The Myth of Bad Policy Choices:
Why Democracies Choose Mediocre Policies

Ivo Bischoff† Lars-H. Siemers‡

This version: June 2010

Abstract
In a game-theoretical approach of probabilistic voting, we introduce biased beliefs among voters and retrospective voting. In order to micro-found biased beliefs we introduce the psychological concept of mental models. We put into perspective the claim that biased beliefs lead to bad policy outcomes in democracy, as has been argued, for instance, by Bryan Caplan (2007: The myth of the rational voter). We show that there is a self-correction mechanism in democracy that may mitigate the problem of biased beliefs. Democracy is characterized by suffering from mediocre mixtures of populist and good policies, and less by purely populist policy. Even good policy outcomes remain possible in equilibrium.

Keyword: Voting behaviour, dynamic party competition, valence, VP-functions, biased beliefs
JEL Codes: D72, D78, D83, D90, P16

† University of Kassel, Department of Economics, Nora-Platiel-Str. 4, 34109 Kassel. E-mail: bischoff@wirtschaft.uni-kassel.de
‡ RWI Essen – Institute for Economic Research, Department of Public Finance, Hohenzollernstraße 1/3, 45128 Essen. E-mail: siemers@rwi-essen.de
1. Introduction

The question whether “democracy”—in the sense of popular government—produces good outcomes is old. Plato and Aristotle distinguished between a “good” and a “bad” form of popular government: in the good form leaders are interested in common welfare, whereas the bad is a degenerated form, characterized by (solely) self-interested leaders (e.g. Inglis and Robertson 2006: 6). The Public Choice literature has compiled a large number of models to illustrate that self-interested politicians, interest groups and bureaucrats may cause bad policy choices (e.g. Stokes 1963; Niskanen 1975; Tollison 1982; Shughart and Razzolini 2001, Shughart and Tollison, 2005, Brennan, 2008). Recently, a number of authors shifted the focus to the role of voters and point at their biased beliefs as an additional source of inefficiency (e.g. Beilharz and Gersbach 2004; Caplan 2007). Caplan collects an impressive amount of evidence for persistently biased beliefs among voters. For instance, voters massively underestimate the benefits from market exchange and foreign trade. Based on this evidence, he argues that democratic mechanisms of preference aggregation lead to bad policy choices. While this pessimistic prediction is the bottom-line conclusion of his book, Caplan hypothesizes that retrospective voting may to some extent restrict populism among parties, and explain why “democracy is not worse” (Caplan, 2007: 160). However, the Public Choice literature lacks in rigorous formal analyses that check Caplan's hypotheses.

In this paper, we analyse in depth the potential of retrospective voting to improve policy choices in democracy. For this purpose, we develop a game-theoretic model of probabilistic voting where voters entertain biased beliefs and politicians are purely office-seeking. We extend the existing models in two important respects: First, we draw on the concept of mental models from cognitive psychology to provide a micro-foundation for persistently biased beliefs among voters. Second, we account for the important empirical regularity in voter behaviour described in the literature on vote and popularity functions. Accordingly, voters evaluate the incumbent based on the current performance of the economy. If the performance is good (bad), voters are more (less) likely to vote for the incumbent. By introducing this form of retrospective voting to our model, we account for a possible self-correction mechanism of

\[\text{\textsuperscript{1}}\text{ Caplan (2007: chapt. 6 and 7) touches on a number of other possible correction mechanisms, like selective representation, but dismisses them as too weak to change his conclusion in substance.}\]
the democratic system that has not been included in formal models of party competition yet. We identify equilibrium conditions under which good policy choices occur even when voters’ beliefs are persistently biased. While optimal policy choices are likely to be rare, we show that democracy is most of the time characterized by half-hearted reforms and thus mediocre outcomes. Purely populist equilibria and thus bad policy choices are, however, rare.

The paper proceeds as follows. In section 2, we present the major idea of our paper in a non-technical way and relate it to the existing literature. In section 3, we provide a model of party competition that introduces the concepts of mental models and retrospective voting to the spatial theory of voting. Section 4 describes the political equilibria. Section 5 discusses the implications of our analysis before section 6 concludes.

2. The Basic Idea and its Relation to the Literature

2.1 Mental Models and Biased Beliefs

In order to micro-found biased beliefs among voters, we draw on the concept of mental models from cognitive psychology. A mental model is a simplified subjective mental representation of a real system (e.g., Johnson-Laird 1983; Legrenzi and Girotto 1996). It is based on the individual’s knowledge about the components of the system, about the simple chains of cause and effect between them, and about the purpose of the system as a whole (e.g., de Kleer and Brown 1983). The urge to understand why the system components interact in a certain way makes individuals introduce unobservable forces (or phenomena) like the concepts of energy in physics or utility in economics (e.g., DiSessa 1982; Kempton 1987; Pennington and Hastie 1993; Leiser and Drori 2005). The individual uses the mental model to reason about how the underlying system reacts to policy changes. In mental simulations, he estimates the impact of alternative interventions and then supports the course of action which, according to his simulations, seems most appropriate (e.g., de Kleer and Brown 1983; Legrenzi and Girotto 1996; Green et al. 1998). Thus, together with his preferences, the individual’s mental model determines his decisions. Given mankind’s cognitive limitations, mental models are strongly simplified representations of the complex real-world system (e.g., Denzau and North 1994; Legrenzi and Girotto 1996; Doyle and Ford 1998; Dutke 1994: 4-6). Consequently, they will lead to biased and in some cases false predictions.

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2 Terms like cognitive maps (Axelrod 1973), folks theory (Holland and Quinn 1987) or naive theory (DiSessa 1982) refer to the same basic concept (e.g., Dutke 1994: 12).
In the context of this paper, the real system to be represented is the national economy. Due to different social background as well as diverging personal experience, different individuals entertain differing mental models of the economy. Therefore, they draw different conclusions when they simulate how a certain policy affects the economy (e.g., Tetlock 1989, 1999; Green et al. 1998; Leiser and Drori 2005). This allows for a dual interpretation of heterogeneous policy preferences (e.g., Swank 1998). First, following the conventional economic approach, different preferences result from differences in tastes or the way that voters are affected by policies individually (e.g., Downs 1957; Enelow and Hinich 1984). Second, they can originate from different mental models which lead voters with equal preferences to have diverse convictions about which policies are adequate to solve a given problem. In this case, policy preferences remain heterogeneous even when there is consensus about the policy objectives. Hence, an important difference is that good policies may fail not just due to opposition of reform losers (e.g. Fernandez and Rodrik 1999, Ruta 2009), but because even voters that benefit do not understand the advantage of reform.

2.2 V-P-Functions, Retrospective Voting and the Resolution of Cognitive Dissonance

Research in cognitive psychology shows that mental models are quite persistent in their basic structure and conclusions, especially when they represent social and political phenomena (e.g. Tetlock 1989, 1999; Dutke 1994: 76; Doyle and Ford 1998). This is partly due to the fact that controlled experiments that would prove a certain mental model wrong cannot be performed for these phenomena. When confronted with evidence that contradicts their mental models, individuals tend to resolve this cognitive dissonance by arguing that unexpected and singular incidences, changes in the unobservable forces or external stimuli have caused the real system to behave differently than predicted (e.g. Oden 1987; Tetlock 1999; Cooper and Goren 2007). Only when the opportunity costs of an inadequate mental model are high and the inadequacy of the mental model is visible for the individual, the dissonance is resolved by learning, so that the mental model is changed. When confronted with evidence on the performance of the economy that contradicts the simulation results of their mental model, politicians face sufficient incentives to learn, because their gains from an improved mental model are likely to outweigh the costs of learning (e.g., Bischoff 2007: chapt. C). For voters, in contrast, this relation is negative because, given the small influence of a single vote, they cannot expect any
benefits from learning. Thus, the concept of mental models provides a micro-foundation for the persistence of biased beliefs among voters.\(^3\)

But how do voters resolve the cognitive dissonance that occurs when the economic outcomes are poor (good) even though the government pursues the policy that an individual considers (in-)adequate? The empirical literature on vote-and-popularity functions (VP-functions) and retrospective voting is the starting point of our argumentation. Initiated by Mueller (1970) and Kramer (1971), more than 300 empirical studies have analysed the relationship between the incumbent’s economic performance and his vote share or popularity (e.g. Miller and Wattenberg 1985; Swank and Eisinga 1999; for a review, see Nannenstad and Paldam 1994; Mueller 2003: sect. 19.1; Paldam 2004). The literature finds strong support for the so-called responsibility hypothesis: voters hold their government responsible for the economic performance, especially for the employment level and inflation. Incumbents who manage to achieve good macroeconomic results are more popular and more likely to be re-elected than incumbents performing poorly. Three features of this behavioural pattern are noteworthy. First, the evaluation is (at least partially) socio-tropic in that voters base their decision to support or punish the incumbent on the macroeconomic performance regardless of whether their own income is affected by this performance (e.g., Paldam 2004). Second, voters are myopic and base their evaluation primarily on the performance of the last 1-2 years (e.g. Paldam 2004). Third, it is retrospective in the sense that the incumbent party’s current and past performance determines his popularity and expected vote share (e.g. Miller and Wattenberg 1985).\(^4\)

We interpret the empirical evidence on the behavioural pattern described above such that there exists a rudimentary but only temporary form of learning in the sense that voters update their beliefs concerning the incumbent’s competence in economic policy issues. If his economic performance is good (bad), he is considered competent (incompetent). The competence we have in mind does not result from the party officials having a superior mental model of the economy and thus being able to identify the adequate policy platform. Instead, it refers

\(^3\) Suen (2004) gives another explanation for persistently biased beliefs based on biased information.

\(^4\) A few studies have elicited the voters’ expectations concerning the incumbents’ future performance and found these to be highly correlated with their perceived performance in the past (e.g. Nannestad and Paldam 2000; Paldam 2004). Thus, essentially, the incumbents’ current and past performance counts.
to non-policy-related elements of competence. For example, these may result from the managerial ability of the party leaders or from their good links to powerful groups within society (e.g. labour unions or trade associations) that help pursuing any policy more effectively and at lower administrative costs. Since the competence of the incumbent is not observable directly, it provides a consistent explanation for unexpected policy results. Given that voting is typically a low-cost decision (Bischoff, 2007: chapt. C.; Caplan: chapt 6), the possibility to explain surprising economic results by unobservable differences in competence is an efficient way of resolving the cognitive dissonance. It does not require the individual voter to think about whether his mental model may be wrong and thus to engage in costly learning.

In our framework, retrospective voting thus can be seen as a special way of endogenizing the concept of valence: valence refers to party or candidate characteristics, other than policy platforms, that codetermine voting behaviour. It is a very broad and well-established concept in political science. It covers a large variety of policy-independent factors like charisma, social background, education etc. (e.g., Stokes 1963, 1992; Groseclose 2001; Schofield 2004; Bruter et al. 2010). In situations where voters share a common goal, it is also interpreted to be the expected competence of candidates in achieving good results with respect to this goal (e.g. Ansolabehere and Snyder 2000). The higher the party’s or candidate’s valence, the higher will be his chance of being elected—other things equal.

We follow the latter definition of valence: Incumbents who managed to achieve good macroeconomic results are considered competent and are assigned a high competence-related valence (hereafter valence) and thus have a higher chance of (re-)election. This establishes a dynamic link between consecutive elections, and parties face a trade-off between choosing policy platforms to maximize votes in the short run and building up the reputation of competence to attract more votes in the future. Accepting losses in votes in the short run represents

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5 When referring to the political landscape of Israel, Schofield (2004) points at the fact that the military is a powerful group. Arguably, Ariel Sharon was considered a competent politician because his good links to the military allowed him to make commitments in negotiations with Palestinian representatives that are more credible than commitments of politicians lacking these links.

6 The fact that voters are unable to predict the correct macroeconomic figures does not challenge our assumption, because the latter merely states that the voters, *ex post*, can tell good economic results from poor ones.
an investment for higher valence and more votes in later elections.\(^7\) It is precisely this dynamic investment relationship that creates a self-correction mechanism in democratic systems that may lead to good policy choices even when voters entertain biased beliefs.

### 2.3 Other Related Literature

Besides the literature on mental models and VP-functions discussed above, our paper relates to a number of theoretical contributions on democratic policy decisions with poorly informed voters. First, it relates to Romer’s idea of correlated misconceptions among voters that lead to poor policy choices (Romer 2003). We follow him in assuming a continuum of voters who initially entertain biased beliefs. Unlike Romer, however, we assume that voters do not change beliefs based on signals on the economic performance of policies. On the other hand, we explicitly model the role of political parties. We follow Beilharz and Gersbach (2004) and Caplan (2007) in assuming that beliefs remain biased even if economic outcomes are poor. Very similar to Gersbach (2003, 2004), Gersbach and Liessem (2007), Liessem (2008), and Müller (2007) we use a model where parties have the option to choose a socially beneficial policy or a bad populist platform. We assume that parties are office-seeking and maximize the expected cumulated vote-share over a particular span of time. In this sense we assume that parties are populist. Similar to Müller (2007) we demonstrate that socially beneficial outcomes can arise in equilibrium even when politicians are purely populist. We extend this strand of literature by additionally allowing parties to choose a platform that represents any mixture of the populist and good platform.

Beilharz and Gersbach (2004) and Beilharz (2005) provide theoretical models that are of particular importance for our paper. They argue that voters initially ignore the empirical feedback on the macroeconomic effects of policies. Hence, in their model, democracies vote into crises if voters do not include general equilibrium effects in their reasoning about minimum wage regulation, because unemployment and tax burden constantly rise. Only if significant crises establish, voters will adjust opinions—and the bad policy may be reversed. Unlike these authors, our model demonstrates that good policy choices are possible before a major crisis occurs and the cognitive dissonance becomes so immanent to large parts of the population that it can only be resolved by changes in mental models. In most cases, severe crises will

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\(^7\) Zakharov (2009), who was among the first to endogenize the concept of valence, shows that parties may invest in the building up of valence.
be prevented because parties do not choose pure populist policies but mixed policy platforms that lead to mediocre, but not bad, outcomes. As good policy outcomes are rewarded (responsibility hypothesis) and deep crises arise rarely, the pressure to change their mental models is taken off the voters.

3. The Basic Model

We consider a society governed by majority-voting in democratic election. Let there be two competing political parties $A$ and $B$ which offer policy platform $\eta^A_t$, respectively $\eta^B_t$. In each election for term $t$, voters can choose between these two platforms.

3.1 The Voting Decision

Let there be a continuum of voters. Voter turnout is 100%. Following the arguments in Section 2, we assume that a voter’s utility depends on individual income and—independent of its impact on the latter—the macroeconomic performance (see Section 2.2). The utility of a single voter $i$ in period $t$ is given by a utility function

$$U_{it} = U_i(y_{it}, a_t)$$

with $y_{it}$ being voter $i$’s income in period $t$ and $a_t$ representing the indicator of the macroeconomic performance of the economy in term $t$, involving, for instance, the unemployment rate, inflation rate or rate of economic growth. Individual income and macroeconomic performance are influenced by economic policy. Let $\eta_t$ represent the policy vector in period $t$. Depending on individual circumstances, voters’ incomes $y_{it}$ are influenced by a given $\eta_t$ in different ways. Next to this direct effect, $\eta_t$ also has an indirect impact on $y_{it}$ by influencing the overall macroeconomic performance $a_t$, which in turn has a direct impact on $y_{it}$. Moreover, $y_{it}$ depends on the policies pursued in combination with voter $i$’s individual circumstances of living, e.g. the sector in which he is employed, his qualification etc. The income $y_{it}$ is thus determined as follows:

$$y_{it} \equiv y_{it}(\eta_t)$$

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8 In the policy vector each row represents a certain policy field and the value of $\eta_t$ in this row states which policy instrument is applied. For instance, one row could represent personal income taxation and the value of $\eta_t$ in this row states whether the current government applies a dual income tax, a classical income tax, or some other concept. Another row may represent wage policy and the value states whether or not there is a minimum wage.
Overall, utility is thus determined by economic policy $\eta$: 

$$U_a = U_i(y_a(\eta), a_i(\eta)) \equiv U_a(\eta)$$

(3)

Due to the complexity of the economy the functional forms of $y_a(\eta)$ and $a_i(\eta)$ are unknown to the individual voter. When inferring on expected values of $y_a$ and $a_i$, the individual voter performs two tasks: The first task is a purely theoretical exercise in which he uses his mental model to simulate the impact of a certain policy platform $\eta$ on $y_a$ and $a_i$, and thus on $U$. For reasons of analytical clarity, we assume that these simulations are based on the assumption that the government is competent in the sense that its valence allows implementing the policy platform offered (see Section 2.2). The mental model $mm_i$ can be thought of as a function assigning certain estimates for $y_a$ and $a_i$ to certain policy vectors, that is, $mm_i: \mathbb{R}^K \rightarrow \mathbb{R}^2$, with $K$ being the number of policy dimensions in $\eta$. Estimated values are labeled by a hat when they are based on the assumption of a competent government, e.g., $\hat{a}_a$ represents the macroeconomic performance of the economy in period $t$, estimated by the mental model of voter $i$:

$$\left\{ \hat{y}_a(\eta), \hat{a}_a(\eta) \right\} = mm_i(\eta)$$

(4)

The policy platform $\eta$ which—in the eyes of voter $i$—is the best, maximizes his estimated utility $\hat{U}_a(\eta)$:

$$\eta_{opt}^i = \arg\max_{\eta} \hat{U}_a(\eta)$$

(5)

Hence, given that both parties are able to fully implement their platforms, that is, both parties are competent, voter $i$ can estimate the isolated effect of the policy platforms offered by the two parties on expected utility $\hat{U}_a = \hat{U}_a(\eta_j^i), j = A, B$. Then, other things equal, voter $i$ favors the party for which this estimated utility is larger.

However, voters also have a subjective perception referring to the competence of the two parties. Therefore, the second task of the voter is to see whether the assumption of both parties being competent can be upheld. For this purpose, he accounts for the macroeconomic performance of the incumbent party, i.e. the party in government in term $t-1$. Voters compare the observable indicator $a_{i-1}$ with their individual benchmark value, labeled $\overline{a}_i$. Then, the valence attributed to party $j$ by voter $i$ is determined in the following way:
\[ \gamma^j_u(\eta_{-i}) = \begin{cases} a_{i-1} (\eta_{-i}^j) - \alpha_i & \text{if party } j \text{ is the incumbent} \\ 0 & \text{otherwise} \end{cases} \] (6)

As the empirical literature states that the responsibility hypothesis only holds for the incumbent, we assume that a party out of office is attributed the neutral value of zero. If the incumbent’s policy produced an outcome lower than the voter’s aspiration level \( \bar{\alpha}_i \), the valence attributed to this party is negative and the party is considered as less competent: \( \gamma^j_u(\eta_{-i}) < 0 \). In the opposite case, voter \( i \) considers the party as being more competent, so that its valence is positive: \( \gamma^j_u(\eta_{-i}) > 0 \). It is important to note that, in our model, parties do not differ in their competence yet voters resolve the cognitive dissonance evoked by unexpected macroeconomic outcomes by assuming that some parties are more competent than others (see Section 2.2).

Combining the results of both estimation tasks, voter \( i \) forms expected utilities for the two competing policy platforms proposed and the subjectively attributed different values of party valence. This utility we denote by \( \hat{U}^j_u = \hat{U}_u[\hat{U}^j_u(\eta^j), \gamma^j_u] \), \( j = \{A,B\} \), and determines the individual voting decision. Applying the concept of probabilistic voting yields the following expression for the probability \( \pi^j_i \) that voter \( i \) votes for party \( j \) in term \( t \):

\[
\pi^j_i = f_i^j(\hat{U}^j_u) = f_i^j(\gamma^j_u, \gamma^{-j}_u, \hat{U}^j_u, \hat{U}^{-j}_u)
\] (7)

\[
\frac{\partial f_i^j}{\partial \gamma^j_u} > 0, \quad \frac{\partial f_i^j}{\partial \gamma^{-j}_u} < 0, \quad \frac{\partial f_i^j}{\partial \hat{U}^j_u} > 0, \quad \frac{\partial f_i^j}{\partial \hat{U}^{-j}_u} < 0
\] (8)

We assume the non-negativity and the adding up conditions to hold: \( \pi^j_i = 1 - \pi^{-j}_i \in [0,1] \). If \( \gamma^j_u = \gamma^{-j}_u \) and \( \hat{U}^j_u = \hat{U}^{-j}_u \), voter \( i \) is indifferent between the two parties and thus \( \pi^j_i = \frac{1}{2} \). However, if \( \hat{U}^j_u = \hat{U}^{-j}_u \), voter \( i \) will rather vote in favor of the party that he attributes more valence to, so that \( \pi^j_i < \frac{1}{2} \) if \( \gamma^j_u < \gamma^{-j}_u \). It is possible that the valence advantage outweighs the difference between \( \hat{U}^j_u \) and \( \hat{U}^{-j}_u \) such that voter \( i \) is more likely to vote for party \( j \) even though \( \eta^j \) is less appealing to him than \( \eta^{-j} \).  

### 3.2 Party Competition

Both parties are led by candidates who are office-seeking. The candidates want to win power (opposition) or to stay in office (incumbent). The probability that voter \( i \) votes for party \( j \) in a particular election \( t \) depends on the difference in expected utility from the policy platforms
\(\left(\hat{U}_u(\eta^i_t) - \hat{U}_u(\eta^{-i}_t)\right)\) and the difference in perceived valence between the parties \((\gamma^j_u - \gamma^{-j}_u)\) of voter \(i\). We assume that the probability \(\pi^j_u\) is additively separable in these two resulting probabilities. Summing up these two probabilities across all voters yields the expected vote share of party \(j\) in election \(t\) as the sum of the two aggregated probabilities:

\[
\Pi^j_t(\gamma^j_u, \gamma^{-j}_u, \hat{U}_u, \hat{U}^{-j}_u) = \int \pi^j_i \, di = A^j_i(\eta^i, \eta^{-i}) + V^j_i(\gamma^j_u, \gamma^{-j}_u)
\]

(9)

where \(A^j_i(\eta^i, \eta^{-i})\) represents the platform-related vote-share and \(V^j_i(\gamma^j_u, \gamma^{-j}_u)\) represents the valence-related vote-share in \(t\). In Appendix A.1, we formally deduce this aggregated function from the individual voting probabilities. The aggregated discounted vote share over the planning horizon \(T\), labeled \(\Theta^j_t\), is given by:

\[
\Theta^j_t = \sum_{\tau=t}^{T-1} \delta^{\tau-t} \Pi^j_{\tau}(\gamma^j_u, \gamma^{-j}_u, \hat{U}_u, \hat{U}^{-j}_u)
\]

(10)

with \(0 < \delta < 1\) denoting the discount factor. The optimal strategy \(\bar{\eta}^j_t = \left(\eta^i_t\right)^{t+1}_{t=0}\) to be chosen by party \(j\) is given by:

\[
\bar{\eta}^j_t = \arg \max_{\eta_t} \Theta^j_t
\]

(11)

For simplicity, we start by assuming that there are only two possible policy platforms from which the parties can choose (Romer, 2003).\(^9\) We assume that there is an adequate, good policy platform \(\eta^g\) and an inadequate, bad platform \(\eta^b\). Following the idea of biased beliefs, we assume that the mental models of the majority of voters assert \(U_u(\eta^b) \succ U_u(\eta^g)\) for all \(t\), despite the fact that the reverse ordering holds for the true utility values (cf. also Beilharz and Gersbach 2004; Beilharz 2005). Only a minority of voters apply mental models that yield the reverse estimated preference ordering. This establishes biased beliefs at the macro level.

We assume complete information at the parties’ side. Since policy platform \(\eta^g\) will yield superior economic outcomes if pursued, the parties know that \(a_{t+1}(\eta^g) > a_{t+1}(\eta^b)\). Let \(a_i(\eta^b) < \bar{a}_i\) and \(a_i(\eta^g) > \bar{a}_i\) for most of \(i \in \{0, 1\}\). Consequently, a government will be attri-
buted a higher valence in \( t+1 \) if it realizes \( \eta_g \) in \( t \) (compared to offering \( \eta_b \)). That is, platform \( \eta_b \) is a popular but bad policy and \( \eta_g \) is a good but temporarily less popular policy. Hence, if a party wins the election in period \( t \) and pursues good policy platform \( \eta_g \), it will be attributed a positive valence, and if a party wins the election in period \( t \) and pursues populist platform \( \eta_b \), it will be allocated a negative valence. Let party \( Inc \) be the incumbent and party \( Opp \) the opposition. We define:

\[
V_{t}^{Inc} (\eta_{t-1}^{Inc} = \eta_g) \equiv v \tag{12}
\]

\[
V_{t}^{Inc} (\eta_{t-1}^{Inc} = \eta_b) \equiv -v \tag{13}
\]

\[
V_{t}^{Opp} (\eta_{t-1}^{Inc}) \equiv -V_{t}^{Inc} (\eta_{t-1}^{Inc}) \tag{14}
\]

With respect to the platform-related part of the expected vote share, we define:

\[
A^j (\eta^j = \eta^{-j}) \equiv \frac{1}{2} \tag{15}
\]

\[
A^j (\eta_b, \eta_g) \equiv \frac{1}{2} + f \tag{16}
\]

\[
A^j (\eta_g, \eta_b) \equiv \frac{1}{2} - f \tag{17}
\]

Hence, playing good policy platform \( \eta_g \) has a potential short-term disadvantage in probability amounting to \( f \), but allows building up valence if being elected, which corresponds with an advantage of size \( v \) in the next election. We restrict the function value to move within interval \([0,1]\) and assume \( 1/2 + f + v \leq 1 \). While \( v > 0 \) measures the gain in the probability of winning due to higher valence, variable \( f > 0 \) measures the effect of biased beliefs: if the populist platform is proposed when the other party proposes platform \( \eta_g \), \( f \) measures the amount of probability of winning beyond \( 1/2 \) due to biased beliefs. The advantage in support of one party is equal to the disadvantage of the other. That is, it makes no difference of whether the incumbent has the valence advantage for having applied \( \eta_g \) or the opposition party has the advantage because the incumbent applied \( \eta_b \).

Party competition is modeled as a non-cooperative dynamic game. The dynamics result from the fact that the valence of both parties in \( t \) depends on which party won the election in \( t-1 \) and the platform pursued by this party. Hence, valence is endogenous. Figure 1 presents the structure of the game. The game consists of four stages and is analyzed by the parties as a \( T \) times repeated game.

[Figure 1 about here]
4. Political Equilibrium

If both parties are allocated the same valence in an election, we obtain \( \Pi_A^A = \Pi_B^B \) whenever both parties choose the same policy platform. Otherwise, the party which chooses the popular platform \( \eta_b \) has a higher probability of winning the election. Given the incumbent’s policy pursued, one party has a valence advantage. Consequently, we must differentiate between the two possible states “party A wins the election” and “party A loses the election”. They occur with probability \( \Pi_A^A \), respectively \( 1 - \Pi_A^A \). Moreover, at the beginning of each election round, voters update their valence parameters \( \gamma^j \), \( j = \{A, B\} \). As the government always pursues a good or a bad policy, we only have to differentiate between two possible starting situations for party competition: \( V_A^A > 0 \) (situation A+) and \( V_A^A < 0 \) (situation A-). Due to the symmetry of the game, both situations are mirror-inverted and it suffices to analyze only one of both cases.

Though we only have two pure strategies, we allow for parties to choose mixed strategies (Harsanyi 1973). We denote the probability that party \( j \) chooses the populist platform \( \eta_b \) by \( q^j \). Finally, we accommodate Caplan’s pessimistic view with two assumptions: (i) We set the tie-breaking rule such that if a party is indifferent between the two platforms, it will choose the populist platform \( \eta_b \); (ii) we assume that parties commit to the platform proposed in the campaign and exclude “cheap talk” strategies. Such strategies would destroy their credibility and the capacity to commit to policy platforms in the future which in turn causes losses in votes (Aragonès et al. 2007). Given our assumption (ii), parties cannot play the populist platform in the campaign and pursue the good policy in order to build up valence. If they could, good policies would prevail in 100 per cent of cases as soon as \( v > 0 \).

4.1 Nash Equilibria in Mixed Strategies

It is intuitively obvious that both parties will offer the opportunistic policy platform if they operate with a time horizon of \( T = 1 \). (See Appendix A.3 for a formal proof). Therefore, we consider the case where parties have an inter-temporal objective function with \( T=2 \). The corresponding payoffs are simply the discounted sum of the payoffs from the \( T=2 \) stage games, as described by equation (10). The game is described by Figure 1 with \( T=2 \).

Having objectives beyond the next election, the parties care about the valence effect for the second election. The two possible scenarios are that in the first election, party A has a valence advantage (A+), so that \( V_A^A = v \), or party A has a valence disadvantage in the first elec-
tion (A'), so that $V_i^A = -v$. That is, there is an atmosphere of contentment or of change, which establishes an incumbent’s bonus or malus. We define the sequence of strategies in equilibrium by $(q_1^A, q_1^b, q_2^A, q_2^b)$, where we drop the counter-probabilities for simplicity. Solving the game by backwards induction, we obtain the political equilibria. We start with the situation where both parties have equal valence, as a benchmark scenario:

**Proposition 1:** Suppose $V_i^A = V_i^B = 0$.

(a) If $f < \delta v$, the unique subgame perfect Nash equilibrium (henceforth abbreviated by NE) in mixed strategies is $(0,0,1,1)$.

(b) If $f \geq \delta v$, the unique subgame perfect NE in mixed strategies is $(1,1,1,1)$.

**Proof:** See Appendix.

If no party has a valence advantage, we obtain the obvious result that a party proposes the good pure strategy platform $\eta_g$ in the first election as long as the dynamic expected gain of votes of doing so is higher than the expected loss of votes of doing so: $\delta v > f$. However, due to its pursued policy, the incumbent will always have a different valence value than the opposition party. In the second election there is no future election and both parties choose the pure populist platform strategy.

We now turn to the realistic case where one party has a valence advantage. We obtain:

**Proposition 2:** Suppose scenario $A^+$. 

(a) If $f < \delta v(1-2V)$, the unique NE in mixed strategies is $(0,0,1,1)$:

(b) If $\delta v(1-2V) \leq f < \delta v(1+2V)$, the unique NE in mixed strategies is $(0,1,1,1)$;

(c) If $f \geq \delta v(1+2V)$, the unique NE in mixed strategies is $(1,1,1,1)$.

**Proof:** See Appendix.

We only have equilibria in pure strategies, too. Figure 2 maps the three relevant areas in the two-dimensional $(f,v)$-space (solid lines). The area in the $(f, \delta v)$-space where both parties choose $\eta_g$ is comparatively small, but so is the area where both choose $\eta_b$. The big remaining area describes all constellations in which the party with the valence-advantage offers the good policy platform $\eta_g$ while the disadvantaged opponent party offers the populist policy $\eta_b$. Given the symmetry of the game, it is intuitively clear that the equilibria of scenario $A^+$ and $A^-$ are identical, with the exception that case (b) is mirror-inverted: if party $A$ has a disadvantage,
party B has the corresponding advantage, and *vice versa*. The corresponding mirror-inverted proposition for the case $A^*$ is stated in the Appendix.

[Figure 2 about here]

It follows that, despite biased beliefs towards bad policies at the voters’ side, good policy equilibria do exist. Good policy outcomes are even likely as long as the degree of the bias in the beliefs toward economically inadequate policies ($f$) is not too high relative to the degree of rewarding good macroeconomic performance ($\delta v$). This result is not impaired by the “last election effect” that in the second election both parties alike play the populist platform $\eta_b$. This result is an artifact of the $T=2$-model and not time-consistent. When actually arriving at this next election, the parties re-optimize their choice of platform, again having planning horizons of two elections. It follows that the decisive result is the choice for the first election.

### 4.2 Mixed Compromise Platforms

We now allow for choosing any linear combination of the good and the populist policy, so that parties can build up a mediocore compromising platform between pure populist and pure good policy. The fraction of platform $\eta_b$ chosen by party $j$ is denoted by $\beta_j^t$. We assume that the expected and actual effect of the mixed platform is the same mixture of the single effects (linear relationship):

$$a_i(\beta_j^t \eta_b + (1-\beta_j^t) \eta_g) = \beta_j^t a_i(\eta_b) + (1-\beta_j^t) a_i(\eta_g)$$

(18)

$$mm_i(\beta_j^t \eta_b + (1-\beta_j^t) \eta_g) = \beta_j^t mm_i(\eta_b) + (1-\beta_j^t) mm_i(\eta_g)$$

(19)

Thus, the utility effect is a linear-combination of the weighted effects, and we obtain:

$$\Lambda^j(\beta_j^t, \beta_{j-1}^t) = \frac{1}{2} + (\beta_j^t - \beta_{j-1}^t) \cdot f$$

(20)

Finally, we assume that the valence effect of a mixed platform is the linear combination of the single effects, too:

$$V_{inc}^j(\beta_{j-1}^t) = \beta_{j-1}^t \cdot (-v) + (1-\beta_{j-1}^t) \cdot v = (1-2\beta_{j-1}^t) \cdot v$$

(21)

Correspondingly, we have $V_{opp}^j(\beta_{j-1}^t) = -(1-2\beta_{j-1}^t) \cdot v$. We denote the initial valence advantage of party $j$ by $v_j^0 > 0$; thus $v_j^0 = -v_j^0 < 0$. The resulting payoff function is then given by:

$$\Theta^j(\beta_j^t, \beta_{j-1}^t) = \frac{1}{2} + v_j^0 + (\beta_j^t - \beta_{j-1}^t) f + \delta \left[ \left( \frac{1}{2} + v_j^0 + (\beta_j^t - \beta_{j-1}^t) f \right) \left( \frac{1}{2} + (1-2\beta_j^t) v \right) \right]$$

(22)
Proposition 3: Suppose scenario $A^+$. 

(a) If $f < \left(\frac{1 - 2v_0^A}{1 + 2\delta v}\right)\delta v$, the unique NE is $(0,0,1,1)$;

(b) If $\frac{1 - 2v_0^A}{1 + 2\delta v} \leq f < \frac{1 + 2v_0^A}{1 + 2\delta v} \delta v$, the unique NE is $(0,\beta^b \in (0,1),1,1)$;

(c) If $\frac{1 + 2v_0^A}{1 + 2\delta v} \leq f < \frac{1 - 2v_0^A}{1 - 2\delta v} \delta v$, the unique NE is $(\beta^A \in (0,1),\beta^b \in (0,1),1,1)$;

(d) If $\frac{1 - 2v_0^A}{1 - 2\delta v} \leq f < \frac{1 + 2v_0^A}{1 - 2\delta v} \delta v$, the unique NE is $(\beta^A \in (0,1),1,1,1)$;

(e) If $f \geq \frac{1 + 2v_0^A}{1 - 2\delta v} \delta v$, the unique NE is $(1,1,1,1)$.

Proof: See Appendix.

Like before, it remains optimal even for a disadvantaged party to choose the complete good platform (case (3a)) as long as the current value of winning valence in the next election is big relative to the gain of populism, and it remains optimal even for the advantaged party to play the complete populist platform if the opportunity costs of investing in future valence is very high (case (3e)). In situations where condition (3a) respectively (3e) hold and both parties chose $\beta_0^A = \beta_0^b = 0$ (case (3a)) respectively $\beta_0^A = \beta_0^b = 1$ (case (3e)) in period $t = 0$, we know that the valence advantage (disadvantage) of the incumbent is given by $v (-v)$. For these situations, we can map the relevant constellations in the two-dimensional $(f, \delta v)$-space (see dotted lines in Figure 2). Compared to the scenario when only pure strategies can be chosen (Proposition 2, solid lines in Figure 2), the areas when both parties choose pure strategies are smaller.

If $f$ ranges between $\left(\frac{1 - 2v_0^A}{1 + 2\delta v}\right)\delta v$ and $\left(\frac{1 + 2v_0^A}{1 - 2\delta v}\right)\delta v$ (area between the dotted lines in Figure 2), mixtures of the platforms are played by at least one party in equilibrium. The disadvantaged party will, compared to Proposition 2, deviate from the purely good platform strategy for lower values of $f$. But the advantaged party will also choose the pure populist platform only for higher values of $f$ (again compared to Proposition 2). Therefore, with the oppor-
tunity to play mixtures of platforms, disadvantaged parties play more populist but advantaged parties play economically superior mixtures of platforms.

For the largest part of all constellations, it is thus optimal for parties to mix the populist and good platform to win elections (case (b) to (d)). For scenarios in the middle (case (c)) we have only mixed platforms in equilibrium, and the policy outcome is neither bad nor good, but some half-hearted compromise. In case (b), either the good or a mediocre policy is chosen. And even in case (d), mediocre policy outcomes occur with positive probability in equilibrium. The degree of populism is higher the larger \( f \), the smaller \( \delta v \) and the larger \( v_0^j \). In sum, the conclusion that policy outcomes are bad in democracy is too harsh. Good policy choices are possible. In most cases, however, democracy suffers from mediocre outcomes.

5. Implications for Biased Beliefs and Policy Convergence

Our micro-founding of the bias of beliefs in party competition discloses that biased beliefs not necessarily have to bias political equilibrium. The political equilibrium is determined by the bias measured at the macro level (cf. end of Appendix A.1). If the society is polarized such that misleading right wing and misleading left wing opinions are neutralizing each other, party competition is not biased toward one side at all. Contradicting mental models of single voters will thus mitigate the overall bias relevant for party competition. Therefore, the relevant aspect for the quality of the outcome of democracy is how the biased mental models are distributed among the voters.

Our results also represent an interesting contribution to the discussion about policy convergence in spatial election models with valence. In our model with endogenous and outcome-related valence, we have to differentiate two types of parameter constellations: In those cases described in propositions (2b) respectively (3b) to (3d), a valence advantage makes the advantaged party offer less populist policy platforms than the disadvantaged. The larger the valence advantage, the larger the difference in platforms when mixtures in policies can be chosen. In the other constellations, however, we find that despite the large difference in valence that automatically occurs when the incumbent offers a pure platform, parties offer the same platform. The effect described in this paper works against the general conclusions from the literature on spatial voting models with valence (Groseclose 2001; Schofield 2004) which says that differences in valence will limit policy convergence when parties have policy preferences.
Our paper adds to the literature on valence in another interesting respect. In the existing models, valence is not “earned” by good economic performance in previous terms but is either exogenously given or built up in costly campaigns (e.g., Zakharov 2009). As this campaign spending per se does not systematically improve policy outcomes, they represent social waste. The stronger voters respond to differences in valence, the more resources are wasted. In our model, building up valence means offering superior policy platforms and thus has welfare-enhancing side-effects. The more sensitively voters respond to differences in perceived outcome-related valence as defined here, the higher overall welfare.

6. Concluding Remarks

Beilharz and Gersbach (2004) show in an interesting paper how biased beliefs at the voters’ side cause democratic societies to vote themselves into crises. Similarly, Caplan (2007) develops the pessimistic view that democracy inevitably produces bad policies due to these biased beliefs. Caplan hypothesized that retrospective voting to some extent may restrict populism among parties and prevent even worse results. However, a rigorous formal analysis of the underlying mechanism is missing. We provide the first rigorous game-theoretic model of party competition in which voters entertain biased beliefs but reward the incumbent for good economic performance retrospectively. First, we micro-found the idea of biased beliefs by introducing the psychological concept of mental models at the voters’ side: Since the functioning of economic policy and other subsystems of the real world are too complex to be understood by humans, voters apply oversimplified mental models that produce biased beliefs for the individual voter. Second, we introduce the empirical findings of the VP-functions literature, which shows that incumbent parties are punished for a bad macroeconomic performance of the economy but rewarded for a good performance. We incorporate this mechanism in a model of probabilistic voting by making party valence (in the sense of perceived competence) endogenous in our model: the valence evaluations are updated depending on the incumbent’s past macroeconomic performance.

We show that competing political parties face incentives to apply good but less popular policy platforms, even though these have less intuitive appeal to the voters than alternative more popular platforms. This is likely to prevent severe crises that Beilharz and Gersbach (2004) saw as a logical consequence of biased beliefs. Therefore, the voters’ biased beliefs are stable. Our results put into perspective Caplan’s claim that, given biased beliefs at the voters’ side, democracy inevitably leads to bad policies. Good policies occur more often (a) the lower the degree of bias at the macro level, and (b) the more sensitively voters account for the par-
ties’ past economic performance. Hence, complementing Beilharz and Gersbach (2004), we emphasize that the democratic system may self-correct biased beliefs of voters.

Extending our model to mixed platforms where parties choose different building blocks of both the populist and the good platform, it becomes very likely that parties offer only half-hearted reform policies that neither produce bad nor good but mediocre outcomes in equilibrium. While Caplan (2007: 158-160) was pessimistic about the influence of retrospective voting, we show that it is often a dominant element in party competition—and thus an important corrective in democracy.

**Acknowledgements:** We thank John Ashworth, Frédéric Blaescheke, Pierre-Guillaume Méon, Markus Müller, Eva Söbbeke, James Vreeland, two anonymous referees, and participants of the 2008 and 2009 Annual Meetings of the EPCS in Jena and Athens, of the 2008 Beyond Basic Questions Conference in Göttingen and of the research seminar in Kassel for very helpful comments. An earlier version of the paper titled “Good policy choices even when voters entertain biased beliefs” appeared as MAGKS Discussion Paper No. 24-2008.
References


Appendix

A.1 Deduction of the Aggregated Function of the Expected Share of Votes

In order to demonstrate how the aggregated function of the expected share of votes of a party $j$, expressed by (9), can be deduced, we micro-found it. We denote the isolated probability of voting for party $j$ resting on expected utility difference and valence difference by functions $\lambda^j$ respectively $\nu^j$. We assume an additive relationship for $\pi^j$ with functions $\lambda^j$ respectively $\nu^j$. Hence,

$$\pi^j = \lambda^j \left( \hat{U}_a (\eta_i^j) - \hat{U}_u (\eta_i^{-j}) \right) + \nu^j (\gamma_i^j - \gamma_i^{-j}) \quad (23)$$

For unbiased beliefs ($ub$) at the side of voter $i$, we obtain $\lambda_{i,ub}^j \left( U_a (\eta_i^j) - U_u (\eta_i^{-j}) \right)$ instead of $\lambda^j \left( \hat{U}_a (\eta_i^j) - \hat{U}_u (\eta_i^{-j}) \right)$. The bias of the beliefs of voter $i$, denoted by $b_{it}$, is defined by the difference between the probability of voting in favor of platform $j$ with correct mental model and the situation with biased mental model: $b_{it} = \lambda_{i,ub}^j - \lambda_{it}^j$. We obtain

$$\Pi_{it}^j = \int_{i=0}^{1} \lambda_{i,ub}^j \, di - \int_{i=0}^{1} b_{it}^j \, di + \int_{i=0}^{1} \nu_{it}^j \, di . \quad (24)$$

Defining $A_{i,ub}^j \equiv \int_{i=0}^{1} \lambda_{i,ub}^j \, di$, $B_{it}^j \equiv \int_{i=0}^{1} b_{it}^j \, di$, $V_{it}^j \equiv \int_{i=0}^{1} \nu_{it}^j \, di$, $A_{it}^j \equiv \int_{i=0}^{1} \lambda_{i,ub}^j \, di - \int_{i=0}^{1} b_{it}^j \, di$, and $\Gamma_{it}^j \equiv \int_{i=0}^{1} \gamma_{it}^j \, di$ we arrive at:

$$\Pi_{it}^j \equiv A_{i,ub}^j - B_{it}^j + V_{it}^j$$

$$\Pi_{it}^j \equiv A_{it}^j \left( \eta_{i-1}^j - \eta_{i-1}^{-j} \right) + V_{it}^j \left( \Gamma_{it}^j - \Gamma_{it}^{-j} \right) \quad (25)$$

$B_{it}^j$ is the degree of bias of the voters’ beliefs at the macro level. Note that $\Gamma_{it}^j = 0$ if party $j$ is in opposition and $\Gamma_{it}^j (\eta_{i-1}^j) = a_{i-1} \left( \eta_{i-1}^j \right) - \int_{0}^{1} \alpha_i \, di$ if party $j$ is the incumbent.

Note that the three definitions (18) to (20) can alternatively be written as $V_{it}^j = V_{it}^j \left( \Gamma_{it}^j - \Gamma_{it}^{-j} \right)$, with

$$V_{it}^j \left( \Gamma_{it}^j - \Gamma_{it}^{-j} < 0 \right) = -v \quad \text{and} \quad V_{it}^j \left( \Gamma_{it}^j - \Gamma_{it}^{-j} > 0 \right) = v ,$$

with $v = a \left( \eta^k \right) - \int_{0}^{1} \alpha_i \, di = \int_{0}^{1} \alpha_i \, di - a \left( \eta^b \right)$. Another point is noteworthy: As the applied mental models can be biased both upwards ($\lambda_{i,ub}^j - \lambda_{it}^j < 0$) and downwards ($\lambda_{i,ub}^j - \lambda_{it}^j > 0$), both contrary biases may cancel out.
Our micro-founding of the bias of beliefs in party competition thus discloses that biased beliefs not necessarily have to bias the political equilibrium. The political equilibrium is determined by the bias measured at the macro level, that is, by $B_i^j$.

A.2 The Payoff Notation

To simplify notation, we denote the payoffs of the 16 possible strategies by $P_k$, $k = \{1, 2, \ldots, 16\}$. The payoffs correspond with the 16 possible permutations of the vector $(\eta^A, \eta^B, \eta^A, \eta^B)$, with $y = \{b, g\}$. We define:

- $P_1$: Payoff when $(\eta_b, \eta_b, \eta_b, \eta_b)$
- $P_2$: Payoff when $(\eta_b, \eta_b, \eta_b, \eta_b)$
- $P_3$: Payoff when $(\eta_b, \eta_b, \eta_b, \eta_b)$
- $P_4$: Payoff when $(\eta_b, \eta_b, \eta_b, \eta_b)$
- $P_5$: Payoff when $(\eta_b, \eta_b, \eta_b, \eta_b)$
- $P_6$: Payoff when $(\eta_b, \eta_b, \eta_b, \eta_b)$
- $P_7$: Payoff when $(\eta_b, \eta_b, \eta_b, \eta_b)$
- $P_8$: Payoff when $(\eta_b, \eta_b, \eta_b, \eta_b)$
- $P_9$: Payoff when $(\eta_b, \eta_b, \eta_b, \eta_b)$
- $P_{10}$: Payoff when $(\eta_b, \eta_b, \eta_b, \eta_b)$
- $P_{11}$: Payoff when $(\eta_b, \eta_b, \eta_b, \eta_b)$
- $P_{12}$: Payoff when $(\eta_b, \eta_b, \eta_b, \eta_b)$
- $P_{13}$: Payoff when $(\eta_b, \eta_b, \eta_b, \eta_b)$
- $P_{14}$: Payoff when $(\eta_b, \eta_b, \eta_b, \eta_b)$
- $P_{15}$: Payoff when $(\eta_b, \eta_b, \eta_b, \eta_b)$
- $P_{16}$: Payoff when $(\eta_b, \eta_b, \eta_b, \eta_b)$

A.3 Lemmata, Additional Propositions and Proofs

In order to analyze the trivial case of $T=1$, we introduce notation $P_{\eta^A, \eta^B}^{A,x}$ for the payoff of party $A$ and $P_{\eta^A, \eta^B}^{B,x}$ for the payoff of party $B$, with $x = \{A^-, A^+\}$ denoting the initial valence difference, given the proposed platforms $\eta^A$ and $\eta^B$. If $T=1$, parties only care for the next election. Then, we have the following one-shot simultaneous-move election game, represented in normal-form:
**Game 1:** One-shot election game

**Lemma 1:** If $T=1$, the unique Nash equilibrium (henceforth abbreviated by NE) in mixed strategies is $(q^A, q^B) = (1, 1)$, which is in pure strategies equivalent to actions $10^{(\eta_b, \eta_b)} (\eta_b, \eta_b)$ and payoffs $(P^{A,x}_{\eta_b}, P^{B,x}_{\eta_b})$, irrespective of valence realization $x = \{A^+, A^-, A^, B^\}$.

**Proof of Lemma 1:** The expected payoff of party $j$ is equal to

$$E(q^j, q^j) = q^j \cdot (P^j_{\eta_b, \eta_b} + (1-q^j) \cdot P^j_{\eta_b, \eta_b}) + (1-q^j) \cdot (P^j_{\eta_b, \eta_b} + (1-q^j) \cdot P^j_{\eta_b, \eta_b})$$

The Kuhn-Tucker first order condition is given by

$$q^j \cdot (P^j_{\eta_b, \eta_b} - P^j_{\eta_b, \eta_b}) + (1-q^j) \cdot (P^j_{\eta_b, \eta_b} - P^j_{\eta_b, \eta_b}) \leq 0$$

If $x = A^+$, the payoff vectors of the pure strategy game are given by

$$\left(P^A_{\eta_b, \eta_b}, P^B_{\eta_b, \eta_b}\right) = \left(P^A_{\eta_b, \eta_b}, P^B_{\eta_b, \eta_b}\right) = \left(\frac{1}{2} + v, \frac{1}{2} - f - v\right)$$

and

$$\left(P^A_{\eta_b, \eta_b}, P^B_{\eta_b, \eta_b}\right) = \left(\frac{1}{2} - f + v, \frac{1}{2} + f - v\right).$$

If $x = A^-$, payoffs are given by

$$\left(P^A_{\eta_b, \eta_b}, P^B_{\eta_b, \eta_b}\right) = \left(P^A_{\eta_b, \eta_b}, P^B_{\eta_b, \eta_b}\right) = \left(\frac{1}{2} - v, \frac{1}{2} + f + v\right)$$

and

$$\left(P^A_{\eta_b, \eta_b}, P^B_{\eta_b, \eta_b}\right) = \left(\frac{1}{2} + f - v, \frac{1}{2} - f + v\right).$$

Due to $\left(P^j_{\eta_b, \eta_b} - P^j_{\eta_b, \eta_b}\right) > 0$ and $\left(P^j_{\eta_b, \eta_b} - P^j_{\eta_b, \eta_b}\right) > 0$, we obtain $\partial E(\cdot)/\partial q^j > 0$ for any $q^j$, and the boundary solution $q^j = 1$ for $j = \{A, B\}$ holds. That is, in equilibrium only the pure strategy $\eta_b$ is played by both parties.

As a valence advantage can only be build up with a delay of one election, it is clear that with $T=1$ no party has any incentive to choose the good policy platform, which potentially costs election chances of size $f$. Hence, we find:

---

10 The first (second) term in parentheses denotes the played platform of party A (B).
Proposition A.1: Suppose parties have a time horizon of one election \((T=1)\). Then, the finitely, or infinitely, repeated Game 1 has the unique subgame-perfect NE in mixed strategies \(q^A = q^B = 1\), that is, both parties choose pure strategy action \(\eta_b\) in all elections.

Proof of Proposition A.1: Note that the payoff structure in situation \(A^+\) is identical to the one in situation \(A^-\); the only difference is that the payoffs of party A and B are mirror-inverted. Since both parties’ time-horizon only spans the next election, Game 1 is played repeatedly in subsequent elections. Both parties and voters observe the outcome of the preceding elections before the next election begins. Then, Game 1 is a stage game that is played indefinitely. According to Lemma 1, every single stage game’s unique NE, where a stage is an election, is the pure strategy tupel \((\eta_A, \eta_B)\), regardless of the preceding stages’ outcomes. It directly follows that this NE of the stage game is the unique subgame-perfect NE of the repeated stage game (cf. Gibbons 1992: 84).

Remark to the following proofs: In the following, stage 1 is the first election and stage 2 the second.

Proof of Proposition 1: We solve the game by backwards induction. Stage 2 represents a subgame that is equal to Game 1. Hence playing strategy \(\eta_b\) is optimal for both parties. Therefore, we only need to deduce payoff vectors \(P_1, P_2, P_3\) and \(P_{13}\) for the subgame at stage 1. If \(V_i^A(G_i^A - G_i^B) = 0\), we obtain via (10):

\[
P_1 = P_{13} = \left(\frac{1}{2}(1+\delta), \frac{1}{2}(1+\delta)\right)
\]

\[
P_2 = \left(\frac{1}{2}(1+\delta) + f - \delta v, \frac{1}{2}(1+\delta) - f + \delta v\right)
\]

\[
P_3 = \left(\frac{1}{2}(1+\delta) - f + \delta v, \frac{1}{2}(1+\delta) + f - \delta v\right)
\]

The analogon to (26) is

\[
E_j^i(q^j, q^i) = q^j \cdot (q^j \cdot P_1^i + (1-q^j) \cdot P_2^i) + (1-q^j) \cdot \left(q^j \cdot P_3^i + (1-q^j) \cdot P_{13}^i\right)
\]

(28)

The Kuhn-Tucker first order condition thus is \(\partial E_j^i(\cdot)/\partial q^j = f - \delta v \leq 0\). That is, as long as \(f < \delta v\) the marginal effect of an increase of \(q^j\) is always negative and we obtain boundary

\[
\text{In the infinitely repeated game scenario, we assume that the presumptions of the Folk Theorem are satisfied, such that the discount factor is sufficiently close to one (e.g. Friedman 1971).}^{11}
\]
solution \( q' = 0 \) for \( j = \{A, B\} \). Otherwise, \( f \geq \delta v \), the marginal benefit is positive for all \( q' \) and we obtain the boundary solution \( q' = 1 \). Therefore, in equilibrium, only pure strategies are played, either \((\eta_a, \eta_a, \eta_b, \eta_b)\) or \((\eta_b, \eta_b, \eta_a, \eta_a)\).

**Proof of Proposition 2:** We solve the game by backwards induction. Following Lemma 1 both parties know that the equilibrium of the residual subgame at stage 2 is \((\eta_b, \eta_b)\), respectively \( q' = 1 \) for \( j = \{A, B\} \). Therefore, only payoff vectors \( P_1, P_5, P_9 \) and \( P_{13} \) are relevant for subgame-perfection at stage 1. If \( V^A_i (\Gamma^A_i - \Gamma^B_i) = v \), we obtain:

\[
P_1 = \left( \frac{1}{2}(1+\delta) + v - 2\delta v^2, \quad \frac{1}{2}(1+\delta) - v + 2\delta v^2 \right)
\]

\[
P_5 = \left( \frac{1}{2}(1+\delta) + v(1-\delta) + f, \quad \frac{1}{2}(1+\delta) - v(1-\delta) - f \right)
\]

\[
P_9 = \left( (1+\delta)(\frac{1}{2}+v) - f, \quad (1+\delta)(\frac{1}{2}-v) + f \right)
\]

\[
P_{13} = \left( \frac{1}{2}(1+\delta) + v + 2\delta v^2, \quad \frac{1}{2}(1+\delta) - v - 2\delta v^2 \right)
\]

Using these payoffs in (28) we obtain two different first order conditions:

\[
\partial E^A(\cdot)/\partial q^A = f - \delta v(1+2v) \leq 0 \quad \text{and} \quad \partial E^B(\cdot)/\partial q^B = f - \delta v(1-2v) \leq 0.
\]

Hence, as long as \( f < \delta v(1-2v) \) the marginal benefit of increasing the probability of playing the populist platform \( \eta_a \) is negative for every value of \( q' \). Thus, in equilibrium, both parties choose \( q' = 0 \), so the pure strategy \( \eta_a \). However, as long as \( \delta v(1-2v) \leq f < \delta v(1+2v) \) the marginal benefit of the advantaged party \( A \) remains negative but the marginal benefit of the disadvantaged party \( B \) is always positive, so that in equilibrium, party \( A \) chooses pure strategy \( \eta_a \) (\( q^A = 0 \)) but party \( B \) pure strategy \( \eta_b \) (\( q^B = 1 \)). However, once \( f \geq \delta v(1+2v) \) the marginal benefit of increasing

---

\(^{12}\) To deduce the payoffs given in vectors \( P_1, P_5, P_9 \) and \( P_{13} \) use (10). For instance, the payoff of party \( A \) in \( P_1 \) is

\[
\left( \frac{1}{2} + v \right) + \delta \left[ \left( \frac{1}{2} + v \right) \left( \frac{1}{2} - v \right) + \left( \frac{1}{2} - v \right) \left( \frac{1}{2} + v \right) \right] = \frac{1}{2}(1+\delta) + v - 2\delta v^2.
\]

That is, in election 2 the probability that party \( A \) has a valence disadvantage (because of winning election 1 and pursuing \( \eta_a \)) is \( \left( \frac{1}{2} + v \right) \), and with counter-probability \( \left( \frac{1}{2} - v \right) \) it looses election 1 and has a valence advantage in election 2 (because of party \( B \) is pursuing \( \eta_b \)).
the probability of playing $\eta_b$ is positive for both parties and both choose the pure strategy $\eta_b \left( q^i = 1 \right)$ for $j = \{A, B\}$. □

**Proof of Proposition 3:** Again, in the second election both parties choose the complete platform $\eta_b$, since there is no next election (Lemma 1): $\beta^A_2 = \beta^B_2 = 1$. Based on (22) the first-order condition for the optimal choice of $\beta^A_1$ is given by:

$$\frac{\partial \Theta^A_1}{\partial \beta^A_1} = f + \delta v \cdot \left[ 2f \left( 1 - 2\beta^A_1 \right) - \left( 1 + 2v^A_0 \right) \right] = 0$$

(29)

It follows:

$$\beta^A_1 = \frac{1}{2} + \frac{1}{4} \left( \frac{f - \delta v \left( 1 + 2v^A_0 \right)}{f \delta v} \right)$$

(30)

Therefore, $\beta^A_1 = 0$ if $f < \delta v \left( 1 + 2v^A_0 \right)/(1 + 2\delta v)$ and $\beta^A_1 = 1$ if $f \geq \delta v \left( 1 + 2v^A_0 \right)/(1 + 2\delta v)$. For the optimal choice of party $B$ we simply have to substitute $+v^i_0 = +v^A_0$ for $+v^B_0 = -v^A_0 < 0$ in (22). □

**Proposition A.2:** Suppose scenario $A'$.

(a) If $f < \delta v(1 - 2v)$, the unique NE is $(\eta^g, \eta^g, \eta^b, \eta^b)$.

(b) If $\delta v(1 - 2v) \leq f < \delta v(1 + 2v)$, the unique NE is $(\eta_b, \eta^g, \eta^b, \eta^b)$.

(c) If $f \geq \delta v(1 + 2v)$, the unique NE is $(\eta^b, \eta^b, \eta^b, \eta^b)$.

**Proof of Proposition A.2:** If $V^A_i \left( I^A_i - I^B_i \right) = -v$, the relevant payoff vectors at stage 1 are given by:

$$P_1 = \left( \frac{1}{2}(1 + \delta) - v + 2\delta v^2, \frac{1}{2}(1 + \delta) + v - 2\delta v^2 \right)$$

$$P_3 = \left( (1 + \delta) \left( \frac{1}{2} - v \right) + f, (1 + \delta) \left( \frac{1}{2} + v \right) - f \right)$$

$$P_5 = \left( \frac{1}{2}(1 + \delta) - v(1 - \delta) - f, \frac{1}{2}(1 + \delta) + v(1 - \delta) + f \right)$$

$$P_{13} = \left( \frac{1}{2}(1 + \delta) - v - 2\delta v^2, \frac{1}{2}(1 + \delta) + v + 2\delta v^2 \right)$$

It is easy to see that this game is identical to the game discussed in the proof of Proposition 3, the only difference being that party $A$ now has the valence disadvantage while party $B$ has the valence advantage. Thus, the results are mirror-inverted. □
### A.4 Figures

#### Game begins at period \( t = 1 \)

<table>
<thead>
<tr>
<th>Stage</th>
<th>Activities</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The parties choose ( \eta_i^a ) resp. ( \eta_i^b ) simultaneously</td>
<td>platforms</td>
</tr>
<tr>
<td>2</td>
<td>Voters make their decision (given ( \eta_i^a, \eta_i^b, \gamma_i^a, \gamma_i^b ))</td>
<td>distribution of votes; election winner</td>
</tr>
<tr>
<td>3</td>
<td>The election winner pursues the policies offered in the election (( \eta_i ))</td>
<td>( a_i(\eta_i) )</td>
</tr>
<tr>
<td>4</td>
<td>Voters update their expected valence for round ( t+1 )</td>
<td>( \gamma_{i, t+1}^a, \gamma_{i, t+1}^b )</td>
</tr>
</tbody>
</table>

*Period \( t \) ends.*

*(equivalent to the start of period \( t+1 \) as long as \( t+1 < T \))*

#### Game ends at period \( t = T=2 \)

**Figure 1:** The structure of the game in pure strategies
Figure 2: The relevant thresholds of Proposition 3 and 4 for pure strategy equilibria in the two-dimensional \((f, \nu)\)-space \((\delta=1 \text{ and } x=A^*)\).