TI 2004-035/1
Tinbergen Institute Discussion Paper

Polarization, Information Collection and Electoral Control

Silvia Dominguez Martinez
Otto H. Swank

Department of Economics, Erasmus Universiteit Rotterdam, and Tinbergen Institute.

Tinbergen Institute
The Tinbergen Institute is the institute for economic research of the Erasmus Universiteit Rotterdam, Universiteit van Amsterdam, and Vrije Universiteit Amsterdam.

Tinbergen Institute Amsterdam
Roetersstraat 31
1018 WB Amsterdam
The Netherlands
Tel.: +31(0)20 551 3500
Fax: +31(0)20 551 3555

Tinbergen Institute Rotterdam
Burg. Oudlaan 50
3062 PA Rotterdam
The Netherlands
Tel.: +31(0)10 408 8900
Fax: +31(0)10 408 9031

Please send questions and/or remarks of non-scientific nature to driessen@tinbergen.nl.
Most TI discussion papers can be downloaded at http://www.tinbergen.nl.

Polarization, Information Collection and Electoral Control*

Silvia Dominguez Martinez† and Otto H. Swank

Erasmus University Rotterdam and Tinbergen Institute

March 22, 2004

Abstract

We identify the conditions under which voters can induce political parties to collect information and to select policies which are optimal from the representative voter's point of view. We show that when parties are office motivated the voting rule should encourage parties to collect information. Voting rules that focus on the opposition party sometimes dominate voting rules that focus on the incumbent party. When parties are policy motivated, parties have also to be motivated to select good policies. Generally, it is easier to stimulate policy motivated parties to collect information than office motivated parties. However, in contrast to office motivated parties, policy motivated parties will sometimes select policies that conflict with the representative voter's interest.

Key words: political competition, information, polarization

JEL Classification: D72

*We are grateful to Klaas Beniers, Josse Delfgaauw, Robert Dur, Bauke Visser and seminar participants at Erasmus University Rotterdam for comments.

†Address: Tinbergen Institute Rotterdam, Burgemeester Oudlaan 50, 3062 PA Rotterdam, The Netherlands. Email: dominguezmartinez@few.eur.nl Tel: +31-10-4088953 Fax: +31-10-4089147.

1 Introduction

In the economics literature, polarization of preferences of political parties generally leads to sub-optimal outcomes. The reason is twofold. First, polarization introduces uncertainty, because it usually implies that (economic) outcomes will depend on electoral outcomes. It is well-known that when voters are risk-averse, they prefer a certain outcome X to a gamble for which the expected outcome is X (Myerson, 1995, Persson and Tabellini, 2000, chapter 5). Second, polarization of preferences prevents information revelation. Schultz (1996, 1999) shows that polarization may induce the incumbent party to bias its policies to increase its chances of re-election. An important feature of his model is that parties have better information on how the economy works than voters.

This paper shows that besides costs, there is a benefit of polarization of preferences: it encourages political parties to make a case for their policies. As a consequence, in a polarized political system, the incentives of parties to collect information are stronger than in a political system in which parties are purely office motivated. When the cost of acquiring information is high relative to the rents from office, voters prefer a polarized political system to a system with office motivated parties. To make our point, we employ a principal-agent model in which two parties compete for office. We examine two cases: the case that the sole aim of parties is holding office, and the case that parties are ideologically driven.[1] In our model, the electorate wants parties to perform two tasks. The first task is acquiring information. The idea is that the electorate wants parties to make a case for their policy. Each party can search for two pieces of information: an argument that justifies intensifying policy and an argument that justifies restricting policy. Both the incumbent party and the opposition party can collect information.[2] It is also possible that one party searches for one piece of information and the other party searches for the other piece

[1] The reason for analyzing office motivated parties and policy motivated parties separately is to highlight the forces at work. We are aware that these are extreme cases. Combining them is straightforward, but tedious.

An other extension of the model is to allow for different types of politicians, for example, allowing for office motivated parties and policy motivated parties. In this set-up, elections can be seen as a mechanism used by the voter to select the type of politician that provides the largest utility to the electorate.

[2] In principal-agent models of politics, the opposition party usually does not play an active role. In the words of Ferejohn (1986, p. 14): "The importance of challengers lies entirely in their availability".

of information. The second task is making a decision about policy. The incumbent party performs this task. We examine to what extent alternative voting rules induce political parties to pursue the voters' interests.

We derive several results. First, in case the parties are office motivated, voting rules should focus on information collection. The reason is that since the incumbent party is not concerned with policy, it always selects the policy voters want. The problem is to encourage parties to collect information. One could interpret this result as a variation on the median voter theorem. As to the determination of policies, office motivated parties tend to act in accordance with the wishes of a majority of voters. Second, a voting rule that encourages the opposition party to collect information may be at least as good as a voting rule that stimulates the incumbent party to collect information. The intuition of this result is that charging the opposition with the task of collecting information increases the value of office (the incumbent party enjoys the rents from office, while the opposition party incurs the cost of effort). This second result is similar to one of the main results of tournament theory that a bigger spread of payoffs leads to higher effort levels (Lazear and Rosen, 1981). Our second result suggests that the role of the opposition party in a democracy might be much bigger than "being available".

Our next two results are related to the case that parties are policy motivated. We show that policy motivated parties need to be given weaker incentives to collect information than office motivated parties. The main reason is that information about policy consequences may warrant particular policies. For instance, a party that is biased towards selecting restrictive policy will search for arguments that support restrictive policy. An implication of this result is that in a polarized party system, as to information collection there is a natural division of tasks. One party collects information about the pros of restrictive policy; the other party collects information about the pros of intensifying policy. Finally, when parties are policy motivated, the voter cannot always induce the incumbent party to select a policy in her interest. At most, the voters can induce the incumbent party sometimes to select the policy that is optimal from her point of view. The reason is that a policy motivated party desires office because of the influence it wields in determining policy. If this influence is not present, the party will simply select its optimal policy, taking for granted that it will be sent away. How often the incumbent party should be allowed to select its

own optimal policy depends on the costs of collecting information.

This article builds on the literature on electoral competition in two-party systems. On the basis of the way voters are modeled, two strands in this literature can be distinguished. First, in spatial models of elections, each voter compares the platforms of the political parties, and votes for the party whose platform yields highest expected utility. This literature gives the conditions under which in a two-party system the platforms of parties converge (see for a survey of this literature Mueller, 2003, chapter 11 and 12), or diverge (Wittman, 1977, Calvert, 1985, Alesina, 1988). Second, in principal-agent models of politics, voters are modeled as a principal who has to keep an officeholder, the agent, in check. The relationship between voters and the officeholder is modeled as an implicit contract (or voting rule). This contract stipulates the conditions under which the office holder stays in office or is replaced by another one. This literature also has provided several insights. For example, Ferejohn (1986) shows how voters can control moral hazard on the part of the incumbent. Persson, Roland and Tabellini (1997) use a principal-agent model to analyze the pros and cons of alternative political institutions.

An attractive feature of the literature using spatial models of politics is its empirical relevance. For example, Alesina and Rosenthal (1989) provide evidence that U.S. macroeconomic data are consistent with the predictions of a model in which parties cater to the interests of their core constituencies. Another attractive feature of spatial models is their focus on competition: both the incumbent and the opposition party play a role. A nice feature of principal-agent models is that they build on the basic idea of representative democracy that there might be huge benefits of delegating authority over policy to a relatively small number of representatives. However, a serious problem resulting from delegating authority is abuse of power. Elections may discipline officeholders, because voters can send them away if they do a poor job or keep them when they do a good job. Another attractive feature of principal-agent models is that they can do justice to the complexity of the policy-decision process. As a rule, the consequences of policy decisions are difficult to foresee. It is in the voters' interest that the officeholder makes *informed* decisions. Voters want political parties to collect information and to act upon this information. Principal-agent models are suitable for analyzing whether or not voters can encourage political parties to collect information. By (1) allowing for polarization;

(2) giving a role to the opposition party; and (3) giving parties multiple tasks, our paper tries to combine the attractive features of the two strands in the literature on electoral competition in two-party systems.

As mentioned before, our paper is closely related to Schultz (1996,1999) who shows that polarization of preferences prevents information revelation and may lead to Pareto inferior equilibria. An important difference between our model and the ones studied by Schultz is that in Schultz it is assumed that parties have better information about how the economy works, while in our model the distribution of information is endogenous. In fact, we show that polarization of preferences may be the reason why political parties are better informed than voters. Thus, in Schultz asymmetric information and polarization lead to manipulation of information, while in our paper polarization induces parties to collect information. As a consequence, in our model polarized preferences may lead to Pareto superior equilibria.

Our paper is also closely related to Dewatripont and Tirole (1999). They show that using two competing agents defending their own special interest improves the quality of decision-making compared to using a single agent. They thus provide a rationale for advocacy.[3] Following Dewatripont and Tirole, we assume that information is hard, i.e. once found, information can costlessly be verified. As a consequence, information cannot be forged or manipulated. We are aware that much of the information supplied by political parties is not hard. Often, it is very difficult for the voter to distinguish relevant from irrelevant information. However, we do believe that at elections voters want political parties to make a case for their policies. Our assumption of hard information reflects that it is easier for a party to convince voters when it has actual information than when it has forged information.[4]

This paper is organized as follows. The next section discusses the model. Section 3 and 4 describe the equilibria of the model. In Section 3 we consider parties that are purely office motivated and in Section 4 we consider purely policy motivated parties. Section 5 concludes.

[3] Ossokina and Swank (2004) also show that voters may benefit from advocacy. Their model revolves around uncertainty about the median voter's preferences.

[4] Swank and Visser (2003) show that if information is soft, it is hard for voters to encourage office motivated politicians to collect information (see also Dur and Swank (forthcoming), and Beniers and Swank (forthcoming) for the question how alternative types of information influence agents' incentives to collect information).

2 The Model

We consider an infinitely repeated game. In each period t, a political party has to make a decision about a public project, X_t. There are three alternatives: $X_t = -1$, $X_t = 0$ and $X_t = 1$. One could interpret $X_t = -1$ as restricting policy, $X_t = 0$ as maintaining status quo, and $X_t = 1$ as intensifying policy. In each period, there are three players: party L, party R and a representative (middle of the road) voter, to which we refer as 'the voter'. The voter's preferences are represented by

$$-E\sum_{t=0}^{\infty}\delta^t\left(X_t-\theta_t\right)^2 \tag{1}$$

where E is the expectations operator, δ is the discount factor $(0<\delta<1)$, and θ_t is a stochastic term. The term θ_t consists of two parts: $\theta_t = \theta_{A,t} + \theta_{B,t}$, with $\theta_{A,t} \in \{-1, 0\}$, $\Pr(\theta_{A,t} = -1) = \Pr(\theta_{A,t} = 0) = \frac{1}{2}$ and $\theta_{B,t} \in \{0, 1\}$, $\Pr(\theta_{B,t} = 0) = \Pr(\theta_{B,t} = 1) = \frac{1}{2}$. The terms $\theta_{A,t}$ and $\theta_{B,t}$ are independent of each other and independent of their previous values. The idea behind the stochastic term is that the consequences of policy are uncertain. Under full information, the voter would prefer $X_t = 1$ if $\theta_t = 1$, $X_t = 0$ if $\theta_t = 0$ and $X_t = -1$ if $\theta_t = -1$. However, the voter does not know $\theta_{A,t}$ and $\theta_{B,t}$. Without further information about the stochastic terms, the voter prefers $X_t = 0$. Notice that the voter wants policy to be based on θ_t.

In each period, policy is selected by the party which won the last elections. Before the governing party selects policy, the two parties may collect information about policy consequences. At cost C_2, a party learns both $\theta_{A,t}$ and $\theta_{B,t}$. At cost C_1, a party can learn the value of either $\theta_{A,t}$ or $\theta_{B,t}$. In a policy debate, information about policy consequences, if collected, can be communicated. We assume that if a party learns that $\theta_{A,t} = -1$ or $\theta_{B,t} = 1$, it can convey this information to the other party and the voter. For example, if a party puts forward an argument for intensifying policy $(\theta_{B,t} = 1)$, this reveals that that party has collected information about $\theta_{B,t}$. However, if a party collects information about, say, $\theta_{B,t}$ and learns that $\theta_{B,t} = 0$, it cannot show that it has collected information. The basic idea about the information structure is that with some probability arguments in favor $(\theta_{B,t} = 1)$ or against $(\theta_{A,t} = -1)$ intensifying policy exist. Costs have to be made

to find arguments. If a party puts forward an argument, then it is clear that the party tried to find an argument. If a party does not put forward an argument, then one cannot infer that the party did collect information. It is possible that $\theta_{A,t} = 0$ and/or $\theta_{B,t} = 0$.

As to the objectives of the parties, we make two assumptions. First, we assume that parties receive rents from holding office. In the next section, the preferences of party L are represented by

$$U_L = E \sum_{t=0}^{\infty} \delta^t \left(d_t \lambda - C_{t,L} \right) \tag{2}$$

where d_t is a variable taking the value one if party L is in office in period t and taking the value zero otherwise, λ denotes the value of holding office, and $C_{t,L} \in \{0, C_1, C_2\}$. Analogously, the preferences of party R are represented by

$$U_R = E \sum_{t=0}^{\infty} \delta^t \left(\left(1 - d_t \right) \lambda - C_{t,R} \right) \tag{3}$$

where $C_{t,R} \in \{0, C_1, C_2\}$. Next, we assume that parties have ideological preferences. In Section 4, the preferences of party L are given by

$$U_L = E \sum_{t=0}^{\infty} \delta^t \left[-(X_t - (-1 + \theta_t))^2 - C_{t,L} \right] \tag{4}$$

and the preferences of party R are given by

$$U_R = E \sum_{t=0}^{\infty} \delta^t \left[-(X_t - (1 + \theta_t))^2 - C_{t,R} \right] \tag{5}$$

Equation (4) reflects that, without further information about θ_t, party L prefers $X_t = -1$. Only if party L learns that $\theta_t = 1$, it prefers $X_t = 0$. Without information about θ_t, party R prefers $X_t = 1$. Only if $\theta_t = -1$, party R prefers $X_t = 0$. Equations (4) and (5) capture the main idea behind models with partisan politicians (Hibbs, 1977, Wittman, 1977, Alesina, 1988), in which political parties differ in their ideological preferences.

At the end of each period, the voter decides whether or not to re-elect the incumbent party. We assume that the voter applies a simple retrospective voting

rule. This rule conditions re-election of the incumbent on outcomes in the current period. When voting, the voter observes the policy selected by the incumbent party, and whether or not parties have found arguments in favor of restricting policy ($\theta_{A,t} = -1$) or intensifying policy ($\theta_{B,t} = 1$). The voting rule is meant to motivate the parties to collect information and to motivate the incumbent party to select the policy that maximizes equation (1).

Let us summarize the timing in each period. (1) The party that won the elections in period $t-1$ takes office. (2) Nature chooses $\theta_{A,t}$ and $\theta_{B,t}$. (3) Each party decides whether to learn the value of either $\theta_{A,t}$ or $\theta_{B,t}$, to learn both values or none of them. (4) The parties reveal the information they collected. (5) The incumbent party selects policy. (6) Elections are held.

3 Office Motivated Parties

In this section we identify the conditions under which the voter can induce political parties to pursue her interest in case parties are purely office motivated. From the voter's point of view, the first best situation is attained if (i) information about both $\theta_{A,t}$ and $\theta_{B,t}$ is collected, and, (ii) given the available information, X_t maximizes (1). With office motivated parties, the incumbent party has never an incentive to select a policy that does not accord with the voter's interest. For this reason, in this section we assume that the incumbent always selects the policy that maximizes (1), given the available information about θ_t. The problem that remains is the design of a voting rule that gives incentives to the parties to collect full information.

The idea behind any voting rule is that good behavior must be rewarded and bad behavior must be punished. Clearly, collecting full information is good, and not collecting information is bad. The main problem is that the voter does not always observe whether or not a party really collected information. A party can only show that it collected information if it found arguments in favor and/or against intensifying policy.

With office motivated parties, voting rules can be distinguished on the basis of two features. The first feature is the party on which the rule focuses. For example, if a rule focuses on the incumbent party, that rule stipulates what the incumbent party should do to get re-elected. The second feature of the voting rule concerns

the question of how demanding the voting rule is.

We first consider a voting rule that focuses only on the incumbent party and is highly demanding. After that, we will discuss voting rules that demand less of the incumbent party or that focus (partially) on the opposition party:

Voting rule I: *Re-elect the incumbent party if and only if it showed that* $\theta_{A,t} = -1$ and $\theta_{B,t} = 1$.

To examine the consequences of this voting rule, we identify the conditions under which it induces the incumbent to collect full information. Notice that if the incumbent party collects full information, the voter attains the first-best situation. A direct implication is that once we have shown that collecting full information is an optimal reply to voting rule I, we have identified an equilibrium of the game.

Suppose that in each period, the incumbent collects full information. Does the incumbent have an incentive to deviate? It is easy to see that collecting partial information cannot be an optimal response to voting rule I. The reason is that collecting partial information is costly but never leads to re-election under voting rule I. In other words, collecting partial information is dominated by collecting no information. Therefore, if an incumbent deviates, it collects no information. If the incumbent collects no information, its payoff equals

$$\lambda + V_{t+1}^{NE} \tag{6}$$

where V_{t+1}^{NE} is the equilibrium continuation value for the incumbent if it is not re-elected. If the incumbent collects full information, then voting rule I implies that with probability $\frac{1}{4}$ it will be re-elected. Thus, collecting full information delivers a payoff equal to

$$\lambda - C_2 + \frac{1}{4}V_{t+1}^{EL} + \frac{3}{4}V_{t+1}^{NE} \tag{7}$$

where V_{t+1}^{EL} is the equilibrium continuation value for the incumbent if it is re-elected.

From (6) and (7) it immediately follows that the incumbent prefers collecting full information to collecting no information if

$$C_2 \leq \frac{1}{4}\left(V_{t+1}^{EL} - V_{t+1}^{NE}\right) \tag{8}$$

In the Appendix we show that $V_{t+1}^{EL} - V_{t+1}^{NE} = \frac{2\delta}{2+\delta}(\lambda - C_2)$. Lemma 1 summarizes

our discussion about rule I.

Lemma 1 *Suppose voting rule I. Furthermore suppose that* $C_2 \leq \frac{1}{4}\left(V_{t+1}^{EL} - V_{t+1}^{NE}\right)$, *with* $V_{t+1}^{EL} - V_{t+1}^{NE} = \frac{2\delta}{2+\delta}(\lambda - C_2)$. *Then, (i) the opposition party does not collect information; (ii) the incumbent party collects full information.*

Proof. The proof of this lemma and other lemmas can be found in the Appendix. ■

Basically Lemma 1 states that if parties care sufficiently about holding office, the cost of collecting information is sufficiently low, and parties are patient enough, then voting rule I leads to a first-best situation for the voter. Of course a high λ is not always good. For example, Dur (2002) shows that electoral concerns may induce parties not to repeal policies that hurt society.

Let us now consider a less demanding voting rule:

Voting rule II: *Re-elect the incumbent party if it showed that* $\theta_{A,t} = -1$ *and* $\theta_{B,t} = 1$, *or it showed that* $\theta_{A,t} = -1$, *or it showed that* $\theta_{B,t} = 1$.

Along the same lines as we derived (8), we can derive that under voting rule II the incumbent prefers collecting full information to collecting no information if

$$C_2 \leq \frac{3}{4}\left(V_{t+1}^{EL} - V_{t+1}^{NE}\right) \tag{9}$$

with $V_{t+1}^{EL} - V_{t+1}^{NE} = \frac{2\delta}{2-\delta}(\lambda - C_2)$ (see the Appendix). Clearly condition (9) is weaker than condition (8). The reason is that if the incumbent party collects full information under voting rule II, it will be re-elected with probability $\frac{3}{4}$. Therefore, the expected benefits of collecting full information are higher under rule II than under rule I. Since showing partial information suffices for getting re-elected, voting rule II has the drawback that the incumbent party may be tempted to collect partial rather than full information.[5] If the incumbent party collects partial information in period t, its expected payoff equals

$$\lambda - C_1 + \frac{1}{2}V_{t+1}^{EL} + \frac{1}{2}V_{t+1}^{NE} \tag{10}$$

[5] We assume that a political party that collects full information, searches for both pieces of information simultaneously. If political parties were allowed to collect information sequentially, voting rule II would induce the parties to stop searching for information, once they have found a piece of information.

Collecting full information yields a higher expected payoff than collecting partial information if

$$C_2 - C_1 \leq \frac{1}{4}\left(V_{t+1}^{EL} - V_{t+1}^{NE}\right) \tag{11}$$

Equation (11) shows that the smaller is the difference between C_2 and C_1, the weaker is the incumbent's incentive to collect partial information. Lemma 2 describes the conditions under which voting rule II induces the incumbent party to collect full information.

Lemma 2 *Suppose voting rule II. Furthermore, suppose that* $C_2 \leq \frac{3}{4}\left(V_{t+1}^{EL} - V_{t+1}^{NE}\right)$ *and* $C_2 - C_1 \leq \frac{1}{4}\left(V_{t+1}^{EL} - V_{t+1}^{NE}\right)$*, with* $V_{t+1}^{EL} - V_{t+1}^{NE} = \frac{2\delta}{2-\delta}(\lambda - C_2)$*. Then, (i) the opposition party does not collect information; (ii) the incumbent party collects full information.*

It is easy to see that both conditions (9) and (11) are weaker than (8). Hence, voting rule II leads to full information collection for a wider range of parameters than voting rule I. To put it differently, voting rule II (weakly) dominates voting rule I.

Voting rule I and II focus on the incumbent party. The same type of voting rules can be applied to the opposition party. Voting rule II applied to the opposition party can be formulated as[6]

Voting rule III: *Elect the opposition party if it showed that* $\theta_{A,t} = -1$ *and* $\theta_{B,t} = 1$*, or it showed that* $\theta_{A,t} = -1$*, or it showed that* $\theta_{B,t} = 1$*.*

Clearly, under voting rule III, the incumbent party has no incentive to collect information. Lemma 3 presents the conditions under which voting rule III induces the opposition party to collect full information.

Lemma 3 *Suppose voting rule III. Furthermore suppose that* $C_2 \leq \frac{3}{4}\left(V_{t+1}^{EL} - V_{t+1}^{NE}\right)$ *and* $C_2 - C_1 \leq \frac{1}{4}\left(V_{t+1}^{EL} - V_{t+1}^{NE}\right)$*, with* $V_{t+1}^{EL} - V_{t+1}^{NE} = \frac{2\delta}{2+\delta}(\lambda + C_2)$*. Then, (i) the incumbent party does not collect information; (ii) the opposition party collects full information.*

[6] Voting rule I can also be rewritten for the opposition party. It is easy to show that such a rule is weakly dominated by voting rule III.

Now we can compare voting rule II to voting rule III. Lemma 2 and 3 show that under voting rule III holding office is more attractive than under voting rule II, if $(2-\delta)\,C_2 > \delta\lambda$. The reason is that under voting rule III, the incumbent party enjoys the rents from holding office, while the opposition party incurs the cost of collecting information. Therefore, the value of holding office increases as the costs of collecting full information increase. In the case that voting rule II is applied, the opposite is true.

A comparison between the conditions in the Lemma 2 and 3 shows that voting rule III dominates voting rule II. Hence, the conditions in Lemma 3 are weaker than the conditions in Lemma 2. This means that the incentives to collect information are stronger if the opponent incurs the cost of information, while the incumbent enjoys the rents from office. We can compare this result to one of the main results in tournament theory. Lazear and Rosen (1981) show that giving a relatively high salary to an individual in a senior position, induces individuals in more junior positions to exert higher effort.

Finally, consider a voting rule which focuses on both the incumbent party and the opposition party.[7]

Voting rule IV: *Elect the opposition if and only if it showed that* $\theta_{B,t} = 1$*, while the incumbent did not show* $\theta_{A,t} = -1$*.*

Notice that under rule IV the incumbent is re-elected if both the incumbent and the opponent supply information. Consequently, under voting rule IV both the incumbent party and the opposition party must have an incentive to collect partial information. Let us first check under which conditions the incumbent party has no incentive to shirk. Collecting partial information yields an expected payoff equal to

$$\lambda - C_1 + \frac{3}{4}V_{t+1}^{EL} + \frac{1}{4}V_{t+1}^{NE}$$

Not collecting information yields an expected payoff equal to

$$\lambda + \frac{1}{2}V_{t+1}^{EL} + \frac{1}{2}V_{t+1}^{NE}$$

[7] There are several variants on voting rule IV. For example, the voting rule can require that the opposition party must show that $\theta_{B,t} = 1$. Another variant is that the opposition party is elected unless the incumbent party shows that $\theta_{A,t} = -1$. It is straightforward to check that all such variants lead to the same type of conditions for full information collection.

It is now easy to see that collecting partial information yields a higher payoff than collecting no information if

$$C_1 \leq \frac{1}{4}\left(V_{t+1}^{EL} - V_{t+1}^{NE}\right) \text{ with } V_{t+1}^{EL} - V_{t+1}^{NE} = \frac{2\delta}{2-\delta}\lambda \tag{12}$$

An identical condition can be derived for the opposition party. Lemma 4 presents the conditions for which voting rule IV leads to full information collection.

Lemma 4 *Suppose voting rule IV. Furthermore suppose that* $C_1 \leq \frac{1}{4}\left(V_{t+1}^{EL} - V_{t+1}^{NE}\right)$ *with* $V_{t+1}^{EL} - V_{t+1}^{NE} = \frac{2\delta}{2-\delta}\lambda$. *Then, (i) the incumbent party collects information about* $\theta_{A,t}$ *and (ii) the opposition party collects information about* $\theta_{B,t}$.

A comparison between Lemma 3 and 4 shows that without further information about C_1 and C_2, one cannot say whether or not voting rule III dominates voting rule IV. If C_2 is close to C_1, then rule III dominates rule IV. If instead C_2 is much higher than C_1, then one should avoid that one party has to collect all information. Consequently, rule IV dominates rule III. The following proposition summarizes the main results of this section.

Proposition 1 *Suppose parties are purely office motivated. Then, a voting rule that only induces the incumbent to collect information (voting rule I and II) is dominated by a voting rule that requires that the opposition collects information (voting rule III). If* $C_1 \leq \frac{1}{3}C_2$, *then the optimal voting rule induces both the incumbent and the opposition to collect partial information.*

So far, we have focused on voting rules which lead to full information collection. If the conditions are such that none of the voting rules leads to full information collection, then the voter prefers the incumbent party always to choose $X_t = 0$. To see why, suppose an equilibrium in which one of the parties collects information about $\theta_{A,t}$, but no party investigates $\theta_{B,t}$. Then, the parameters of the model are such that the voter weakly prefers $X_t = 0$, irrespective of the value of $\theta_{A,t}$. Therefore, if only one term is investigated, the voter does not want that the information about this term will affect policy. The implication is that from the voter's point of view, a voting rule that leads to no information collection is at least as good as a voting rule that leads to partial information collection. Hence, if the conditions for voting

rules III and IV are violated, one optimal voting rule is re-elect the incumbent party if it chooses $X_t = 0$.

4 Policy Motivated Parties

This section describes the conditions under which the voter can induce political parties to pursue her interest in case parties are purely policy motivated [see eqs. (4) and (5)]. In contrast to office motivated parties, policy motivated parties have an incentive to select policies which do not always accord with the voter's interest. For this reason, a voting rule should not only give incentives to the parties to collect information, but should also give incentives to the incumbent party to select the policy which, given the available information, maximizes (1). An implication is that a voting rule should mainly focus on the incumbent party.

Before analyzing alternative voting rules in detail, we first present two more general results.

Lemma 5 *The voter (weakly) prefers a situation in which party L examines $\theta_{A,t}$ and party R examines $\theta_{B,t}$ to a situation in which the incumbent party examines both $\theta_{A,t}$ and $\theta_{B,t}$, and the other party examines nothing.*

The reason for Lemma (5) is that policy motivated parties may have an incentive to conceal information. Suppose, for instance, that the incumbent party examines both $\theta_{A,t}$ and $\theta_{B,t}$, and discovers that $\theta_{A,t} = -1$ and $\theta_{B,t} = 1$. Furthermore suppose that party L is in office. Then, the incumbent party prefers $X_t = -1$ while the voter prefers $X_t = 0$. As a consequence, for a reasonable voting rule, party L has no incentive to reveal that $\theta_{B,t} = 1$. It is easy to verify that for any reasonable voting rule, neither party L nor party R has an incentive to conceal information if party L examines $\theta_{A,t}$ and party R examines $\theta_{B,t}$.

Lemma 6 *There does not exist a voting rule that induces (i) party L to investigate $\theta_{A,t}$, (ii) party R to investigate $\theta_{B,t}$, and (iii) the incumbent party to select the policy that maximizes the voter's payoff function given the available information.*

To understand Lemma 6, suppose that a voting rule exists that does lead to a first-best situation from the voter's point of view. Call this voting rule V. A

direct implication of rule V is that the equilibrium continuation value of the game is independent of the election result. To put it differently, the payoff to a party is independent of whether or not it wins the next election. But then the incumbent party has no reason not to select its first-best policy.

An implication of Lemma 6 is that the incumbent must gain something from promoting the voter's interest. To put it in a more popular way, there should be something in it for the incumbent party. Thus, a voting rule must allow the incumbent to sometimes pursue its own interest. However, as we will show the voter should not be too generous. The voter might be better off if no decision is made and the status quo is retained in each period. Then, the voter achieves an expected utility of $-\frac{2}{4}$. Hence, the voter only has an incentive to delegate the policy decision to political parties, if it yields and expected utility larger than $-\frac{2}{4}$.

With policy motivated parties, voting rules can be distinguished on the basis of one feature, namely how demanding the voting rule is. In Lemma 6 we have already shown that the voter can never achieve a first-best situation. Below, we discuss some voting rules that permit the incumbent party sometimes to pursue its own interest. Let us first consider voting rule VI.

Voting rule VI: *Re-elect the incumbent party unless* $X_t \neq 0$ if $\theta_t = 0$.

Under voting rule VI the incumbent party is allowed to select its optimal policy if $\theta_t = -1$ or $\theta_t = 1$. However, the voter wants the incumbent party to select her optimal policy if $\theta_t = 0$. To examine how voting rule VI shapes the policy decision, suppose that party L is in office and that both parties collect information.[8] Clearly, unless $\theta_t = 0$, party L will select the policy which maximizes its current payoff, for there is no trade-off between current and future policy. Hence, party L chooses $X_t = -1$ if $\theta_t = -1$, and $X_t = 0$ if $\theta_t = 1$. If $\theta_t = 0$, then $X_t = -1$ yields an expected payoff to party L equal to $-C_1 + V_{t+1}^{NE}$, while $X_t = 0$ delivers $-C_1 + V_{t+1}^{EL} - 1$. Hence, when $\theta_t = 0$, party L chooses $X_t = 0$ if $V_{t+1}^{EL} - V_{t+1}^{NE} \geq 1$. Notice that if this condition holds, party L will always win the next election. If $V_{t+1}^{EL} - V_{t+1}^{NE} < 1$, then rule VI does not give incentives to party L to behave in accordance with the voter's interest.

Let us now identify the conditions under which party L investigates $\theta_{A,t}$ and party R investigates $\theta_{B,t}$. Suppose an equilibrium in which both parties investigate and

[8] The analysis of the case that party R is in office is analogous.

select policy in accordance with voting rule VI. What are the incentives for party L to deviate? Investigating yields a payoff equal to $-\frac{3}{4} - C_1 + V_{t+1}^{EL}$, if $V_{t+1}^{EL} - V_{t+1}^{NE} \geq 1$. To derive the payoff to party L if it does not investigate $\theta_{A,t}$, we first have to determine which policy it would select in that case. Notice that if party L did not collect information, the voter would conclude that party L found $\theta_{A,t} = 0$. Suppose that $\theta_{B,t} = 1$. Then, it is optimal for party L to select $X_t = 0$. Now suppose that $\theta_{B,t} = 0$. Then, party L faces a trade-off between optimal policy in period t ($X_t = -1$) and losing the next election on the one hand and suboptimal policy in period t ($X_t = 0$) and winning the next election on the other hand. It is easy to verify that if party L is sufficiently concerned with the future ($V_{t+1}^{EL} - V_{t+1}^{NE} = \frac{\delta}{1-\delta} > 2$),[9] then it chooses $X_t = 0$. In that case not investigating $\theta_{A,t}$ yields a payoff to party L equal to $-\frac{6}{4} + V_{t+1}^{EL}$. Hence, given that $V_{t+1}^{EL} - V_{t+1}^{NE} > 2$, party L prefers investigating to not investigating if $C_1 \leq \frac{3}{4}$. In case $V_{t+1}^{EL} - V_{t+1}^{NE} < 2$, then party L selects $X_t = -1$ if $\theta_{B,t} = 0$, and not investigating $\theta_{A,t}$ yields a payoff equal to $-\frac{1}{2} + \frac{1}{2}V_{t+1}^{EL} + \frac{1}{2}V_{t+1}^{NE}$. Consequently, party L prefers investigating to not investigating if $C_1 \leq \frac{1}{2}\left(V_{t+1}^{EL} - V_{t+1}^{NE}\right) - \frac{1}{4}$.

We have now identified the conditions under which the incumbent party collects information. Let us now analyze under which conditions the opposition party, say party R, collects information. It is easy to verify that investigating $\theta_{B,t}$ yields an expected payoff to party R equal to $-\frac{7}{4} - C_1 + V_{t+1}^{NE}$, while not investigating yields $-\frac{10}{4} + V_{t+1}^{NE}$. Hence, party R investigates if $C_1 \leq \frac{3}{4}$.

Lemma 7 summarizes our discussion about voting rule VI.

Lemma 7 *Suppose voting rule VI. If* $\frac{2}{3} < \delta < 1$ *and* $C_1 \leq \frac{3}{4}$, *or* $\frac{1}{2} < \delta < \frac{2}{3}$ *and* $C_1 \leq \frac{1}{2}\left(V_{t+1}^{EL} - V_{t+1}^{NE}\right) - \frac{1}{4}$, *with* $V_{t+1}^{EL} - V_{t+1}^{NE} = \frac{\delta}{1-\delta}$, *then (i) the incumbent party collects information about* $\theta_{A,t}$ *and (ii) the opposition party collects information about* $\theta_{B,t}$, *and (iii) the incumbent party implements* $X_t = -1$ *if* $\theta_t = -1$, $X_t = 0$ *if* $\theta_t = 0$ *and* $X_t = 0$ *if* $\theta_t = 1$.

Basically, Lemma 7 states that if the costs of collecting information are sufficiently low, and parties are sufficiently concerned with the future, then voting rule VI leads to full information collection, and party L (R) selects policy in accordance

[9] See the Appendix for the proof that $V_{t+1}^{EL} - V_{t+1}^{NE} = \frac{\delta}{1-\delta}$

with the voter's interest unless $\theta_t = 1$ ($\theta_t = -1$). If the conditions presented in Lemma 7 are satisfied, then the voter's expected payoff equals $-\frac{1}{4}$ in each period.

Under voting rule VI, the incumbent party, say party L, is always re-elected if the conditions in Lemma 7 are satisfied. Also in the case that the incumbent party implements $X_t = 0$ if $\theta_{A,t} = 0$ and $\theta_{B,t} = 1$, he is re-elected. A variant of this voting rule is a voting rule under which the opposition is elected if $\theta_{A,t} = 0$ and $\theta_{B,t} = 1$. Let us consider this rule.

Voting rule VII: *Suppose party L is in office. Then re-elect the incumbent party if it implements the policy that maximizes the voter's utility given the available information unless* $\theta_{A,t} = 0$ *and* $\theta_{B,t} = 1$*; if* $\theta_{A,t} = 0$ *and* $\theta_{B,t} = 1$*, the opposition party is elected.*

If party R is in office, then re-elect the incumbent party if it implements the policy that maximizes the voter's utility given the available information unless $\theta_{A,t} = -1$ *and* $\theta_{B,t} = 0$*; if* $\theta_{A,t} = -1$ *and* $\theta_{B,t} = 0$*, the opposition party is elected.*

Along the same lines as we derived the conditions in Lemma 7, we can derive the conditions under which rule VII induces parties to investigate the full consequences of policy (see Appendix). These conditions are presented in Lemma 8.

Lemma 8 *Suppose voting rule VII. If* $\frac{2}{3} < \delta < 1$ *and* $C_1 \leq \frac{3}{4}\left(V_{t+1}^{EL} - V_{t+1}^{NE}\right) - \frac{1}{4}$*, with* $V_{t+1}^{EL} - V_{t+1}^{NE} = \frac{2\delta}{2-\delta}$*, then (i) the incumbent party collects information about* $\theta_{A,t}$ *and (ii) the opposition party collects information about* $\theta_{B,t}$*, and (iii) the incumbent party implements* $X_t = -1$ *if* $\theta_t = -1$*,* $X_t = 0$ *if* $\theta_t = 0$ *and* $X_t = 0$ *if* $\theta_t = 1$*.*

A comparison between the conditions in Lemma 7 and Lemma 8 shows that voting rule VII dominates voting rule VI if $\delta > \frac{4}{5}$. This means that, if the future is very important, voting rule VII gives a stronger incentive to parties to collect information. The reason is that under voting rule VII the probability of being re-elected depends on the information the incumbent has collected. Under voting rule VI, on the other hand, the probability of being re-elected is independent of the information presented by the incumbent if $\delta > \frac{2}{3}$. Hence, under voting rule VII the incumbent has a stronger incentive to collect information. Also the opponent party has a stronger incentive to collect information. Under voting rule VI, the opponent only collects information to influence the choice of policy made by the incumbent

party. Under voting rule VII collecting information has a second objective. By collecting information the opponent party can increase the probability of being in office next period and in this way be able to determine future policy.

Apart from voting rules VI and VII, there are several other voting rules that may give incentives to policy motivated parties. Like rule VI and VII, two similar voting rules yield an expected payoff to the voter equal to $-\frac{1}{4}$ in each period. We first briefly discuss those rules.

Voting rule VIII: *Re-elect the incumbent party if it implements the policy that maximizes the voter's utility given the available information unless* $\theta_{A,t} = \theta_{B,t} = 0$*; if* $\theta_{A,t} = \theta_{B,t} = 0$*, the incumbent is always re-elected.*

A direct implication of voting rule VIII is that the incumbent party selects a policy which conflicts with the voter's preferences if $\theta_{A,t} = \theta_{B,t} = 0$. Rule VIII is clearly a variant of rule VI. For one event, the incumbent party may do what it wishes. Because voting rules VI and VIII are essentially the same, they work under the same conditions.

A variation on voting rule VIII is a voting rule according to which the opposition party is elected if $\theta_{A,t} = \theta_{B,t} = 0$. Call this voting rule IX. It is easy to show that voting rule IX is dominated by voting rule VIII. The reason is that under rule IX, the opposition party is elected if no information is presented. Hence, under rule IX the opposition has a weaker incentive to collect information than under rule VIII.

Until now we have considered voting rules that yield an expected payoff to the voter equal to $-\frac{1}{4}$. Next we want to determine what happens if the conditions in lemmas 7 and 8 are not satisfied. This means that either the future is less important or collecting information is too costly. We focus on the situation in which the future is less important.[10] In this situation the incumbent has a weaker incentive to implement the policy that maximizes voter's utility given the available information. Consequently, the voter has to allow the incumbent to pursue its own interest more often. Let us consider the following voting rule.

Voting rule X: *Re-elect the incumbent party if it implements* $X_t = -1$ if $\theta_{A,t} = -1$ and $X_t = 0$ if $\theta_{A,t} = 0$.

[10] The case in which collecting information is too costly leads to similar results.

Voting rule X allows the incumbent to deviate in two cases, namely if $\theta_{A,t} = -1$ and $\theta_{B,t} = 1$ and if $\theta_{A,t} = 0$ and $\theta_{B,t} = 1$. Hence, voting rule X allows the incumbent party to ignore $\theta_{B,t} = 1$. Consequently, the opponent has no incentive to collect information. The reason is that collecting information has no effect for the opponent. Lemma 9 presents the results under which voting rule X induces the incumbent to follow the interests of the electorate.

Lemma 9 *Suppose voting rule X. Furthermore suppose that* $\frac{1}{3-C_1} < \delta < 1$ *and* $C_1 < 1$. *Then, (i) the incumbent party collects information about* $\theta_{A,t}$ *and (ii) the opposition party collects no information. With respect to policy, the incumbent party implements* $X_t = -1$ *if* $\theta_{A,t} = -1$ *and* $X_t = 0$ *if* $\theta_{A,t} = 0$.

A comparison of Lemma 9 and the other lemmas in this section, shows that the conditions under which the incumbent pursues the interest of the electorate are weaker in lemma 9. However, we cannot conclude that voting rule X dominates the other rules. The reason is that the voter achieves a lower expected utility under voting rule X. If the conditions in Lemma 9 are satisfied, the voter achieves an expected utility of $-\frac{2}{4}$. This means that in order to make a less patient incumbent party pursue the interests of the electorate, the voter has to give up some utility.

We have already shown that if no policy decision is made, the payoff to the voter equals $-\frac{2}{4}$. This means that no policy decision leads to at least as good results as voting rules like rule X.[11]

The following proposition summarizes the main results of this section.

Proposition 2 *Suppose parties are purely policy motivated. Then, the voter can never achieve a first-best outcome. The voter can achieve an expected utility equal to* $-\frac{1}{4}$, *if parties care enough about the future* ($\delta > \frac{1}{2}$). *If* $\delta > \frac{4}{5}$, *then a voting rule in which the incumbent is not always re-elected (rule VII) dominates a voting rule that always re-elects the incumbent (rule VI). For* $\frac{1}{2} < \delta < \frac{4}{5}$, *the opposite is true. If the conditions of rule VI and VII are not satisfied, the voter is better off making the decision herself. This leads to an expected utility equal to* $-\frac{2}{4}$.

[11] There are several variants on voting rule X. These variants lead to an expected utility of at most $-\frac{2}{4}$. The intuition is that in order to have a less patient incumbent party pursue the voter's interest, the voter has to apply a less demanding voting rule as compared to the other voting rules in this section. A less demanding voting rule, yields a lower expected utility to the voter. A similar argument applies if collecting information is too costly.

5 Concluding Remarks

In this paper we have analyzed to what extent voters can motivate political parties to collect information about policy consequences and to select good policies. We have designed a model in which the incumbent party determines policy. The consequences of policies are uncertain. To reduce this uncertainty both the incumbent and the opposition party can collect information. With respect to the preferences of parties we have distinguished two situations. Parties are either office motivated or policy motivated.

We have shown that office motivated parties choose policies that, given the available information, promote the interest of the representative voter. Information collection requires that parties sufficiently value office. One interesting result is that voting rules that focus on both the incumbent party and the opposition party perform at least as well as voting rules that exclusively focus on the incumbent party.

In case parties are policy motivated, the voter does not always need to induce parties to collect information. As parties derive utility from the implemented policy, they already have an incentive to collect information. The problem with policy motivated parties is that they tend to select sub-optimal policies. The voter must induce the incumbent party to implement the policy that maximizes her utility. An interesting result is that if parties are policy motivated, the voter can never achieve a first-best outcome. The incumbent must gain something from promoting the voter's interest.

We have argued that if parties are policy motivated, the voter never achieves a first-best outcome. In contrast, if parties are office motivated the voter can achieve a first-best outcome. It is too early to conclude from these results that a system with policy motivated parties is inferior to a system with office motivated parties. With office motivated parties, attaining the first best situation requires that the rents of holding office are large enough. This raises the question where do these rents come from? Possibly these rents are paid by the voter as in Persson, Roland and Tabellini (1997). Then, a system with policy motivated parties might be superior to a system with office motivated parties.

6 Appendix

Appendix A: **Present discounted value of office**

In this appendix we determine the present discounted value of office. Suppose that in period 1 party L will be in office. With a probability of α, the incumbent is re-elected in each future period. Let V_{t+1}^{EL} be the equilibrium continuation value for the party if he is elected in period t and V_{t+1}^{NE} be the equilibrium continuation value for the party if he is sent home in period t. Let ρ_t be the probability that party L is in office in period t, then

$$\begin{aligned} \rho_{t+1} &= \alpha\rho_t + (1-\alpha)(1-\rho_t) \\ &= (2\alpha-1)\rho_t + (1-\alpha) \end{aligned} \tag{13}$$

The general solution of this first-order difference equation is

$$\begin{aligned} \rho_t &= A(2\alpha-1)^t + \frac{(1-\alpha)}{1-(2\alpha-1)} \\ &= A(2\alpha-1)^t + \frac{1}{2} \end{aligned} \tag{14}$$

where A is an arbitrary constant. Recall that in period $t=1$, party L is in office, implying that for $t=1$, $\rho_1 = 1$. Now A directly follows from (14) $A = \frac{1}{2}\frac{1}{(2\alpha-1)}$. Hence the particular solution of (14) is

$$\rho_t = \frac{1}{2}(2\alpha-1)^{t-1} + \frac{1}{2}$$

It is now straightforward to calculate V_{t+1}^{EL}:

$$\begin{aligned} V_{t+1}^{EL} &= \sum_{t=1}^{\infty} \delta^t \left(\frac{1}{2}(2\alpha-1)^{t-1} + \frac{1}{2}\right)\left(U^I - U^O\right) \\ &= \frac{(1-\alpha\delta)\delta}{(1-\delta)(1-2\alpha\delta+\delta)}\left(U^I - U^O\right) \end{aligned}$$

where U^I is the utility a party receives if he holds office and U^O is the utility a party receives if he does not hold office.

Now suppose that in $t=0$ party L is not re-elected. Then, in period $t+1$ party R will enter office, implying that $\rho_1 = 0$. From (14) it follows that $A = -\frac{1}{2}\frac{1}{(2\alpha-1)}$.

Hence, the particular solution of (14) is

$$\rho_t = -\frac{1}{2}(2\alpha - 1)^{t-1} + \frac{1}{2}$$

We can now write the equilibrium continuation value if party L is not re-elected in period $t = 0$ as

$$\begin{aligned} V_{t+1}^{NE} &= \sum_{t=1}^{\infty} \delta^t \left(-\frac{1}{2}(2\alpha - 1)^{t-1} + \frac{1}{2} \right) \left(U^I - U^O \right) \\ &= \frac{(\delta - \alpha\delta)\,\delta}{(1-\delta)(1 - 2\alpha\delta + \delta)} \left(U^I - U^O \right) \end{aligned}$$

Hence,

$$V_{t+1}^{EL} - V_{t+1}^{NE} = \frac{\delta}{1 - 2\alpha\delta + \delta} \left(U^I - U^O \right) \tag{15}$$

Appendix B: **Proofs of lemmas**

In this appendix we provide the proofs of the lemmas that are discussed in the paper.

Proof of Lemma 1: A proof was provided in the text above the lemma. The present discounted value of office, $V_{t+1}^{EL} - V_{t+1}^{NE}$, can be determined making use of equation (15). Under voting rule I the incumbent party is re-elected if and only if he shows that $\theta_{A,t} = -1$ and $\theta_{B,t} = 1$. Suppose that in equilibrium the party in office collects full information and the opponent collects no information. In equilibrium, the probability that the incumbent is elected equals $\alpha = \Pr(\theta_{A,t} = -1, \theta_{B,t} = 1) = \frac{1}{4}$. The utility a party gets if he holds office $\left(= U^I\right)$ equals $\lambda - C_2$ and the utility he gets if he is out of office equals 0. Substituting this into equation (15) gives $V_{t+1}^{EL} - V_{t+1}^{NE} = \frac{2\delta}{2+\delta}(\lambda - C_2)$. Q.E.D.

Proof of Lemma 2: A proof was provided in the text above the lemma. Again, $V_{t+1}^{EL} - V_{t+1}^{NE}$ follows from (15). Under voting rule II the incumbent party is re-elected if he shows that $\theta_{A,t} = -1$ and $\theta_{B,t} = 1$, or it showed that $\theta_{A,t} = -1$, or it showed that $\theta_{B,t} = 1$. Suppose that in equilibrium the party in office collects full information and the opponent collects no information. In equilibrium, the probability that the incumbent is elected equals $\alpha = \Pr(\theta_{A,t} = -1, \theta_{B,t} = 1) + \Pr(\theta_{A,t} = -1, \theta_{B,t} = 0) + \Pr(\theta_{A,t} = 0, \theta_{B,t} = 1) = \frac{3}{4}$. The utility a party achieves if he holds office $\left(= U^I\right)$ equals $\lambda - C_2$ and the utility he achieves if he is out of office equals 0. Hence, $V_{t+1}^{EL} - V_{t+1}^{NE} = \frac{2\delta}{2-\delta}(\lambda - C_2)$. Q.E.D.

Proof of Lemma 3: Along the same lines as we derived the conditions in lemma 2, we can derive the conditions in lemma 3. The main difference is that now the opponent has to decide whether or not to collect information. Under voting rule III, the opponent prefers collecting full information to collecting no information if $C_2 \leq \frac{3}{4}\left(V_{t+1}^{EL} - V_{t+1}^{NE}\right)$. He prefers to collect full information to collecting partial information if $C_2 - C_1 \leq \frac{1}{4}\left(V_{t+1}^{EL} - V_{t+1}^{NE}\right)$. The incumbent has no incentive to collect information. Next, we have to determine $V_{t+1}^{EL} - V_{t+1}^{NE}$. Under voting rule III the incumbent party is only re-elected if $\theta_{A,t} = 0$ and $\theta_{B,t} = 0$. Suppose that in equilibrium the opposition party collects full information and the incumbent party collects no information. In equilibrium, the probability that the incumbent is elected equals $\alpha = \Pr\left(\theta_{A,t} = 0, \theta_{B,t} = 0\right) = \frac{1}{4}$. The utility a party receives if he holds office $\left(= U^I\right)$ equals λ and the utility he receives if he is out of office $\left(= U^O\right)$ equals $-C_2$. Hence, $V_{t+1}^{EL} - V_{t+1}^{NE} = \frac{2\delta}{2+\delta}\left(\lambda + C_2\right)$. Q.E.D.

Proof of Lemma 4: A proof was provided in the text above the lemma. The present discounted value of holding office, $V_{t+1}^{EL} - V_{t+1}^{NE}$, can be determined making use of (15). Under voting rule IV the incumbent party is re-elected if $\theta_{A,t} = 0$ and $\theta_{B,t} = 0$, $\theta_{A,t} = -1$ and $\theta_{B,t} = 0$ or $\theta_{A,t} = -1$ and $\theta_{B,t} = 1$. Suppose that in equilibrium each party collects partial information. In equilibrium, the probability that the incumbent is elected equals $\alpha = \Pr\left(\theta_{A,t} = -1, \theta_{B,t} = 1\right) + \Pr\left(\theta_{A,t} = -1, \theta_{B,t} = 0\right) + \Pr\left(\theta_{A,t} = 0, \theta_{B,t} = 0\right) = \frac{3}{4}$. The utility a party receives if he holds office $\left(= U^I\right)$ equals $\lambda - C_1$ and the utility he receives if he is out of office $\left(= U^O\right)$ equals $-C_1$. Hence, $V_{t+1}^{EL} - V_{t+1}^{NE} = \frac{2\delta}{2-\delta}\lambda$. Q.E.D.

Proof of Lemma 7: A proof was provided in the text above the lemma. Again, $V_{t+1}^{EL} - V_{t+1}^{NE}$ can be determined making use of (15). Under voting rule VI the incumbent party is re-elected if he implements $X_t = 0$ if $\theta_t = 0$. Suppose that in equilibrium each party collects partial information and that $V_{t+1}^{EL} - V_{t+1}^{NE} > 1$. Then, in equilibrium, the probability that the incumbent is re-elected equals $\alpha = 1$. The utility a party receives if he holds office $\left(= U^I\right)$ equals $-\frac{3}{4} - C_1$ and the utility he receives if he is out of office $\left(= U^O\right)$ equals $-\frac{7}{4} - C_1$. Hence, $V_{t+1}^{EL} - V_{t+1}^{NE} = \frac{\delta}{1-\delta}$. Q.E.D.

Proof of Lemma 8: Suppose voting rule VII. Furthermore suppose that in equilibrium each party collects partial information. First we determine which policy the incumbent party implements given the value of the stochastic term. The incumbent

party implements $X_t = -1$ if $\theta_t = -1$ and $X_t = 0$ if $\theta_t = 1$. If $\theta_t = 0$, the incumbent implements $X_t = 0$ if and only if $V_{t+1}^{EL} - V_{t+1}^{NE} > 1$, else he implements $X_t = -1$. Now, we can determine the expected payoff if the incumbent investigates $\theta_{A,t}$ and the opponent investigates $\theta_{B,t}$. If $V_{t+1}^{EL} - V_{t+1}^{NE} > 1$, the expected payoff to the incumbent equals $-\frac{3}{4} - C_1 + \frac{3}{4}V_{t+1}^{EL} + \frac{1}{4}V_{t+1}^{NE}$ and the expected payoff to the opponent equals $-\frac{7}{4} - C_1 + \frac{1}{4}V_{t+1}^{EL} + \frac{3}{4}V_{t+1}^{NE}$.

To identify the conditions under which both parties collect partial information, we have to determine whether or not the incumbent has an incentive to deviate. Let us determine the expected payoff achieved by the incumbent if he does not collect information. In this case the incumbent implements $X_t = 0$ if $\theta_{B,t} = 1$. If $\theta_{B,t} = 0$, the incumbent implements $X_t = 0$ if and only if $V_{t+1}^{EL} - V_{t+1}^{NE} > 2$, else he implements $X_t = -1$. If $V_{t+1}^{EL} - V_{t+1}^{NE} > 2$, the expected payoff to the incumbent equals $-\frac{6}{4} + \frac{2}{4}V_{t+1}^{EL} + \frac{2}{4}V_{t+1}^{NE}$. If $V_{t+1}^{EL} - V_{t+1}^{NE} < 2$, the expected payoff to the incumbent equals $-\frac{2}{4} + V_{t+1}^{NE}$. Hence, the incumbent collects partial information if (i) $V_{t+1}^{EL} - V_{t+1}^{NE} > 2$ and $C_1 \leq \frac{3}{4} + \frac{1}{4}\left(V_{t+1}^{EL} - V_{t+1}^{NE}\right)$, and, (ii) $1 < V_{t+1}^{EL} - V_{t+1}^{NE} < 2$ and $C_1 \leq \frac{3}{4}\left(V_{t+1}^{EL} - V_{t+1}^{NE}\right) - \frac{1}{4}$.

Next, we can determine whether or not the opponent has an incentive to deviate. Let us determine the expected payoff to the opponent if he does not collect information. Then the incumbent implements $X_t = 0$ if $\theta_{A,t} = 0$ and $X_t = -1$ if $\theta_{A,t} = -1$. The expected payoff to the opponent equals $-\frac{10}{4} + V_{t+1}^{NE}$. Hence, the opponent collects partial information if and only if $C_1 \leq \frac{3}{4} + \frac{1}{4}\left(V_{t+1}^{EL} - V_{t+1}^{NE}\right)$.

Finally, we can determine the relative value of holding office. Suppose that in equilibrium each party collects partial information and that $V_{t+1}^{EL} - V_{t+1}^{NE} > 1$. Then, in equilibrium, the probability that the incumbent is re-elected equals $\alpha = \Pr(\theta_{A,t} = -1, \theta_{B,t} = 1) + \Pr(\theta_{A,t} = -1, \theta_{B,t} = 0) + \Pr(\theta_{A,t} = 0, \theta_{B,t} = 0) = \frac{3}{4}$. The utility a party receives if he holds office $\left(= U^I\right)$ equals $-\frac{3}{4} - C_1$ and the utility he receives if he is out of office $\left(= U^O\right)$ equals $-\frac{7}{4} - C_1$. Hence, $V_{t+1}^{EL} - V_{t+1}^{NE} = \frac{2\delta}{2-\delta}$. Because $0 < \delta < 1$, the following always holds $V_{t+1}^{EL} - V_{t+1}^{NE} = \frac{2\delta}{2-\delta} < 2$. Therefore, we only need to consider the case in which $1 < V_{t+1}^{EL} - V_{t+1}^{NE} < 2$, say $\frac{2}{3} < \delta < 1$. Q.E.D.

Proof of Lemma 9: Suppose voting rule X. Furthermore suppose that in equilibrium the incumbent investigates $\theta_{A,t}$ and the opponent does not collect information. First we determine which policy the incumbent party implements given the value of

the stochastic term. The incumbent implements $X_t = 0$ if $\theta_{A,t} = 0$ and $X_t = -1$ if $\theta_{A,t} = -1$. The expected payoff to the incumbent equals $-\frac{2}{4} + V_{t+1}^{EL} - C_1$ and the expected payoff to the opponent equals $-\frac{10}{4} + V_{t+1}^{NE}$.

To identify the conditions under which the incumbent collects partial information, we have to determine whether or not the incumbent has an incentive to deviate. Let us determine the expected payoff achieved by the incumbent if he does not collect information. In this case the incumbent implements $X_t = 0$ if $V_{t+1}^{EL} - V_{t+1}^{NE} > 1$, else he implements $X_t = -1$. The expected payoff to the incumbent if $V_{t+1}^{EL} - V_{t+1}^{NE} > 1$ equals $-\frac{6}{4} + V_{t+1}^{EL}$. Hence, the incumbent collects partial information if $V_{t+1}^{EL} - V_{t+1}^{NE} > 1$ and $C_1 \leq 1$.

Next we can determine whether or not the opponent has an incentive to deviate. Let us determine the expected payoff to the opponent if he collects partial information. In this case the incumbent implements $X_t = -1$ if $\theta_{A,t} = -1$ and $\theta_{B,t} = 0$, $X_t = -1$ if $\theta_{A,t} = -1$ and $\theta_{B,t} = 1$ and $X_t = 0$ if $\theta_{A,t} = 0$ and $\theta_{B,t} = 1$. If $\theta_{A,t} = 0$ and $\theta_{B,t} = 0$, the incumbent implements $X_t = 0$ if and only if $V_{t+1}^{EL} - V_{t+1}^{NE} > 1$, else he implements $X_t = -1$. If $V_{t+1}^{EL} - V_{t+1}^{NE} > 1$, the expected payoff to the opponent equals $-\frac{10}{4} + V_{t+1}^{NE} - C_1$.

Finally, we can determine the relative value of holding office. Suppose that in equilibrium the incumbent party collects full information and the opponent does not collect information and $V_{t+1}^{EL} - V_{t+1}^{NE} > 1$. Then, in equilibrium, the probability that the incumbent is re-elected equals $\alpha = 1$. The utility a party achieves if he holds office $\left(= U^I\right)$ equals $-\frac{2}{4} - C_1$ and the utility he gets if he is out of office $\left(= U^O\right)$ equals $-\frac{10}{4}$. Hence, $V_{t+1}^{EL} - V_{t+1}^{NE} = \frac{\delta}{1-\delta}(2 - C_1)$. Q.E.D.

References

[1] Alesina, A. (1988), Credibility and Policy Convergence in a Two-Party System with Rational Voters, *American Economic Review*, vol. 78 (4), 796–805.

[2] Alesina, A. and Rosenthal, H. (1989), Partisan Cycles in Congressional Elections and the Macroeconomy, *American Political Science Review*, vol. 83, 373-398.

[3] Beniers, K. and Swank, O.H. (2003), On the Composition of Committees, *Journal of Law, Economics and Organization* (forthcoming).

[4] Calvert, R. (1995), Robustness of the Multidimensional Voting Model: Candidates' Motivations, Uncertainty, and Convergence. *American Journal of Political Science*, vol. 29, 69-95.

[5] Dewatripont, M. and Tirole, J. (1999), Advocates, *Journal of Political Economy*, vol. 107 (1), 1-39.

[6] Dur, R. (2002), Why do Policy Makers Stick to Inefficient Decisions?, *Public Choice*, vol. 107 (3), 221-234.

[7] Dur, R. and Swank, O.H. (2003), Producing and Manipulating Information, *Economic Journal* (forthcoming).

[8] Ferejohn, J. (1986), Incumbent performance and electoral control, *Public Choice*, vol. 50, 5-25.

[9] Hibbs, D. (1977), Political Parties and Macroeconomic Policy, *The American Political Science Review*, vol.71 (4), 1467-1487.

[10] Lazear, E. and Rosen, S. (1981), Rank-Order Tournaments as Optimum Labor Contracts, *Journal of Political Economy*, vol.89 (4), 841-864.

[11] Mueller, D.C. (2003), Public Choice III, Cambridge: Cambridge University Press.

[12] Myerson, R.B. (1995), Analysis of Democratic Institutions: Structure, Conduct and Performance, *Journal of Economic Perspectives*, vol. 9 (1), 77-89.

[13] Ossokina, I.V. and Swank, O.H. (2004), The Optimal Degree of Polarization, *European Journal of Political Economy*, vol. 20 (1), 255-262.

[14] Persson, T., Roland, G. and Tabellini, G. (1997), Separation of Powers and Political Accountability, *Quarterly Journal of Economics*, vol. 112 (4), 1163-1202.

[15] Persson, T. and Tabellini, G. (2000), Political Economics: Explaining Economic Policy, The MIT Press, Cambridge, Massachusetts - London, England.

[16] Schultz, C. (1996), Polarization and Inefficient Policies, *Review of Economic Studies*, vol. 63 (2), 331-344.

[17] Schultz, C. (1999), Monetary policy, delegation and polarisation, *Economic Journal*, vol. 109, 164-178.

[18] Swank, O.H. and Visser, B. (2003), Do Elections lead to Informed Public Decisions, *Tinbergen Institute Discussion Paper* 2003-067/1.

[19] Wittman, D.A. (1977), Candidates with Policy Preferences: A Dynamic Model, *Journal of Economic Theory*, vol. 14, 180-189.