbb{E}(s_e^{parl})$ follows directly from part *iii* of Lemmas 1.1 and 1.2, while $\mathbb{E}(s_l^{pres}) \leq \mathbb{E}(s_l^{parl})$ is due to $\varphi^{pres} \leq \varphi^{parl}$ combined with the fact that $s_l(\varphi)$ is increasing in φ , and strictly so if the legislator represents a poor constituency (from assumption 1.1). ■

A.2.4. Proof of Proposition 1.2

Let $\Gamma_{ij} \equiv \Pr(\theta_e = \theta_i, \theta_{lm} = \theta_j)$, where $i, j \in \{L, H\}$. The probability of each configuration of the office-holders' preferences can be expressed as:

$$\Gamma_{LL} = (1 - \xi) + \xi\pi \left\{ \rho \sum_{k=\frac{n+1}{2}}^n \binom{n}{k} \pi^k (1 - \pi)^{n-k} \right. \\ \left. + (1 - \rho) \sum_{j=0}^{n^r} \sum_{k=\frac{n+1}{2} - (n^r - j)}^{n^p} \binom{n^r}{j} \binom{n^p}{k} \pi^{j+k} (1 - \pi)^{n-j-k} \right\}$$

$$\Gamma_{LH} = \xi\pi \left\{ \rho \sum_{k=0}^{\frac{n-1}{2}} \binom{n}{k} \pi^k (1 - \pi)^{n-k} \right. \\ \left. + (1 - \rho) \sum_{j=0}^{n^r} \sum_{k=0}^{\frac{n-1}{2} - (n^r - j)} \binom{n^r}{j} \binom{n^p}{k} \pi^{j+k} (1 - \pi)^{n-j-k} \right\}$$

$$\Gamma_{HL} = \xi(1 - \pi) \left\{ \rho \sum_{k=\frac{n+1}{2}}^n \binom{n}{k} \pi^k (1 - \pi)^{n-k} \right. \\ \left. + (1 - \rho) \sum_{j=0}^{n^r} \sum_{k=\frac{n+1}{2} - (n^r - j)}^{n^p} \binom{n^r}{j} \binom{n^p}{k} \pi^{j+k} (1 - \pi)^{n-j-k} \right\}$$

$$\Gamma_{HH} = \xi(1 - \pi) \left\{ \rho \sum_{k=0}^{\frac{n-1}{2}} \binom{n}{k} \pi^k (1 - \pi)^{n-k} \right. \\ \left. + (1 - \rho) \sum_{j=0}^{n^r} \sum_{k=0}^{\frac{n-1}{2} - (n^r - j)} \binom{n^r}{j} \binom{n^p}{k} \pi^{j+k} (1 - \pi)^{n-j-k} \right\}$$

Observe that the expected quadratic distance between the public policy and the median voters' preference is given by:

$$\mathbb{E}[(x - \theta_L)^2] = \underbrace{\Gamma_{LH}(x(\theta_L, \theta_H) - \theta_L)^2}_{\text{case I}} \\ + \underbrace{\Gamma_{HL}(x(\theta_H, \theta_L) - \theta_L)^2}_{\text{case II}} + \underbrace{\Gamma_{HH}(x(\theta_H, \theta_H) - \theta_L)^2}_{\text{case III}}$$

where we have used the fact that $x(\theta_L, \theta_L) = \theta_L$ under both regimes.

Next, observe that, when $\Delta = \theta_H - \theta_L$ large enough, we can always guarantee that:

$$(A.10) \quad (x^{pres}(\theta_L, \theta_H) - \theta_L)^2 < (x^{parl}(\theta_L, \theta_H) - \theta_L)^2$$

and

$$(A.11) \quad (x^{pres}(\theta_H, \theta_L) - \theta_L)^2 > (x^{parl}(\theta_H, \theta_L) - \theta_L)^2,$$

that is, when $\theta_e = \theta_L$ and $\theta_{lm} = \theta_H$ (case I), the public policy is closer to θ_L under presidential systems, while, when $\theta_e = \theta_H$ and $\theta_{lm} = \theta_L$ (case II), the

public policy is closer to θ_L under parliamentary systems. The requirement that Δ be large enough is sufficient to rule out the cases where $(x^{pres}(\theta_H, \theta_L) - \theta_L)^2 \leq (x^{parl}(\theta_H, \theta_L) - \theta_L)^2$. Intuitively, this situation occurs whenever y^p and Δ are small enough, so that it is inexpensive for the poor to incentivize a misaligned president to propose a policy that is very close to θ_L . As we have shown in the proofs of Lemmas 1.1 and 1.2, the weight in the public policy attached to the preference of a misaligned leader increases with Δ in a presidential system (see equation (A.4) and discussion in the last paragraph of the proof of Lemma 1.1), while the weight attached to the preference of the median legislator increases with Δ in a parliamentary system (see equation (A.5) and discussion the last paragraph of the proof of Lemma 1.2). Finally, observe that, when $\theta_e = \theta_H$ and $\theta_{lm} = \theta_H$ (case *III*), the parliamentary system is always worse to the poor:

$$(A.12) \quad (x^{pres}(\theta_H, \theta_H) - \theta_L)^2 < (x^{parl}(\theta_H, \theta_H) - \theta_L)^2,$$

since $x^{parl}(\theta_H, \theta_H) = \theta_H$ and $x^{pres}(\theta_H, \theta_H) < \theta_H$.⁴

Thus, in order to guarantee that the parliamentary regime yields better policies in expectation, the configuration of preferences $\theta_e = \theta_H$ and $\theta_{lm} = \theta_L$ (case *II*) must occur with high enough frequency relative to the other two possibilities. Here, we show that there always exists π large enough, so that the probability

⁴The fact that $x^{parl}(\theta_H, \theta_H) = \theta_H$ is an immediate consequence of equation (A.5), while $x^{pres}(\theta_H, \theta_H) < \theta_H$ follows from equation (A.4), which guarantees that the preference of the poor voters, θ_L , always receives a strictly positive weight in the public policy.

ratio $\frac{\Gamma_{HL}}{\Gamma_{LH}+\Gamma_{HH}}$ can always be made arbitrarily high. Formally, we prove that $\lim_{\pi \rightarrow 1} \frac{\Gamma_{HL}}{\Gamma_{LH}+\Gamma_{HH}} \rightarrow +\infty$, provided that $n^p > n^r + 1$, so that there always exist a threshold $\bar{\pi}$ such that if $\pi > \bar{\pi}$ the parliamentary system is preferred in terms of the public policies it generates.

Note, first, that the expression for the probability ratio $\frac{\Gamma_{HL}}{\Gamma_{LH}+\Gamma_{HH}}$ is given by:

$$\frac{\Gamma_{HL}}{\Gamma_{LH} + \Gamma_{HH}} = \frac{\Lambda_1}{\Lambda_2},$$

where:

$$\Lambda_1 = (1 - \pi) \left\{ \rho \sum_{k=\frac{n+1}{2}}^n \binom{n}{k} \pi^k (1 - \pi)^{n-k} \right. \\ \left. + (1 - \rho) \sum_{j=0}^{n^r} \sum_{k=\frac{n+1}{2}-(n^r-j)}^{n^p} \binom{n^r}{j} \binom{n^p}{k} \pi^{j+k} (1 - \pi)^{n-j-k} \right\}$$

and

$$\Lambda_2 = \left\{ \rho \sum_{k=0}^{\frac{n-1}{2}} \binom{n}{k} \pi^k (1 - \pi)^{n-k} \right. \\ \left. + (1 - \rho) \sum_{j=0}^{n^r} \sum_{k=0}^{\frac{n-1}{2}-(n^r-j)} \binom{n^r}{j} \binom{n^p}{k} \pi^{j+k} (1 - \pi)^{n-j-k} \right\}$$

The algebra involved in the proof is straightforward, but lengthy. Here, we simply sketch the main steps of our argument. First, it is possible to show that both the numerator and the denominator of the above expression converge to zero as π

approaches one:

$$\lim_{\pi \rightarrow 1} (1 - \pi) \left\{ \rho \sum_{k=\frac{n+1}{2}}^n \binom{n}{k} \pi^k (1 - \pi)^{n-k} \right. \\ \left. + (1 - \rho) \sum_{j=0}^{n^r} \sum_{k=\frac{n+1}{2} - (n^r - j)}^{n^p} \binom{n^r}{j} \binom{n^p}{k} \pi^{j+k} (1 - \pi)^{n-j-k} \right\} \rightarrow 0$$

and

$$\lim_{\pi \rightarrow 1} \left\{ \rho \sum_{k=0}^{\frac{n-1}{2}} \binom{n}{k} \pi^k (1 - \pi)^{n-k} \right. \\ \left. + (1 - \rho) \sum_{j=0}^{n^r} \sum_{k=0}^{\frac{n-1}{2} - (n^r - j)} \binom{n^r}{j} \binom{n^p}{k} \pi^{j+k} (1 - \pi)^{n-j-k} \right\} \rightarrow 0$$

Intuitively, when $\pi \rightarrow 1$, we have $\Gamma_{LL} \rightarrow 1$ and $\Gamma_{HL}, \Gamma_{LH}, \Gamma_{HH} \rightarrow 0$, i.e. the "dominant" case is $\theta_e = \theta_L$ and $\theta_{l^m} = \theta_L$. Next, applying the L'Hospital rule, we can show that the denominator converges to zero faster than the numerator, so that:

$$\lim_{\pi \rightarrow 1} \frac{\Gamma_{HL}}{\Gamma_{LH} + \Gamma_{HH}} \rightarrow +\infty$$

The requirement that $n^p > n^r + 1$ is in order to guarantee that there are enough poor representatives in the assembly so that $\Pr(\theta_{l^m} = \theta_H)$ approaches zero rapid enough. ■

A.2.5. Proof of Proposition 1.3

Part i. Observe that, in a presidential system, the incentive compatibility constraint (IC_e) pins down the utility of the executive leader, so that:

$$(A.13) \quad V_e^{pres}(\boldsymbol{\theta}) = \begin{cases} \kappa & \text{if } \theta_e = \theta_{lm} \\ \kappa - \frac{1}{8}\Delta^2 & \text{if } \theta_e \neq \theta_{lm} \end{cases}$$

while, in a parliamentary system, we have:

$$(A.14) \quad V_e^{parl}(\boldsymbol{\theta}) = \begin{cases} \kappa & \text{if } \theta_e = \theta_{lm} \\ < \kappa - \frac{1}{8}\Delta^2 & \text{if } \theta_e \neq \theta_{lm} \end{cases}$$

where the last inequality follows from the fact that $s_e^{parl} \leq \kappa$ (Lemma 1.2) and $\frac{1}{2}(x^{parl} - \theta_e)^2 \geq \frac{1}{2}\left(\frac{n\theta_{lm} + (1-\lambda^p)\theta_e}{n+(1-\lambda^p)} - \theta_e\right)^2 = \frac{1}{2}\left(\frac{n}{n+(1-\lambda^p)}\right)^2 \Delta^2 > \frac{1}{8}\Delta^2$, when $\theta_e \neq \theta_{lm}$.⁵ Therefore, it must be that $\mathbb{E}(V_e^{pres}) > \mathbb{E}(V_e^{parl})$. ■

Part ii. In a parliamentary system, the utility of a legislator whose preference is aligned with the median representative is determined by the confidence requirement constraint (CR):

$$(A.15) \quad V_l^{parl}(\theta_l = \theta_{lm}) = s_l \left(1 - \frac{\kappa}{n}\right)$$

⁵Here, we consider the most favorable case for the prime-minister, where the constraint $s_e \geq 0$ is not binding, so that $\mu = \frac{n}{1-\lambda^p}$ and $x^{parl} = \frac{\theta_e + (n/1-\lambda^p)\theta_{lm}}{1+(n/1-\lambda^p)}$. See discussion in the last paragraph of the proof of Lemma 1.2.

Observe that the expected utility of this same agent is strictly smaller in a presidential system, since $\mathbb{E}(s_l^{pres}) \leq s_l (1 - \frac{\kappa}{n})$ and $\mathbb{E}(x^{pres} - \theta_{lm})^2 > 0$.⁶ Thus, conditional on belonging to the "winning coalition", a legislator is always better off under a parliamentary system, i.e. $\mathbb{E}(V_l^{pres}(\theta_l = \theta_{lm})) < \mathbb{E}(V_l^{parl}(\theta_l = \theta_{lm}))$. On the other hand, an agent who is not aligned with the median type may actually do worse off under a parliamentary regime, given that in this case the public policy is always implemented far from his preferred position.

Note that the expected utility of a representative can be written, in general, as:

$$(A.16) \quad \mathbb{E}(V_l) = \underbrace{\Pr(\theta_l = \theta_{lm}) \mathbb{E}(V_l(\theta_l = \theta_{lm}))}_{\text{parliamentary sys. preferred}} + \underbrace{\Pr(\theta_l \neq \theta_{lm}) \mathbb{E}(V_l(\theta_l \neq \theta_{lm}))}_{\text{presidential sys. may be preferred}}$$

Therefore, as long as the probability that a legislator is aligned with the median type is sufficiently large, we have:

$$(A.17) \quad \mathbb{E}(V_l^{pres}) < \mathbb{E}(V_l^{parl})$$

Formally, there exists η such that if $\Pr(\theta_l = \theta_{lm}) \geq \eta$, then the above expression always hold. In particular, it is guaranteed to be satisfied whenever $\Pr(\theta_l = \theta_{lm}) = 1$. The exact value of the threshold η depends on the parameters of the model. ■

⁶The inequality $\mathbb{E}(s_l^{pres}) \leq s_l (1 - \frac{\kappa}{n})$ is due to the fact that $\varphi^{pres} \leq 1 - \frac{\kappa}{n}$, which, in turn, follows from $s_e^{pres} \geq \kappa$ (see equation [A.6]).

A.2.6. Proof of Proposition 1.4

Part i. The utility of the poor voters is given by:

$$(A.18) \quad U^p = \underbrace{(1 - \tau)y^p + \frac{1}{\alpha}\ell^p(\varphi)^\alpha}_{\text{term I}} - \underbrace{\frac{1}{2}(x - \theta_L)^2}_{\text{term II}}$$

Let us first consider term I . Observe that when λ^p is arbitrarily small, i.e. $\lambda^p \rightarrow 0$, we have, for any possible configuration of office holders' preferences:

$$(A.19) \quad (1 - \tau^{pres})y^p + \frac{1}{\alpha}\ell^p(\varphi^{pres})^\alpha \rightarrow (1 - \tau^{pres})y^p + \frac{1}{\alpha}(\beta\omega_L)^\alpha,$$

and

$$(A.20) \quad (1 - \tau^{parl})y^p + \frac{1}{\alpha}\ell^p(\varphi^{parl})^\alpha \rightarrow \frac{1}{\alpha}(\beta\omega_L)^\alpha,$$

which follows from the fact that $\tau^{parl} = 1$ and $\lim_{\lambda^p \rightarrow 0} \ell^p(\varphi) = \beta\omega_L$ (see equation [1.7]). Thus, when $\lambda^p \rightarrow 0$, we obtain:

$$(A.21) \quad (1 - \tau^{pres})y^p + \frac{1}{\alpha}\ell(\varphi^{pres})^\alpha \geq (1 - \tau^{parl})y^p + \frac{1}{\alpha}\ell(\varphi^{parl})^\alpha,$$

with strict inequality when $\tau^{pres} < 1$. Next, consider term II . Note that when π is arbitrarily small, i.e. $\pi \rightarrow 0$, we have:

$$(A.22) \quad \frac{1}{2}\mathbb{E}(x^{pres} - \theta_L)^2 < \frac{1}{2}\mathbb{E}(x^{parl} - \theta_L)^2,$$

which follows from fact that, in this case, the "dominant" configuration of preferences is $\theta_e = \theta_m = \theta_H$, so that $x^{parl} = \theta_H$ and $x^{pres} < \theta_H$.⁷ Therefore, combining (A.21) and (A.22), we can guarantee that $\mathbb{E}(U^{p,pres}) > \mathbb{E}(U^{p,parl})$, whenever λ^p and π are sufficiently small. ■

Part ii. Observe, first, that when λ^p is large enough, i.e. $\lambda^p \rightarrow 1$, we have, for any possible configuration of office holders' preferences:

$$(A.23) \quad (1 - \tau^{pres})y^p + \frac{1}{\alpha}\ell^p(\varphi^{pres})^\alpha \rightarrow \frac{1}{\alpha}(\varphi^{pres})^\alpha,$$

and

$$(A.24) \quad (1 - \tau^{parl})y^p + \frac{1}{\alpha}\ell^p(\varphi^{parl})^\alpha \rightarrow \frac{1}{\alpha}(\varphi^{parl})^\alpha,$$

which follows from the fact that, in this case, $\tau^{parl} = \tau^{pres} = 1$ and $\lim_{\lambda^p \rightarrow 1} \ell^p(\varphi) = \varphi$.⁸ Thus, when $\lambda^p \rightarrow 1$, we obtain:

$$(A.25) \quad (1 - \tau^{pres})y^p + \frac{1}{\alpha}\ell^p(\varphi^{pres})^\alpha \leq (1 - \tau^{parl})y^p + \frac{1}{\alpha}\ell^p(\varphi^{parl})^\alpha,$$

⁷See discussion in footnote 4.

⁸In order to prove that $\tau^{pres} = 1$, suppose, by contradiction, that $\tau \leq 1$ is not binding. In this case, the Lagrangian multiplier associated with this constraint is equal to zero, i.e. $\mu = 0$, so that the first-order condition in equation (A.2) can be expressed as $(\varphi^{pres})^{\alpha-1} = y^p$, where we have assumed that $\varphi^{pres} \geq \varphi^o$ holds, i.e. $\nu_1 = 0$. Observe that, since $0 < \alpha < 1$ and $0 < y^p < 1$, we must have $\varphi^{pres} = (1/y^p)^{1-\alpha} > 1$ (thus, indeed, $\varphi^{pres} > \varphi^o$). But this implies that $\tau^{pres} \leq 1$ must necessarily bind in equilibrium, which is a contradiction.

since $\varphi^{pres} \leq \varphi^{parl}$ (Proposition 1.1). Moreover, when π is large enough, i.e. $\pi \rightarrow 1$, we must have:

$$(A.26) \quad \frac{1}{2}\mathbb{E}(x^{pres} - \theta_L)^2 > \frac{1}{2}\mathbb{E}(x^{parl} - \theta_L)^2,$$

which follows from Proposition 1.2. Therefore, combining (A.25) and (A.26), we can guarantee that $\mathbb{E}(U^{p,pres}) < \mathbb{E}(U^{p,parl})$, whenever λ^p and π are sufficiently large.

■

A.2.7. Proof of Proposition 1.5

Part i. Observe that:

$$(A.27) \quad \frac{\partial \Omega}{\partial \lambda^r} = \frac{\partial}{\partial \lambda^r} \{\mathbb{E}(U^{r,parl} - U^{r,pres})\} = \mathbb{E}\{\ell^r(\varphi^{parl})^{\alpha-1} \varphi^{parl} - \ell^r(\varphi^{pres})^{\alpha-1} \varphi^{pres}\}$$

To prove that this expression is strictly positive, consider the following derivative:

$$(A.28) \quad \frac{\partial}{\partial \varphi} \{\ell^r(\varphi)^{\alpha-1} \varphi\} = 1 + \frac{(\alpha-1)\varphi}{\ell^r(\varphi)} \lambda^r$$

Substituting $\ell^r(\varphi^{parl}) = \lambda^r \varphi + \beta \omega_L$, we obtain:

$$\frac{\partial}{\partial \varphi} \{\ell^r(\varphi)^{\alpha-1} \varphi\} = 1 + \frac{(\alpha-1)\varphi}{\lambda^r \varphi + \beta \omega_L} \lambda^r,$$

which, under the assumption that $0 < \alpha < 1$, can be re-expressed as:

$$(A.29) \quad \frac{\partial}{\partial \varphi} \{\ell^r(\varphi)^{\alpha-1} \varphi\} = \frac{\alpha \lambda^r \varphi + \beta \omega_L}{\lambda^r \varphi + \beta \omega_L} > 0$$

The above result combined with the fact that $\varphi^{parl} \geq \varphi^{pres}$, with strict inequality when $\theta_e \neq \theta_l^m$, implies that $\frac{\partial \Omega}{\partial \lambda^r} > 0$. ■

Part ii. Note that:

$$(A.30) \quad \frac{\partial \Omega}{\partial y^r} = \frac{\partial}{\partial y^r} \{\mathbb{E}(U^{r,parl} - U^{r,pres})\} = \mathbb{E}(1 - \tau^{parl}) - \mathbb{E}(1 - \tau^{pres}),$$

which, using the fact that $\tau^{parl} = 1$, yields:

$$(A.31) \quad \frac{\partial \Omega}{\partial y^r} = \mathbb{E}(\tau^{pres}) - 1 \leq 0,$$

with strict inequality when $\mathbb{E}(\tau^{pres}) < 1$. ■

A.3. Extra Figures and Tables

| FORMA DE GOVERNO | | SISTEMA DE GOVERNO | |
|------------------|-----------|--------------------|------------------|
| 1 | MONARQUIA | 1 | PARLAMENTARISMO |
| 2 | REPÚBLICA | 2 | PRESIDENCIALISMO |

Note: A vertical dashed line on the left side of the ballot is labeled "1ª DOBRA" (1st fold).

Note. This figure depicts the ballot used in the referendum. Voters were asked to choose between "monarchy" and "republic" as the "form of government" (left-hand side) and between "parliamentarism" and "presidentialism" as the "system of government" (right-hand side).

Figure A.1: The Referendum Ballot

| | Obs. | Mean | S.D. | Min. | Max. |
|---|-------|-------|-------|-------|-------|
| Panel A. Cross-section of Municipalities | | | | | |
| % parliamentary system | 4,144 | 0.167 | 0.068 | 0.029 | 0.438 |
| # AM radio stations | 4,144 | 0.31 | 0.72 | 0 | 10 |
| federal judges and prosecutors | 4,144 | 0.03 | 0.18 | 0 | 1 |
| log (income per capita) | 4,144 | 4.72 | 0.56 | 3.31 | 6.36 |
| log (population) | 4,144 | 9.33 | 1.03 | 6.62 | 13.11 |
| illiteracy rate | 4,144 | 0.286 | 0.160 | 0.018 | 0.892 |
| gini coefficient | 4,144 | 0.53 | 0.05 | 0.34 | 0.79 |
| Panel B. Survey Data | | | | | |
| Voting intention: parliamentary system | 2,343 | 0.236 | 0.424 | 0 | 1 |
| Trust in the congress: Very low | 2,343 | 0.310 | 0.462 | 0 | 1 |
| Do you think that the members of the congress represent the interests of the population? No. | 2,343 | 0.835 | 0.370 | 0 | 1 |
| Do you follow the political news? Yes, frequently. | 2,334 | 0.349 | 0.476 | 0 | 1 |
| Do you think that elections are important to allow the population to have a say in what the government does? Yes, very important. | 2,343 | 0.771 | 0.419 | 0 | 1 |
| Ideology: from left to right (scale 0 -10) | 2,343 | 5.85 | 2.56 | 0 | 10 |
| Schooling: primary | 2,343 | 0.583 | 0.493 | 0 | 1 |
| Schooling: secondary | 2,343 | 0.281 | 0.449 | 0 | 1 |
| Schooling: superior | 2,343 | 0.135 | 0.342 | 0 | 1 |
| Household income: < 2 min. wages | 2,343 | 0.232 | 0.422 | 0 | 1 |
| Household income: 2 - 5 min. wages | 2,343 | 0.261 | 0.439 | 0 | 1 |
| Household income: 5 - 10 min. wages | 2,343 | 0.227 | 0.419 | 0 | 1 |
| Household income: 10 - 20 min. wages | 2,343 | 0.134 | 0.340 | 0 | 1 |
| Household income: > 20 min. wages | 2,343 | 0.079 | 0.271 | 0 | 1 |
| Household income: not reported | 2,343 | 0.064 | 0.244 | 0 | 1 |

Notes. This table reports summary statistics for selected variables considered in the analysis. Panel A refers to main variables present in the sample of Brazilian municipalities, while Panel B refers to main characteristics present in the survey data (source: Datafolha Institute; March 28th, 1993).

Table A.1: Summary Statistics

APPENDIX B

Checks and Balances and Political Transparency

B.1. Proofs

B.1.1. Proof of Proposition 2.3

We solve the model for a stationary equilibrium. The proof proceeds as follows: we, first, solve for the equilibrium in each case (A.1, A.2, B.1 and B.2) and, then, consider the optimal strategies of the agenda setter and the voters in his group for all possible values of the parameters.

Equilibrium

Case A.1. In this case, the optimization problem is given by:

$$(B.1) \quad \max_{\{s_i\}, \{f_i\}, \tau} 1 - \tau + f_a$$

subject to

$$\left\{ \begin{array}{ll} f + s \leq 3\tau & (BC) \\ s_m + \delta W \geq \sigma & (IC_m^A) \\ s_a + \delta W \geq 3 - (\sigma + \delta W) & (IC_a^1) \\ f_m = 1 - \sigma & \end{array} \right.$$

and the aggregate incentive compatibility constraint can be written as:

$$(B.2) \quad s = 3(1 - \delta W)$$

In equilibrium, the continuation value is $W^{A.1} = 1$ and we have:

$$\tau^{A.1} = 1,$$

$$(B.3) \quad s^{A.1} = 3(1 - \delta),$$

$$(B.4) \quad s_a^{A.1} = 3 - \sigma - 2\delta$$

and

$$(B.5) \quad f_a^{A.1} = 3\delta - (1 - \sigma),$$

with $f_m^{A.1} = 1 - \sigma$ and $f_n^{A.1} = 0$.

Case A.2. In this case, the optimization problem is given by:

$$(B.6) \quad \max_{\{s_i\}, \{f_i\}, \tau} 1 - \tau + f_a$$

subject to

$$\begin{cases} f + s \leq 3\tau & (BC) \\ s_m + \delta W \geq \sigma & (IC_m^A) \\ s_a \geq 2 & (IC_a^2) \\ f_m = 1 - \sigma \end{cases}$$

and the aggregate incentive compatibility constraint can be written as:

$$(B.7) \quad s = (2 + \sigma) - \delta W$$

In equilibrium, the continuation value is $W^{A.2} = \frac{2+\sigma}{3-2\delta}$ and we have:

$$(B.8) \quad \tau^{A.2} = 1,$$

$$(B.9) \quad s^{A.2} = 3(1 - \delta) \frac{2 + \sigma}{3 - 2\delta},$$

$$(B.10) \quad s_a^{A.2} = 2$$

and

$$(B.11) \quad f_a^{A.2} = \delta \frac{2 + \sigma}{3 - 2\delta},$$

with $f_m^{A.2} = 1 - \sigma$ and $f_n^{A.2} = 0$.

Case B.1. In this case, voters in a prefer to propose a policy such that $f_m = f_n = 0$. This implies that legislator m is not reelected in equilibrium, given that he approves this proposal against the interests of his voters. Thus, the continuation value of legislators should be defined recursively as:

$$(B.12) \quad W = \frac{s}{3} + \frac{2}{3}\delta W$$

The relevant optimization problem in this case is given by:

$$(B.13) \quad \max_{\{s_i\}, \{f_i\}, \tau} 1 - \tau + f_a$$

subject to

$$\begin{cases} f + s \leq 3\tau & (BC) \\ s_m \geq \sigma + \delta W & (IC_m^B) \\ s_a + \delta W \geq 3 - (\sigma + \delta W) & (IC_a^1) \end{cases}$$

and the aggregate incentive compatibility constraint can be written as:

$$(B.14) \quad s = 3 - \delta W$$

In equilibrium, the continuation value is $W^{B.1} = \frac{3}{3-\delta}$ and we have:

$$(B.15) \quad \tau^{B.1} = 1,$$

$$(B.16) \quad s^{B.1} = 3 \frac{3 - 2\delta}{3 - \delta},$$

$$(B.17) \quad s_a^{B.1} = 3 - \sigma - \frac{6\delta}{3 - \delta}$$

and

$$(B.18) \quad f_a^{B.1} = \frac{3\delta}{3 - \delta},$$

with $f_m^{B.1} = f_n^{B.1} = 0$.

Case B.2. In this case, the relevant optimization problem is given by:

$$(B.19) \quad \max_{\{s_i\}, \{f_i\}, \tau} 1 - \tau + f_a$$

subject to

$$\begin{cases} s + f \leq 3\tau & (BC) \\ s_m \geq \sigma + \delta W & (IC_m^B) \\ s_a \geq 2 & (IC_a^2) \end{cases}$$

and the aggregate incentive compatibility constraint can be written as:

$$(B.20) \quad s = (2 + \sigma) + \delta W$$

In equilibrium, the continuation value is $W^{B.2} = \frac{2+\sigma}{3-3\delta}$, by equation (A.12), and we have:

$$(B.21) \quad \tau^{B.2} = 1,$$

$$(B.22) \quad s^{B.2} = (2 + \sigma) \frac{3 - 2\delta}{3 - 3\delta},$$

$$(B.23) \quad s_a^{B.2} = 2$$

and

$$(B.24) \quad f_a^{B.2} = 3 - (2 + \sigma) \frac{3 - 2\delta}{3 - 3\delta},$$

with $f_m^{B.2} = f_n^{B.2} = 0$.

Optimal Strategy of the Agenda Setter

Proceeding by backward induction, we start by deriving the optimal strategy of the agenda setter. First, consider the case where the voters in a adopt a strategy consistent with a proposal that satisfies $U_m(\mathbf{q}) \geq 1 - \sigma$. In this case, we compare the agenda setter's payoffs under A.1 and A.2. From equations (B.4) and (B.10), it follows that:

$$s_a^{A.1} \geq s_a^{A.2} \leftrightarrow 3 - \sigma - 2\delta \geq 2,$$

so that the agenda setter adopts a strategy consistent with equilibrium A.1 if, and only if,

$$(B.25) \quad \delta \leq \frac{1 - \sigma}{2}$$

while, otherwise, he implements a strategy that leads to equilibrium A.2.

Next, consider the case where the voters in a adopt a strategy consistent with a proposal such that $U_m(\mathbf{q}) = 0$. In this case, we compare the agenda setter's payoffs under B.1 and B.2. From equations (B.16) and (B.23), it follows that:

$$s_a^{B.1} \geq s_a^{B.2} \leftrightarrow 3 - \sigma - \frac{6\delta}{3 - \delta} \geq 2,$$

so that the agenda setter adopts a strategy consistent with equilibrium B.1 if, and only if,

$$(B.26) \quad \delta \leq \frac{3(1 - \sigma)}{7 - \sigma}$$

while, otherwise, he implements a strategy that leads to equilibrium B.2.

Optimal Strategies of Voters in a

Moving backwards, voters in group a formulate their reelection strategies taking as given the optimal behavior of all other agents. Their problem is to decide whether to formulate a voting rule that will induce the agenda setter to propose a policy \mathbf{q} such that (A) $U_m(\mathbf{q}) = 1 - \sigma$ or (B) $U_m(\mathbf{q}) = 0$. There are three regions of the parameters to consider:

$$(B.27) \quad 0 \leq \delta \leq \frac{3 - 3\sigma}{7 - \sigma}$$

$$(B.28) \quad \frac{3 - 3\sigma}{7 - \sigma} < \delta < \frac{1 - \sigma}{2}$$

and

$$(B.29) \quad \frac{1-\sigma}{2} \leq \delta \leq 1$$

Case $0 \leq \delta \leq \frac{3-3\sigma}{7-\sigma}$. Suppose, first, that $0 \leq \delta \leq \frac{3-3\sigma}{7-\sigma}$, in which circumstance the agenda setter always adopts a strategy consistent with equilibria A.1 and B.1. We compare the voters' payoffs under these two cases. From equations (B.5) and (B.18), it follows that:

$$f_a^{A.1} \leq f_a^{B.1} \leftrightarrow 3\delta - (1-\sigma) \leq \frac{3\delta}{3-\delta},$$

which can be re-expressed as:

$$(B.30) \quad \delta^2 - \frac{7-\sigma}{3}\delta + (1-\sigma) \geq 0$$

Observe that by substituting $\delta = \frac{3-3\sigma}{7-\sigma}$ into this inequality we obtain:

$$\left(\frac{3(1-\sigma)}{7-\sigma}\right)^2 - \frac{7-\sigma}{3} \frac{3(1-\sigma)}{7-\sigma} + (1-\sigma) = \left(\frac{3(1-\sigma)}{7-\sigma}\right)^2 \geq 0$$

Furthermore, note that for any δ such that $0 \leq \delta < \frac{3-3\sigma}{7-\sigma}$, it must be the case that:

$$\delta^2 + \underbrace{\left(-\frac{7-\sigma}{3}\delta + (1-\sigma)\right)}_M \geq 0,$$

since, for this range of the parameters, we always have $M > 0$. Therefore, when $0 \leq \delta \leq \frac{3-3\sigma}{7-\sigma}$, voters in the agenda setter's district always choose to adopt a strategy consistent with $U_m(\mathbf{q}) = 0$, so that the equilibrium always falls into category B.1.

Case $\frac{3-3\sigma}{7-\sigma} < \delta < \frac{1-\sigma}{2}$. Next, suppose that $\frac{3-3\sigma}{7-\sigma} < \delta < \frac{1-\sigma}{2}$, in which circumstance the agenda setter always adopts a strategy consistent with equilibria A.1 and B.2. We compare the voters' payoffs under these two cases. From equations (B.5) and (B.24), it follows that:

$$f_a^{A.1} \leq f_a^{B.2} \leftrightarrow 3\delta - (1 - \sigma) \leq 3 - (2 + \sigma) \frac{3 - 2\delta}{3 - 3\delta},$$

which can be re-expressed as:

$$(B.31) \quad \delta^2 - \frac{17 - 5\sigma}{9}\delta + \frac{6(1 - \sigma)}{9} \geq 0$$

The solution for this quadratic equation, under the restriction that $\delta \in [0, 1]$, is given by:

$$(B.32) \quad \bar{\delta} = \frac{1}{2} \left(\frac{17 - 5\sigma}{9} - \sqrt{\left(\frac{17 - 5\sigma}{9} \right)^2 - \frac{8(1 - \sigma)}{3}} \right),$$

with $\frac{3-3\sigma}{7-\sigma} < \bar{\delta} < \frac{1-\sigma}{2}$. It is, therefore, possible to show that: (1) if $\frac{3-3\sigma}{7-\sigma} \leq \delta \leq \bar{\delta}$, then the equilibrium falls into case B.2, while (2) if $\bar{\delta} \leq \delta \leq \frac{1-\sigma}{2}$, then the equilibrium falls into case B.1.

Case $\frac{1-\sigma}{2} \leq \delta \leq 1$. Finally, suppose that $\frac{1-\sigma}{2} \leq \delta \leq 1$, in which circumstance the agenda setter always adopts a strategy consistent with equilibria A.2 and B.2. We compare the voters' payoffs under these two cases. From equations (B.11) and (B.24), it follows that:

$$f_a^{A.2} \geq f_a^{B.2} \leftrightarrow \delta \frac{2+\sigma}{3-2\delta} \geq 3 - (2+\sigma) \frac{3-2\delta}{3-3\delta},$$

which can be re-expressed as:

$$(B.33) \quad \delta^2 - \frac{9(3-\sigma)}{16-\sigma}\delta + \frac{9(1-\sigma)}{16-\sigma} \leq 0$$

Let $J(\delta) \equiv \delta^2 - \frac{9(3-\sigma)}{16-\sigma}\delta + \frac{9(1-\sigma)}{16-\sigma}$. Observe that substituting $\delta = \frac{1-\sigma}{2}$ into this function, we obtain:

$$J\left(\frac{1-\sigma}{2}\right) = \left(\frac{1-\sigma}{2}\right)^2 - \frac{9(3+\sigma)}{16-\sigma} \left(\frac{1-\sigma}{2}\right) + \frac{9(1-\sigma)}{16-\sigma} = \frac{1-\sigma}{2} - \frac{9(1+\sigma)}{16-\sigma},$$

which can be shown to be always strictly negative for any $\sigma \in [0, 1]$. Furthermore, observe that the derivative:

$$\frac{\partial J(\delta)}{\partial \delta} = \delta - \frac{9(3-\sigma)}{16-\sigma}$$

is always negative for any $\delta \leq \frac{9(3-\sigma)}{16-\sigma}$. But, since $\frac{9(3-\sigma)}{16-\sigma} > 1$, it follows that $J(\delta)$ is strictly negative for any δ such that $\frac{1-\sigma}{2} \leq \delta \leq 1$. Therefore, whenever $\frac{1-\sigma}{2} \leq \delta \leq 1$, voters in the agenda setter's district always choose to adopt a strategy

consistent with $U_m(\mathbf{q}) = 1 - \sigma$, so that the equilibrium always falls into category A.2.

Summary

The following table provides a summary of the characterization of the equilibrium:

| <i>parameter region</i> | <i>case</i> |
|--|-------------|
| $0 \leq \delta \leq \frac{3-3\sigma}{7-\sigma}$ | B.1 |
| $\frac{3-3\sigma}{7-\sigma} \leq \delta \leq \bar{\delta}(\sigma)$ | B.2 |
| $\bar{\delta}(\sigma) \leq \delta \leq \frac{1-\sigma}{2}$ | A.1 |
| $\frac{1-\sigma}{2} \leq \delta \leq 1$ | A.2 |

where $\bar{\delta}(\sigma) = \frac{1}{2} \left(\frac{17-5\sigma}{9} - \sqrt{\left(\frac{17-5\sigma}{9}\right)^2 - \frac{8(1-\sigma)}{3}} \right)$. ■

APPENDIX C

Public versus Secret Voting in Committees**C.1. Proofs****C.1.1. Proof of Proposition 3.1**

We start by deriving the necessary conditions for the existence of a fully competent equilibrium. First, note that we need to guarantee that all competent members who are biased against the state of the world, $\theta \neq \omega$, prefer to vote correctly rather than abstain or vote incorrectly. Under a fully competent equilibrium, the expected utility of voting correctly for these members is:

$$U_c^{\theta \neq \omega, P}(v_c = \omega) = \phi + \alpha,$$

while the expected utility of voting incorrectly is:

$$\begin{aligned} U_c^{\theta \neq \omega, P}(v_c = \tilde{\omega}) &= \alpha \left(1 - \frac{1}{2} \binom{n-1}{n-2} \sigma (1-\sigma)^{n-2} - \binom{n-1}{n-1} (1-\sigma)^{n-1} \right) \\ &\quad + \gamma \left(\frac{1}{2} \binom{n-1}{n-2} \sigma (1-\sigma)^{n-2} + \binom{n-1}{n-1} (1-\sigma)^{n-1} \right) \end{aligned}$$

where $\tilde{\omega} \in \{A, B\}$ denotes the alternative contrary to the state of the world. Observe that, in this case, voting according to bias is always preferred to abstaining, since the reputation reward associated with both situations is zero. We, thus, need to guarantee that:

$$U_c^{\theta \neq \omega, \mathbb{P}}(v_c = \omega) \geq U_c^{\theta \neq \omega, \mathbb{P}}(v_c = \tilde{\omega}),$$

and re-arranging the expressions derive above, we obtain:

$$(C.1) \quad \gamma \leq \alpha + \frac{1}{\left(1 + \frac{n-3}{2}\sigma\right)(1-\sigma)^{n-2}}\phi$$

Second, we need to make sure that the incompetent members prefer to abstain rather than to vote for their preferred alternative. Under a fully competent equilibrium, the expected utility of abstaining for these members is:

$$\begin{aligned} U_{nc}^{\theta, \mathbb{P}}(v_{nc} = \emptyset) &= \frac{1}{2} \left\{ \alpha \left(1 - \frac{1}{2} \binom{n-1}{n-1} (1-\sigma)^{n-1} \right) \right. \\ &\quad \left. + \gamma \left(\frac{1}{2} \binom{n-1}{n-1} (1-\sigma)^{n-1} \right) \right\} \\ &\quad + \frac{1}{2} \left\{ (\alpha + \gamma) \left(1 - \frac{1}{2} \binom{n-1}{n-1} (1-\sigma)^{n-1} \right) \right\} \end{aligned}$$

while the expected utility of voting according to their biases is:

$$\begin{aligned}
U_{\text{nc}}^{\theta, \text{p}}(v_{\text{nc}} = \theta) &= \frac{1}{2} \left\{ \alpha \left(1 - \frac{1}{2} \binom{n-1}{n-2} \sigma (1-\sigma)^{n-2} - \binom{n-1}{n-1} (1-\sigma)^{n-1} \right) \right. \\
&\quad \left. + \gamma \left(\frac{1}{2} \binom{n-1}{n-2} \sigma (1-\sigma)^{n-2} + \binom{n-1}{n-1} (1-\sigma)^{n-1} \right) \right\} \\
&\quad + \frac{1}{2} (\alpha + \gamma)
\end{aligned}$$

In this case, we need to guarantee that:

$$U_{\text{nc}}^{\theta, \text{p}}(v_{\text{nc}} = \emptyset) \geq U_{\text{nc}}^{\theta, \text{p}}(v_{\text{nc}} = \theta),$$

and re-arranging the expressions above, we obtain:

$$(C.2) \quad \gamma \leq \frac{(n-1)\sigma}{2+(n-3)\sigma} \alpha - \frac{1}{\left(1 + \frac{n-3}{2}\sigma\right) (1-\sigma)^{n-2}} \phi$$

Note that since $\frac{(n-1)\sigma}{2+(n-3)\sigma} \leq 1$, it follows that $\frac{(n-1)\sigma}{2+(n-3)\sigma} \alpha - \frac{1}{\left(1 + \frac{n-3}{2}\sigma\right) (1-\sigma)^{n-2}} \phi < \alpha + \frac{1}{\left(1 + \frac{n-3}{2}\sigma\right) (1-\sigma)^{n-2}} \phi$, so that expression (20) is the binding constraint, i.e. whenever condition (C.2) is satisfied, then so is (C.1), while the opposite does not hold.

Next, we proceed to derive the necessary conditions for the existence of a partially competent equilibrium. As before, we must guarantee that all competent members who are biased against the state of the world, $\theta \neq \omega$, prefer to vote correctly rather than abstain or vote incorrectly. Observe that, under a partially competent equilibrium, the expected utility of voting correctly for these members

is:

$$\begin{aligned}
U_c^{\theta \neq \omega, \mathbb{P}}(v_c = \omega) = & \\
& \phi \frac{\sigma}{\sigma + \frac{1}{2}(1 - \sigma)} \\
& + \alpha \left\{ 1 - \sum_{k=\frac{n-1}{2}+1}^n \binom{n-1}{k} \left(\sigma + \frac{1-\sigma}{2} \right)^{n-1-k} \left(\frac{1-\sigma}{2} \right)^k \right\} \\
& + \gamma \left\{ \sum_{k=\frac{n-1}{2}+1}^n \binom{n-1}{k} \left(\sigma + \frac{1-\sigma}{2} \right)^{n-1-k} \left(\frac{1-\sigma}{2} \right)^k \right\}
\end{aligned}$$

while their expected utility of abstaining and voting incorrectly are, respectively, given by:

$$\begin{aligned}
U_c^{\theta \neq \omega, \mathbb{P}}(v_c = \emptyset) = & \\
& \alpha \left\{ 1 - \frac{1}{2} \binom{n-1}{(n-1)/2} \left(\sigma + \frac{1-\sigma}{2} \right)^{\frac{n-1}{2}} \left(\frac{1-\sigma}{2} \right)^{\frac{n-1}{2}} \right. \\
& \left. - \sum_{i=\frac{n+1}{2}}^n \binom{n-1}{i} \left(\sigma + \frac{1-\sigma}{2} \right)^{n-1-i} \left(\frac{1-\sigma}{2} \right)^i \right\} \\
& + \gamma \left\{ \frac{1}{2} \binom{n-1}{(n-1)/2} \left(\sigma + \frac{1-\sigma}{2} \right)^{\frac{n-1}{2}} \left(\frac{1-\sigma}{2} \right)^{\frac{n-1}{2}} \right. \\
& \left. + \sum_{i=\frac{n+1}{2}}^n \binom{n-1}{i} \left(\sigma + \frac{1-\sigma}{2} \right)^{n-1-i} \left(\frac{1-\sigma}{2} \right)^i \right\}
\end{aligned}$$

and

$$U_c^{\theta \neq \omega, \text{P}}(v_c = \tilde{\omega}) = \alpha \left\{ 1 - \sum_{i=\frac{n-1}{2}}^n \binom{n-1}{i} \left(\sigma + \frac{1-\sigma}{2} \right)^{n-1-i} \left(\frac{1-\sigma}{2} \right)^i \right\} \\ + \gamma \left\{ \sum_{i=\frac{n-1}{2}}^n \binom{n-1}{i} \left(\sigma + \frac{1-\sigma}{2} \right)^{n-1-i} \left(\frac{1-\sigma}{2} \right)^i \right\}$$

In this case, we need to guarantee that:

$$U_c^{\theta \neq \omega, \text{P}}(v_c = \omega) \geq \max \{ U_c^{\theta \neq \omega, \text{P}}(v_c = \emptyset), U_c^{\theta \neq \omega, \text{P}}(v_c = \tilde{\omega}) \}$$

It is possible to show that whenever $\alpha \geq \gamma$, i.e. when the common value is larger than the bias term, then $U_c^{\theta \neq \omega, \text{P}}(v_c = \omega) > U_c^{\theta \neq \omega, \text{P}}(v_c = \emptyset) > U_c^{\theta \neq \omega, \text{P}}(v_c = \tilde{\omega})$, so that the above condition is always satisfied; while when $\alpha < \gamma$, then $U_c^{\theta \neq \omega, \text{P}}(v_c = \emptyset) < U_c^{\theta \neq \omega, \text{P}}(v_c = \tilde{\omega})$, so that the we must impose that:

$$U_c^{\theta \neq \omega, \text{P}}(v_c = \omega) \geq U_c^{\theta \neq \omega, \text{P}}(v_c = \tilde{\omega}),$$

and re-arranging the expressions above, we obtain:

$$(C.3) \quad \gamma \leq \alpha + \frac{2^n \sigma}{\binom{n-1}{(n-1)/2} (1+\sigma)^{(n-1)/2+1} (1-\sigma)^{(n-1)/2}} \phi$$

Moreover, we need to make sure that the incompetent members prefer to vote for their preferred alternative rather than to abstain. Under a partially competent

equilibrium, the expected utility of voting according to their biases is:

$$\begin{aligned}
U_{\text{nc}}^{\theta, \text{P}}(v_{\text{nc}} = \theta) = & \\
& \phi\left(\frac{1}{2}\frac{\sigma}{\sigma + \frac{1}{2}(1-\sigma)}\right) \\
& + \frac{1}{2} \left\{ \alpha \left(1 - \sum_{i=\frac{n-1}{2}}^n \binom{n-1}{i} \left(\frac{1+\sigma}{2}\right)^{n-1-i} \left(\frac{1-\sigma}{2}\right)^i \right) \right. \\
& \quad \left. + \gamma \sum_{i=\frac{n-1}{2}}^n \binom{n-1}{i} \left(\frac{1+\sigma}{2}\right)^{n-1-i} \left(\frac{1-\sigma}{2}\right)^i \right\} \\
& + \frac{1}{2} \left\{ (\alpha + \gamma) \left(1 - \sum_{i=\frac{n+1}{2}}^n \binom{n-1}{i} \left(\frac{1+\sigma}{2}\right)^{n-1-i} \left(\frac{1-\sigma}{2}\right)^i \right) \right\}
\end{aligned}$$

while the expected utility of abstaining is:

$$\begin{aligned}
U_{\text{nc}}^{\theta, \text{P}}(v_{\text{nc}} = \emptyset) = & \\
& \frac{1}{2} \left\{ \alpha \left(1 - \frac{1}{2} \binom{n-1}{(n-1)/2} \left(\frac{1+\sigma}{2}\right)^{\frac{n-1}{2}} \left(\frac{1-\sigma}{2}\right)^{\frac{n-1}{2}} \right. \right. \\
& \quad \left. \left. - \sum_{i=\frac{n+1}{2}}^n \binom{n-1}{i} \left(\frac{1+\sigma}{2}\right)^{n-1-i} \left(\frac{1-\sigma}{2}\right)^i \right) \right. \\
& \quad \left. + \gamma \left(\frac{1}{2} \binom{n-1}{(n-1)/2} \left(\frac{1+\sigma}{2}\right)^{\frac{n-1}{2}} \left(\frac{1-\sigma}{2}\right)^{\frac{n-1}{2}} \right. \right. \\
& \quad \left. \left. + \sum_{i=\frac{n+1}{2}}^n \binom{n-1}{i} \left(\frac{1+\sigma}{2}\right)^{n-1-i} \left(\frac{1-\sigma}{2}\right)^i \right) \right\}
\end{aligned}$$

$$\begin{aligned}
& + \frac{1}{2} \left\{ (\alpha + \gamma) \left(1 - \frac{1}{2} \binom{n-1}{(n-1)/2} \left(\frac{1+\sigma}{2} \right)^{\frac{n-1}{2}} \left(\frac{1-\sigma}{2} \right)^{\frac{n-1}{2}} \right. \right. \\
& \quad \left. \left. - \sum_{i=\frac{n+1}{2}}^n \binom{n-1}{i} \left(\frac{1+\sigma}{2} \right)^{n-1-i} \left(\frac{1-\sigma}{2} \right)^i \right) \right\}
\end{aligned}$$

Thus, we need to guarantee that:

$$U_{\text{nc}}^{\theta, \text{p}}(v_{\text{nc}} = \theta) \geq U_{\text{nc}}^{\theta, \text{p}}(v_{\text{nc}} = \emptyset)$$

and re-arranging the expressions above, we obtain:

$$\phi \left(\frac{1}{2} \frac{\sigma}{\sigma + \frac{1}{2}(1-\sigma)} \right) + \gamma \left\{ \frac{1}{2} \binom{n-1}{(n-1)/2} \left(\frac{1+\sigma}{2} \right)^{\frac{n-1}{2}} \left(\frac{1-\sigma}{2} \right)^{\frac{n-1}{2}} \right\} \geq 0,$$

which is always satisfied. Therefore, the necessary condition for the existence of a partially competent equilibrium is given by constraint (C.3).

Finally, let:

$$\bar{\gamma}_{full}^{\text{p}} \equiv \frac{(n-1)\sigma}{2 + (n-3)\sigma} \alpha - \frac{1}{\left(1 + \frac{n-3}{2}\sigma\right) (1-\sigma)^{n-2}} \phi$$

and

$$\bar{\gamma}_{part}^{\text{p}} \equiv \alpha + \frac{2^n \sigma}{\binom{n-1}{(n-1)/2} (1+\sigma)^{(n-1)/2+1} (1-\sigma)^{(n-1)/2}} \phi$$

Notice that, since $\frac{(n-1)\sigma}{2+(n-3)\sigma} \leq 1$, it immediately follows that $\bar{\gamma}_{full}^p < \bar{\gamma}_{part}^p$, i.e. it is always harder to sustain a fully competent equilibrium than a partially competent one. ■

C.1.2. Proof of Proposition 3.2

This proof follows the same steps used to derive proposition 1. The only difference is that the reputation rewards under a fully and a partially competent equilibrium are now given, respectively, by:

$$r^s = \frac{1}{n} \sum_{i=1}^n \mathbb{I}_{\{v_i=\omega\}}$$

and

$$r^s = \frac{\sigma}{\sigma + \frac{1}{2}(1-\sigma)} \frac{1}{n} \sum_{i=1}^n \mathbb{I}_{\{v_i=\omega\}}$$

where $\sum_{i=1}^n \mathbb{I}_{\{v_i=\omega\}}$ is the total number of correct votes. All conditions derived above remain the same, except that the term ϕ now appears divided by n . This change captures the fact that, under secret voting, the impact of an agent's vote on his own reputation is diluted across other members of the committee. The full proof is omitted for brevity. ■

C.1.3. Proof of Proposition 3.3

Observe, first, that when $\gamma \geq \alpha$, the:

$$\gamma > \frac{(n-1)\sigma}{2+(n-3)\sigma}\alpha - \frac{1}{\left(1+\frac{n-3}{2}\sigma\right)(1-\sigma)^{n-2}}\phi$$

and

$$\gamma > \frac{(n-1)\sigma}{2+(n-3)\sigma}\alpha - \frac{1}{\left(1+\frac{n-3}{2}\sigma\right)(1-\sigma)^{n-2}}\frac{\phi}{n}$$

so that a fully competent equilibrium can never be sustained under public or secret voting, i.e. conditions (2.5) and (2.12) are violated. Furthermore, it is immediate to see that:

$$\begin{aligned}\bar{\gamma}_{part}^p &\equiv \alpha + \frac{2^n\sigma}{\binom{n-1}{(n-1)/2}(1+\sigma)^{\frac{n-1}{2}+1}(1-\sigma)^{\frac{n-1}{2}}}\phi > \\ \bar{\gamma}_{part}^s &\equiv \alpha + \frac{2^n\sigma}{\binom{n-1}{(n-1)/2}(1+\sigma)^{\frac{n-1}{2}+1}(1-\sigma)^{\frac{n-1}{2}}}\frac{\phi}{n},\end{aligned}$$

so that $\gamma \leq \bar{\gamma}_{part}^s \rightarrow \gamma \leq \bar{\gamma}_{part}^p$.

Second, note that when $\gamma < \alpha$, then:

$$\gamma < \alpha + \frac{2^n\sigma}{\binom{n-1}{(n-1)/2}(1+\sigma)^{\frac{n-1}{2}+1}(1-\sigma)^{\frac{n-1}{2}}}\phi$$

and

$$\gamma < \alpha + \frac{2^n\sigma}{\binom{n-1}{(n-1)/2}(1+\sigma)^{\frac{n-1}{2}+1}(1-\sigma)^{\frac{n-1}{2}}}\frac{\phi}{n},$$

so that a partially competent equilibrium can always be sustained under public or secret voting, i.e. conditions (2.6) and (2.13) always hold. Furthermore, it is easy to see that:

$$\bar{\gamma}_{full}^p \equiv \frac{(n-1)\sigma}{2+(n-3)\sigma}\alpha - \frac{1}{\left(1+\frac{n-3}{2}\sigma\right)(1-\sigma)^{n-2}}\phi <$$

$$\bar{\gamma}_{full}^s \equiv \frac{(n-1)\sigma}{2+(n-3)\sigma}\alpha - \frac{1}{\left(1+\frac{n-3}{2}\sigma\right)(1-\sigma)^{n-2}}\frac{\phi}{n}$$

so that $\gamma < \bar{\gamma}_{full}^p \rightarrow \gamma < \bar{\gamma}_{full}^s$. ■

C.1.4. Probability of Correct Decision

For a given set of parameter values, the probability of a correct decision under a fully competent equilibrium is such that:

$$P_{full} = 1 - \frac{1}{2} \Pr(\text{"all members are incompetent"}) = 1 - \frac{1}{2} \binom{n}{0} (1-\sigma)^n,$$

which yields:

$$(C.4) \quad P_{full} = 1 - \frac{1}{2} (1-\sigma)^n$$

Next, under a partially competent equilibrium, we have:

$$(C.5) \quad P_{part} = \Pr \left(\sum_{i=1}^n \mathbb{I}_{\{v_i=\omega\}} \geq \frac{n+1}{2} \right) \rightarrow$$

$$P_{part} = \sum_{i=\frac{n+1}{2}}^n \binom{n}{i} \left(\sigma + \frac{1}{2}(1-\sigma) \right)^i \left(\frac{1}{2}(1-\sigma) \right)^{n-i},$$

where $\sigma + \frac{1}{2}(1-\sigma)$ is the expected fraction of members who vote correctly, while under a "bias" equilibrium, we have:

$$P_{bias} = \Pr \left(\sum_{i=1}^n \mathbb{I}_{\{v_i=\omega\}} \geq \frac{n+1}{2} \right) = \sum_{i=\frac{n+1}{2}}^n \binom{n}{i} \left(\frac{1}{2} \right)^i \left(\frac{1}{2} \right)^{n-i},$$

where $\frac{1}{2}$ is the expected proportion of members who vote correctly in this case.

Re-arranging this expression, we obtain:

$$(C.6) \quad P_{bias} = \left(\frac{1}{2} \right)^n \sum_{i=\frac{n+1}{2}}^n \binom{n}{i} = \left(\frac{1}{2} \right)^n \frac{2^n}{2} \rightarrow P_{bias} = \frac{1}{2}$$

Finally, note that $P_{part} > P_{bias}$, since the fraction of members who vote correctly is larger under a partially competent equilibrium, i.e. $\sigma + \frac{1}{2}(1-\sigma) > \frac{1}{2}$. Furthermore, starting from a fully competent equilibrium, it is possible to show that the probability of a correct outcome can never increase when an incompetent

member deviates from abstaining to voting. Note that, in this case, we would have:

$$\begin{aligned} \tilde{P}_{full}^1 &= (1 - \sigma)^n \left\{ 1 - \frac{1}{2} (1 - \sigma)^n \right\} + \\ &\quad (1 - (1 - \sigma)^n) \underbrace{\left\{ \frac{1}{2} + \frac{1}{2} \left(1 - (1 - \sigma)^{n-1} - \frac{1}{2} \binom{n-1}{1} \sigma (1 - \sigma)^{n-2} \right) \right\}}_{\Gamma^1}, \end{aligned}$$

where Γ^1 is the probability that a correct decision is obtained given that an incompetent member votes for his preferred alternative. This expression can be re-written as:

$$\begin{aligned} \tilde{P}_{full}^1 &= (1 - \sigma)^n \left\{ 1 - \frac{1}{2} (1 - \sigma)^n \right\} + \\ &\quad (1 - (1 - \sigma)^n) \left\{ 1 - \frac{1}{2} (1 - \sigma)^{n-1} - \frac{n-1}{4} \sigma (1 - \sigma)^{n-2} \right\} \end{aligned}$$

It, then, follows that $P_{full}^1 > \tilde{P}_{full}^1$, since $1 - \frac{1}{2} (1 - \sigma)^{n-1} - \frac{n-1}{4} \sigma (1 - \sigma)^{n-2} < 1 - \frac{1}{2} (1 - \sigma)^n$. This argument can be repeated iteratively to show that allowing additional incompetent members to deviate cannot increase the probability of a correct outcome. Therefore, we conclude that $P_{full} > P_{part}$. ■