

Good Policy Choices Even When Voters Entertain Biased Beliefs

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Abstract

We show that biased beliefs not necessarily lead to weak policy outcomes in democracy, as has been argued e.g. by Bryan Caplan (2007: The myth of the rational voter). In a game-theoretical approach of probabilistic voting, we introduce the idea of biased beliefs and retrospective voting and show that there is a self-correction mechanism in democracy that may mitigate the problem of biased beliefs. In order to micro-found biased beliefs we introduce the psychological concept of mental models to address voters' naive reasoning about the economy. We show that democracy often suffers from mediocre mixtures of populist and good policies in equilibrium, but less from purely populist policy. Interesting institutional implications follow.

Keyword: Voting behaviour, dynamic party competition, valence, VP-functions, biased beliefs

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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). After a period of handling governments as benevolent institutions, the public choice literature introduced the perspective that politicians, parties, and governments are, respectively consist of individuals who are primarily self-interested and adapt to incentives (e.g. Shughart and Tollison 2005; Shughart 2006; Brennan 2008; Grant 2008). Rent-seeking and other activities of bureaucrats, politicians and interest groups cause inefficient democratic outcomes (e.g. Stokes 1963; Niskanen 1975; Tollison 1982; Shughart and Raz-zolini 2001). 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 inevitably lead to bad policy choices.¹

In this paper, 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 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.

¹ He touches on a number of factors that might improve the policy choices, but dismisses them as too weak (e.g. Caplan 2007: chapt. 6 and 7).

Our analysis covers two different types of policy spaces. When parties can choose between only two policy platforms, a populist and a good one, real mixed strategies do not exist in equilibrium. When they are allowed to choose any linear combination of these two platforms, it is optimal to choose a mixture of elements of populist and good platforms. In sum, our results contradict the conclusion that biased beliefs inevitably lead to weak policy choices in democracy. We provide a brief outlook at the impact of political institutions on policy outcomes and argue that it is rather the case that reforms in democracy are often half-hearted and the outcome thus is mediocre.

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 presents a game-theoretic analysis which demonstrates that party competition can lead to good policy choices even when voters' beliefs are biased. Section 5 discusses the implications of our findings and 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).² 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 changes in model parameters, for instance, by policy. In mental simulations, he estimates the impact of alternative interventions and then chooses the course of action which, according to his simulations, seems most appropriate (e.g., de Kleer and

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).

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. Some individuals entertain mental models that provide them with good predictions for the behaviour of the underlying system while others entertain models of poor predictive quality.

In the context of this paper, the real system to be represented is the national economy with all its interdependencies with the world markets. 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. recently 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: chapter C). For voters, however, 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

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. Nannenstad and Paldam 2000; Paldam 2004). Thus, essentially, the incumbents' current and past performance counts.

We interpret the behavioural pattern described above as 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 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.⁵ 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 (e.g., Tyrann 2004), 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 (e.g. Stokes 1963; Groseclose 2001). Valence 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 1992; Groseclose 2001; Schofield 2004). 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.

In this paper, we follow the latter definition of valence: Incumbents who managed to achieve good macroeconomic results are considered competent and are assigned a high com-

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 Palastinian representatives that are more credible than commitments of politicians lacking these links.

petence-related valence (hereafter valence) and thus have a higher chance of (re-)election.⁶ This establishes a dynamic link between consecutive elections. Parties and politicians who want to be elected face a trade-off between choosing policy platforms to maximize votes in the short run and building up the reputation of a competent politician to attract more votes in the future. In other words, accepting losses in votes in the short run may be seen as an investment for higher valence and more votes in later elections.⁷ In this paper, we argue that 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 (e.g. Romer 2003). We follow him in assuming a continuum of voters who initially entertain biased beliefs. Unlike Romer (2003), however, we do not assume that voters 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 chances of being (re)elected 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

⁶ The fact that voters are unable to predict the correct macroeconomic figures—as e.g. pointed out by Caplan (2007: chapt. 6)—does not challenge our assumption of retrospective voting, because the latter merely states that the voters, *ex post*, can tell good economic results from poor ones.

⁷ Zakharov (2009), who was among the first to endogenise the concept of valence, shows that parties may invest in the building up of valence.

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. In their models, they demonstrate how democracies will vote into crises, if voters do not include general equilibrium effects in their reasoning about minimum wage regulation. As a consequence, unemployment and tax burden constantly rise and the economy moves toward crisis. 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 is so immanent to large parts of the population that it can only be resolved by changes in mental models. By showing that good policy choices are possible even when voters' beliefs remain biased, we challenge the pessimistic conclusion on democracy made by Caplan (2007) and others, without denying the overwhelming evidence that voters' beliefs are biased, like e.g. Wittman (1995).

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 η_t^A , respectively η_t^B . 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

$$U_{it} = U_i(y_{it}, a_t) \quad (1)$$

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*, measuring, for instance, the unemployment rate, inflation rate or rate of economic growth. Individual income is influenced by the economic policy. Let η_t represent the policy vector in period *t*, in which each row represents a certain policy field and the value of η_t in this row states which policy instrument is applied.

For instance, one row could represent personal income taxation and the value of η_t in this row states whether the current government applies a dual income tax, a classical income tax, a flat tax, or some other concept. Another row may represent wage policy and the value states whether or not there is a minimum wage. Depending on individual circumstances, voters' incomes y_{it} are influenced by a given η_t in different ways. Next to this direct effect, η_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:

$$y_{it} = y_{it}(\eta_t, a_t(\eta_t)) \equiv y_{it}(\eta_t) \quad (2)$$

Overall, utility is determined by:

$$U_{it} = U_i(y_{it}(\eta_t), a_t(\eta_t)) \equiv U_{it}(\eta_t) \quad (3)$$

Due to the complexity of the economy the functional forms of $y_{it}(\eta_t)$ and $a_t(\eta_t)$ are unknown to the individual voter. When inferring on expected values of y_{it} and a_t , 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 η_t on y_{it} and a_t . For reasons of analytical clarity, we assume that these simulations are based on the assumption that the government is competent in the sense that their managerial ability and links to labour unions or trade associations allowing them to implement 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_{it} and a_t to certain policy vectors, that is, $mm_i: \mathbb{R}^K \rightarrow \mathbb{R}^2$, with K being the number of policy dimensions in η_t . Estimated values are labelled by a hat when they are based on the assumption of a competent government, e.g., \hat{a}_{it} represents the macroeconomic performance of the economy in period t , estimated by the mental model of voter i :

$$\{\hat{y}_{it}(\eta_t), \hat{a}_{it}(\eta_t)\} = mm_i(\eta_t) \quad (4)$$

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

$$\eta_{it}^{opt} = \underset{\{\eta_t\}}{arg \max} \hat{U}_{it}(\eta_t) \quad (5)$$

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 $\hat{U}_{it}^j = \hat{U}_{it}(\eta_t^j)$, $j = A, B$. Then, other things equal, voter i favours 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_{t-1} with their individual benchmark value, labelled \bar{a}_i . Then, the valence attributed to party j by voter i is determined in the following way:

$$\gamma_{it}^j(\eta_{t-1}^j) = \begin{cases} a_{t-1}(\eta_{t-1}^j) - \bar{a}_i & \text{if party } j \text{ is in power in period } t \\ 0 & \text{otherwise} \end{cases}, \quad (6)$$

where we assume that a party out of office is attributed the neutral value of zero and the performance is equal to the aspiration level. If the incumbent's policy produced an outcome lower than the voter's aspiration level \bar{a}_i , the valence attributed to this party is negative and the party is considered as less competent: $\gamma_{it}^j(\eta_{t-1}^j) < 0$. In the opposite case, voter i considers the party as being more competent, so that its valence is positive: $\gamma_{it}^j(\eta_{t-1}^j) > 0$. 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 an expected utility referring the two competing parties resting on the two policy platforms proposed and the subjectively attributed different values of valence. This utility we denote by $\hat{U}_{it}^j = \hat{U}_{it}[\hat{U}_{it}(\eta_t^j), \gamma_{it}^j]$, $j = \{A, B\}$, and determines the individual voting decision. Applying the concept of probabilistic voting yields the following expression for the probability π_{it}^j that voter i votes for party j in term t :

$$\pi_{it}^j = f_i^j\left(\hat{U}_{it}^j\right) = f_i^j(\gamma_{it}^j, \gamma_{it}^{-j}, \hat{U}_{it}^j, \hat{U}_{it}^{-j}) \quad (7)$$

$$\frac{\partial f_i^j}{\partial \gamma_{it}^j} > 0, \quad \frac{\partial f_i^j}{\partial \gamma_{it}^{-j}} < 0, \quad \frac{\partial f_i^j}{\partial \hat{U}_{it}^j} > 0, \quad \frac{\partial f_i^j}{\partial \hat{U}_{it}^{-j}} < 0 \quad (8)$$

We assume the non-negativity and the adding up conditions to hold: $\pi_{it}^j = 1 - \pi_{it}^{-j} \in [0,1]$. If $\gamma_{it}^j = \gamma_{it}^{-j}$ and $\hat{U}_{it}^j = \hat{U}_{it}^{-j}$, voter i is indifferent between the two parties and thus $\pi_{it}^j = \frac{1}{2}$. However, if $\hat{U}_{it}^j = \hat{U}_{it}^{-j}$, voter i will rather vote in favour of the party that has more valence, so that $\pi_{it}^j < \frac{1}{2}$ if $\gamma_{it}^j < \gamma_{it}^{-j}$. It is possible that the valence advantage outweighs the difference between \hat{U}_{it}^j and \hat{U}_{it}^{-j} such that voter i is more likely to vote for party j even though η^j is less appealing to him than η^{-j} .

3.2 Party Competition

Both parties are lead by candidates who are office-seeking. The candidates want to win power (opposition) or to stay in office (incumbent). They maximize the probability of winning for T terms. The factor of discounting is denoted by $\delta \in (0,1)$.

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 $(\hat{U}_{it}(\eta_t^j) - \hat{U}_{it}(\eta_t^{-j}))$ and the difference in perceived valence between the parties $(\gamma_{it}^j - \gamma_{it}^{-j})$. We assume an additive relationship with functions λ_{it}^j respectively v_{it}^j :

$$\pi_{it}^j = \lambda_{it}^j (\hat{U}_{it}(\eta_t^j) - \hat{U}_{it}(\eta_t^{-j})) + v_{it}^j (\gamma_{it}^j - \gamma_{it}^{-j}) \quad (9)$$

Summing up these probabilities across all voters yields the expected probability of winning in election t of party j :

$$\Pi_t^j(\gamma_{it}^j, \gamma_{it}^{-j}, \hat{U}_{it}^j, \hat{U}_{it}^{-j}) = \int_{i=0}^1 \lambda_{it}^j (\hat{U}_{it}(\eta_t^j) - \hat{U}_{it}(\eta_t^{-j})) di + \int_{i=0}^1 v_{it}^j (\gamma_{it}^j - \gamma_{it}^{-j}) di \quad (10)$$

Hence, the overall probability of being elected in the planning horizon T , labelled Θ_t^j , is given by:

$$\Theta_t^j = \sum_{\tau=t}^{t+T-1} \delta_\tau^{\tau-t} \Pi_\tau^j(\gamma_{it}^j, \gamma_{it}^{-j}, \hat{U}_{it}^j, \hat{U}_{it}^{-j}) \quad (11)$$

The optimal strategy $\bar{\eta}_t^j = (\eta_\tau^j)_{\tau=t}^{t+T-1}$ to be chosen by party j is given by:

$$\bar{\eta}_t^j = \arg \max_{\{\bar{\eta}_t\}} \Theta_t^j \quad (12)$$

This decision will be influenced by biased beliefs of the voters. For unbiased beliefs (ub) at the side of voter i , we obtain $\lambda_{it}^{j,ub} (U_{it}(\eta_t^j) - U_{it}(\eta_t^{-j}))$ instead of $\lambda_{it}^j (\hat{U}_{it}(\eta_t^j) - \hat{U}_{it}(\eta_t^{-j}))$. The bias of the beliefs of voter i , denoted by b_{it} , is defined by the difference between the probability of voting in favour of platform j with correct mental model and the situation with biased mental model: $b_{it} = \lambda_{it}^{j,ub} - \lambda_{it}^j$. We obtain

$$\Pi_t^j = \int_{i=0}^1 \lambda_{it}^{j,ub} di - \int_{i=0}^1 b_{it}^j di + \int_{i=0}^1 v_{it}^j di. \quad (13)$$

Defining $A_t^{j,ub} \equiv \int_{i=0}^1 \lambda_{it}^{j,ub} di$, $B_t^j \equiv \int_{i=0}^1 b_{it}^j di$, $V_t^j \equiv \int_{i=0}^1 v_{it}^j di$, $A_t^j \equiv \int_{i=0}^1 \lambda_{it}^{j,ub} di - \int_{i=0}^1 b_{it}^j di$, and

$\Gamma_t^j \equiv \int_{i=0}^1 \gamma_{it}^j di$ we arrive at:

$$\begin{aligned} \Pi_t^j &\equiv A_t^{j,ub} - B_t^j + V_t^j \\ \Pi_t^j &\equiv A_t^j (\eta_t^j - \eta_t^{-j}) + V_t^j (\Gamma_t^j - \Gamma_t^{-j}) \end{aligned} \quad (14)$$

B_t^j is the degree of bias of the voters' beliefs at the macro level. Note that $\Gamma_t^j = 0$ if party j is in opposition and $\Gamma_t^j (\eta_{t-1}^j) = a_{t-1} (\eta_{t-1}^j) - \int_{i=0}^1 \bar{a}_i di$ if party j is the incumbent.

4. Political Equilibrium

For simplicity, we start by assuming that there are only two possible policy platforms from which the parties can choose (e.g., Romer, 2003).⁸ We assume that there is an adequate, good policy platform η_g and an inadequate, bad platform η_b . Following the idea of biased beliefs, we assume that the mental models of the majority of voters assert $\hat{U}_{it}(\eta_b) \succ \hat{U}_{it}(\eta_g)$ 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.

⁸ Suppose, for instance, that there are two alternative policy proposals of "experts" that reduce the otherwise infinitely high number of possible platforms (Beilharz 2005: 90).

We assume complete information at the parties' side. Since policy platform η_g will yield superior economic outcomes if pursued, the parties know that $a_{t+1}(\eta_g) > a_{t+1}(\eta_b)$. Let $a_t(\eta_b) < \bar{a}_i$ and $a_t(\eta_g) > \bar{a}_i$ for most of $i \in [0,1]$. Consequently, a government will be attributed a higher valence in $t+1$, if it realizes η_g in t (compared to offering η_b). That is, platform η_b is a popular but harmful policy and η_g is a good but temporarily less popular policy. Hence, if a party wins the election in period t and pursues good policy platform η_g , it will be attributed a positive valence $\Gamma_{t+1}^j > 0$, and if a party wins the election in period t and pursues populist platform η_b , it will be allocated a negative valence $\Gamma_{t+1}^j < 0$. Referring to (14), we define:

$$A_t^j(\eta_t^j = \eta_t^{-j}) \equiv \frac{1}{2} \quad (15)$$

$$A_t^j(\eta_b, \eta_g) \equiv \frac{1}{2} + f \quad (16)$$

$$A_t^j(\eta_g, \eta_b) \equiv \frac{1}{2} - f \quad (17)$$

Let party *Inc* be the incumbent and party *Opp* the opposition. We define:

$$V_t^{Inc}(\eta_{t-1}^{Inc} = \eta_g) \equiv v \quad (18)$$

$$V_t^{Inc}(\eta_{t-1}^{Inc} = \eta_b) \equiv -v \quad (19)$$

$$V_t^{Opp}(\eta_{t-1}^{Inc}) \equiv -V_t^{Inc}(\eta_{t-1}^{Inc}) \quad (20)$$

Hence, playing good policy platform η_g has a 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. Note that the three definitions (18) to (20) can alternatively be written as $V_t^j = V_t^j(\Gamma_t^j - \Gamma_t^{-j})$, with $V_t^j(\Gamma_t^j - \Gamma_t^{-j} < 0) = -v$ and $V_t^j(\Gamma_t^j - \Gamma_t^{-j} > 0) = v$, with $v \equiv a(\eta_g) - \int_0^1 \bar{a}_i di = \int_0^1 \bar{a}_i di - a(\eta_b)$. 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 η_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, as described by (20).⁹

Party competition is modelled as a non-cooperative dynamic game. Besides the aspect of repeated elections, the dynamics result from the fact that the valence of parties in t depends on which party won the election in $t-1$ and the policy platform pursued by it. 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]

If both parties are allocated the same valence in an election, we obtain $\Pi_t^A = \Pi_t^B$ whenever both parties choose the same policy platform. Otherwise, the party which chooses the popular platform η_b has a higher probability of winning the election. Given the incumbent's policy pursued, one party has a valence advantage. Deducing expected payoffs, we must differentiate between the two possible states “party A wins the election” and “party A loses the election”. They occur with probability Π_t^A , respectively $1 - \Pi_t^A$. Moreover, at the beginning of each election voters update their valence parameters γ_{it}^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: $\Gamma_t^A > \Gamma_t^B$ (situation A⁺) and $\Gamma_t^A < \Gamma_t^B$ (situation A⁻). However, 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 η_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

⁹ Note that we assume the following condition to hold for a given combination of (η_t^j, η_t^{-j}) :

$$\Pi_t^j(\eta_t^j, \eta_t^{-j}, \Gamma_t^j > 0, \Gamma_t^{-j} = 0) = \Pi_t^j(\eta_t^j, \eta_t^{-j}, \Gamma_t^j = 0, \Gamma_t^{-j} < 0)$$

That is, it makes no difference of whether the incumbent has the valence advantage for having applied η_g or the opposition party has the advantage because the incumbent applied η_b .

choose the populist platform ¹⁰ η_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 (e.g., 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 occur more often and the conclusion of Caplan (2007) that biased beliefs automatically lead to poor policy outcomes would cease to be valid. In this sense, we investigate a “worst case”-scenario.

4.1 When Parties Have Short-Term Objectives

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 η^A and η^B . We start with the case $T=1$, that is, parties only care for the next election. Then, we have the following one-shot simultaneous-move election game, represented in normal-form:

		B	
		η_b	η_g
A	η_b	$P_{\eta_b, \eta_b}^{A,x}, P_{\eta_b, \eta_b}^{B,x}$	$P_{\eta_b, \eta_g}^{A,x}, P_{\eta_b, \eta_g}^{B,x}$
	η_g	$P_{\eta_g, \eta_b}^{A,x}, P_{\eta_g, \eta_b}^{B,x}$	$P_{\eta_g, \eta_g}^{A,x}, P_{\eta_g, \eta_g}^{B,x}$

Game 1: One-shot election game

¹⁰ This assumption is only made to analyze a worst-case scenario. The authors assume that politicians have at least lexicographic preferences in the sense that if the chances of winning an election are equal for both platforms they will prefer the good policy.

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:

Proposition 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 η_b in all elections.*

Proof: See Appendix.

Hence, even in a dynamic game with endogenous valence and mixed strategy option parties will always propose populist platform η_b in elections as pure strategy. This holds in equilibrium although the incumbent party always suffers from a valence disadvantage. Platform η_g , although known as the economically better policy, is never chosen in equilibrium. As claimed by Beilharz and Gersbach (2004) and Caplan (2007), democracy is characterized by weak, populist policy due to biased beliefs. Moreover, there is a kind of political cycle characterized by alternating majorities.

4.2 When Parties Have Long-Term Objectives

We now extend the time horizon slightly by one term and consider the case where parties have an inter-temporal objective function ($T=2$). The corresponding payoffs are simply the discounted sum of the payoffs from the $T=2$ stage games, as described by equation (11). 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 $V_t^A(\Gamma_t^A - \Gamma_t^B) = v$, or party A has a valence disadvantage in the first election (A^-), so that $V_t^A(\Gamma_t^A - \Gamma_t^B) = -v$. 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-probability 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 2: Suppose $V_t^A = V_t^B = 0$.

- (a) If $\delta v > f$, the unique subgame perfect NE in mixed strategies is $(0,0,1,1)$.
- (b) If $\delta v \leq f$, the unique subgame perfect NE in mixed strategies is $(1,1,1,1)$.

Proof: See Appendix.

If no party has a valence advantage, we thus obtain the obvious result that a party proposes the good pure strategy platform η_g 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. We obtain:

Proposition 3: 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.

Again we only have equilibria in pure strategies. It is clear that in the second election no party will choose the economically better platform. This follows from the logic of Proposition 1: given biased beliefs toward the bad policy, there is no point in choosing the good policy, if the following election is not taken into account. Moreover, 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 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 η_g is comparatively small, but so is the area where both choose η_b . The big remaining area describes all constellations in which the party with the valence-advantage offers the good policy platform η_g while the disadvantaged opponent party offers the populist policy η_b .

[Figure 2 about here]

Therefore, despite biased beliefs towards bad policies at the voters' side, good policy equilibria do exist. Good policy outcomes are even likely following our results, 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 (δv). This result is not impaired by the “last election effect” that in the second election both parties alike play the populist platform η_b . This result is an artefact 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.

4.3 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 mediocre compromising platform between pure populist and pure good policy. The fraction of platform η_b chosen by party j is denoted by β_t^j . We assume that the expected and actual effect of the mixed platform is the same mixture of the single effects (linear relationship):

$$a_t(\beta_t^j \eta_b + (1 - \beta_t^j) \eta_g) = \beta_t^j a_t(\eta_b) + (1 - \beta_t^j) a_t(\eta_g) \quad (21)$$

$$mm_i(\beta_t^j \eta_b + (1 - \beta_t^j) \eta_g) = \beta_t^j mm_i(\eta_b) + (1 - \beta_t^j) mm_i(\eta_g) \quad (22)$$

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

$\lambda_{it}^j = \lambda_{it}^j \left((\beta_t^j - \beta_t^{-j}) (\hat{U}_i(\eta_b) - \hat{U}_i(\eta_g)) \right)$. It follows that:

$$A_t^j(\beta_t^j, \beta_t^{-j}) = \frac{1}{2} + (\beta_t^j - \beta_t^{-j}) \cdot f \quad (23)$$

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

$$V_t^{Inc}(\beta_{t-1}^{Inc}) = \beta_{t-1}^{Inc} \cdot (-v) + (1 - \beta_{t-1}^{Inc}) \cdot v = (1 - 2\beta_{t-1}^{Inc}) \cdot v \quad (24)$$

Correspondingly, we have $V_t^{Opp}(\beta_{t-1}^{Inc}) = -(1 - 2\beta_{t-1}^{Inc}) \cdot v$. We denote the initial valence advantage of party j by $v_0^j > 0$; thus $v_0^{-j} = -v_0^j < 0$. The resulting payoff function is then given by:

$$\Theta^j(\beta_t^j, \beta_t^{-j}) = \frac{1}{2} + v_0^j + (\beta_1^j - \beta_1^{-j}) f + \delta \cdot \left[\begin{aligned} & \left(\frac{1}{2} + v_0^j + (\beta_1^j - \beta_1^{-j}) f \right) \left(\frac{1}{2} + (1 - 2\beta_1^j) v \right) \\ & + \left(\frac{1}{2} - v_0^j - (\beta_1^j - \beta_1^{-j}) f \right) \left(\frac{1}{2} - (1 - 2\beta_1^{-j}) v \right) \end{aligned} \right] \quad (25)$$

The strategies are described by $(\beta_1^A, \beta_1^B, \beta_2^A, \beta_2^B)$. These preliminaries settled we obtain:

Proposition 4: *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 $\left(\frac{1-2v_0^A}{1+2\delta v}\right)\delta v \leq f < \left(\frac{1+2v_0^A}{1+2\delta v}\right)\delta v$, the unique NE is $(0, \beta_1^B \in (0,1), 1, 1)$;*

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

$$(\beta_1^A \in (0,1), \beta_1^B \in (0,1), 1, 1);$$

(d) *If $\left(\frac{1-2v_0^A}{1-2\delta v}\right)\delta v \leq f < \left(\frac{1+2v_0^A}{1-2\delta v}\right)\delta v$, the unique NE is $(\beta_1^A \in (0,1), 1, 1, 1)$;*

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

Proof: *See Appendix.*

Just like before, it remains optimal even for a disadvantaged party to choose the complete good platform (case (4a)) 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 (4e)). In situations where condition (4a) respectively (4e) hold and both parties chose $\beta_0^A = \beta_0^B = 0$ (case (4a)) respectively $\beta_0^A = \beta_0^B = 1$ (case (4e)) 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 3, 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 3, deviate from the purely good platform strategy at a lower level of f . But the advantaged party will also choose the pure populist plat-

form at a higher level of f . Therefore, with the opportunity 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 δv and the larger v_0^j . In sum, the conclusion that policy outcomes are bad in democracy is too harsh. But democracy often suffers from mediocre respectively only moderate quality outcomes due to biased beliefs in party competition.

Our results 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 case (3b) respectively (4b) to (4d), 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 (e.g., 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.

4.4 Biased Beliefs at the Micro and at the Macro Level

Our micro-founding of the bias of beliefs in party competition 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 by B_t^j . Coming from the micro level we defined

$$B_t^j \equiv \int_{i=0}^1 b_{it}^j di = \int_{i=0}^1 (\lambda_{it}^{j,ub} - \lambda_{it}^j) di.$$

As the applied mental models can be biased both upwards ($\lambda_{it}^{j,ub} - \lambda_{it}^j < 0$) and downwards ($\lambda_{it}^{j,ub} - \lambda_{it}^j > 0$), both contrary biases may cancel out. If the society is polarized such that misleading right wing and misleading left wing opinions are neutralizing each other at the macro level, party competition is not biased toward one side at all. Contradicting mental models of single voters will 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.

5. Policy Implications and Conclusion

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. We provide a game-theoretic model of party competition where voters entertain such biased beliefs in the sense that inadequate policies are more popular than adequate policies. In a first step we micro-found the idea of biased beliefs in party competition by introducing the psychological concept of mental models. 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. In a second step, 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 introduce this mechanism 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.

Based on our model, 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 contradicts Caplan's claim that, given biased beliefs at the voters' side, democracy inevitably leads to poor policies. The essential

point for the existence of incentives to realize good policies is the opportunity of building up an advantage in valence for the elections to come. However, this dynamic benefit of offering and pursuing good policies has to outweigh the losses from not offering more popular platforms. Good policy outcomes are likely as long as the degree of the bias in the beliefs toward economically inadequate policies (in our model measured by f) is not too high relative to the degree of rewarding good macroeconomic performance (in our model measured by v). That is, good policies occur more often (a) the lower the degree of bias at the *macro level*, (b) the more sensitively voters account for the parties' past economic performance.

However, we also demonstrate that the parties' time horizon proves to be of crucial importance for the quality of policy choices. In a party competition where parties focus solely the current election, building up valence is irrelevant and Caplan's pessimistic view of democracy indeed proves to be true. If parties apply a time horizon that spans two elections, however, there exists a range of constellations with sufficiently high incentives for choosing good policies in equilibrium. Hence, in contrast to Beilharz and Gersbach (2004) and Caplan (2007), 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 produces bad nor good but mediocre outcomes in equilibrium. This is exactly what we often observe in politics.

One essential precondition for the effective working of the disclosed self-correction mechanism is that there is a direct link between the governments' policy choices and economic results. Via this link voters decide on the valence they are attributing to the incumbent. In some federalist countries, this link is weakened due to mixed or joint competences and the practice of excessive fiscal equalisation (e.g. Kiewiet 2000; Kotsogiannis and Schwager, 2008; Stehn and Fedelino 2009). Hence, such fiscal institutions may lower the relative price of populist policies and thus lead to weaker policy outcomes.

Democracies in which the supply side of policies is dominated by political parties can be assumed to operate with a larger time horizon than democracies in which the individual candidates dominate policy supply, since parties will discipline their candidates and force them to account for the valence-effects of their policy choices even in their last term in office. Assuming that this constellation is favourable to good policy choices, party-dominated democracies should witness better economic policies, because the relevant actors on the supply side face stronger incentives to invest in a higher valence by offering economically superior

yet unpopular policy platforms. Given that party control is generally stronger in parliamentary systems than in presidential systems, we expect, all other things equal, the latter to operate at a lower T and thus witness poorer economic results.¹¹

If we interpret our dynamic benefit by building up valence more broadly as “dynamic advantage in the future”, the incentives to provide more effort and to pursue better policies via competition for ‘incentive contracts’ (e.g. Gersbach 2005) would improve the policy outcome. In all cases where the self-correction mechanism is too weak to achieve purely good policy platforms, incentive contracts would increase the fraction of good policy elements in mediocre mixtures of policy in equilibrium.

¹¹ The empirical evidence by Persson and Tabellini (1999; 2003: chapt. 7) partly points in this direction by showing that productivity is higher in parliamentary than in presidential democracies. However, this effect does not hold for other indicators of government activity.

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References

- Ansolabehere, S. and J. M. Snyder (2000). Valence politics and equilibrium in spatial election models. *Public Choice* 103 (1-2): 327-336.
- Aragonès, E., T. Palfrey and A. Postlewaite (2007). Political reputations and campaign promises. *Journal of the European Economic Association* 5(4): 846-884.
- Axelrod, R. (1973). The cognitive map approach to decision making. In Axelrod, R. (ed). *Structure of decision. The cognitive maps of political elites*. Princeton: Princeton University Press: 3-17.
- Beilharz, H.-J. (2005). *Democracy, Crises, and Misconceptions*. Doctoral thesis, Heidelberg: Ruprecht-Karls-University at Heidelberg. <http://www.ub.uni-heidelberg.de/archiv/6140/>
- Beilharz, H.-J. and H. Gersbach (2004). *General Equilibrium Effects and Voting into a Crisis*. CEPR Discussion Paper No. 4454, London.
- Bischoff, I. (2007). *Mentale Modelle, politisches Lernen und demokratische Wirtschaftspolitik [Mental Models, Political Learning and Economic Policy in Democracy]*. Marburg: Metropolis Verlag.
- Brennan, G. (2008). *Homo Economicus and Homo Politicus: An introduction*. *Public Choice* 137(3-4): 429-438.
- Caplan, B. (2007). *The Myth of the Rational Voter. Why Democracies Choose Bad Policies*. Princeton: Princeton University Press.
- Cooper, J. and Goren, A. (2007). Cognitive dissonance theory. In Baumeister, R. F. and Vohs, K. D. (eds), *Encyclopedia of Social Psychology*, Volume 1: 149-153. Los Angeles et al.: Sage Publications Inc.
- De Kleer, J. and Brown, J. S. (1983). Assumptions and ambiguities in mechanistic mental models. In Gentner, D. and Stevens, A. (eds), *Mental models*: 155-191. Hillsdale: Lawrence Erlbaum Associates.
- Denzau, A. T. and North, D. C. (1994). Shared mental models: Ideologies and institutions. *Kyklos* 47:3-31.

- DiSessa, A. (1982). Unlearning Aristotelian physics: A study of knowledge-based learning. *Cognitive Science* 6: 37-75.
- Downs, A. (1957). *An economic theory of democracy*. New York: Harper & Row.
- Doyle, J. K. and Ford, D. N. (1998). Mental models concepts for system dynamic research. *System Dynamics Review* 14: 3-29.
- Dutke, S. (1994). *Mentale Modelle: Konstrukte des Wissens und Verstehens*. [Mental Models: Building Blocks of Knowledge and Understanding]. Göttingen: Verlag für die Angewandte Psychologie.
- Enelow, J. M. and Hinich, M. J. (1984). *The spatial theory of voting*. Cambridge: Cambridge University Press.
- Friedman, J. W. (1971). A non-cooperative equilibrium for supergames. *The Review of Economic Studies* 38(1): 1-12.
- Gersbach, H. (2005). *Designing democracy – Ideas for better rules*. Berlin et al.: Springer.
- Gersbach, H. (2004). Competition of politicians for incentive contracts and elections. *Public Choice* 121: 157-177.
- Gersbach, H. (2003). Incentive contracts and elections for politicians and the down-up problem. In M. Sertel and S. Koray (eds.), *Advances in economic design*: 65-76. Berlin: Springer.
- Gersbach, H. and V. Liessem (2008). Reelection thresholds in politics. *Social Choice and Welfare* 31(2): 233-255.
- Gibbons, R. (1992). *A primer in game theory*. New York: Harvester and Wheatsheaf.
- Grant, R.W. (2008). Passions and interests revisited: The psychological foundations of economics and politics. *Public Choice* 137(3-4): 451-461.
- Green, D. W., McManus, I. C. and Derrick, B. J. (1998). Cognitive structural models of unemployment and employment. *British Journal of Social Psychology* 37: 415-438.
- Groseclose, T. (2001). A model of candidate location when one candidate has a valence advantage. *American Journal of Political Science* 45: 862-886.
- Harsanyi, J. (1973). Games with randomly disturbed payoffs: a new rational for mixed strategy equilibrium points. *International Journal of Game Theory* 2: 1-23.

- Holland, D. and Quinn, N. (eds, 1987). *Cultural models in language and thought*. Cambridge: Cambridge University Press.
- Inglis, D. and R. Robertson (2006). From republican virtue to global imaginary: Changing visions of the historian Polybius. *History of the Human Sciences* 19(1): 1-18.
- Johnson-Laird, P. N. (1983). *Mental models*. Cambridge: Cambridge University Press.
- Kempton, W. (1987). Two theories of heat control. In Holland und Quinn (eds.): 222-241.
- Kiewiet, D. R. (2000). Economic retrospective voting and incentives for policy-making. *Electoral Studies* 19(2-3): 427-444.
- Kotsogiannis, C. and Schwager, R. (2008). Accountability and fiscal equalization. *Journal of Public Economics* 92(12): 2336-2349.
- Kramer, G. H. (1971). Short-term fluctuations in US voting behaviour. *American Political Science Review* 65: 131-143.
- Legrenzi, P. and Girotto, V. (1996). Mental models in reasoning and decision making processes. In Oakhill, J., and Garnham, A. (Eds.), *Mental models in cognitive science*: 95-118. Hove, Sussex: (Erlbaum UK) Taylor and Francis, Psychology Press.
- Leiser, D. and Drori, S. (2005). Naive understanding of inflation. *Journal of Socio-Economics* 34: 179-198.
- Liessem, V. (2008). Electoral competition, incentive contracts for politicians and unknown preferences. *Social Choice and Welfare* 30(1): 13-41.
- Miller, A. H. and Wattenberg, M. P. (1985). Throwing the rascals out: Policy and performance evaluations of presidential candidates, 1952-1980. *American Political Science Review* 79(2): 359-372.
- Mueller, J. E. (1970). Presidential popularity from Truman to Johnson. *American Journal of Political Science* 32:113-121.
- Mueller, D. C. (2003). *Public Choice III*. Cambridge: Cambridge University Press.
- Müller, M. (2007). Motivation of politicians and long-term policies. *Public Choice* 132(3-4): 273-289.
- Nannestad, P. and M. Paldam (1994). The VP-function: A survey of the literature on vote and popularity functions after 25 years. *Public Choice* 79, 213-245.

- Nannestad, P. and M. Paldam (2000). What do voters know about the economy? A study of Danish data, 1990-1993. *Electoral Studies* 19, 313-332.
- Niskanen, W. A. (1975). Bureaucrats and politicians. *Journal of Law and Economics* 18: 617-644.
- Oden, G. C. (1987). Concept, knowledge, and thought. *Annual Review of Psychology* 38, 203-227.
- Paldam, M. (2004), Are vote and popularity functions economically correct? In Rowley, C. K. and F. Schneider (eds), *The Encyclopedia of Public Choice*, Vol. 1: 49-59. Dordrecht: Kluwer Academic Publishers.
- Pennington, N. and Hastie, R. (1993). Reasoning in explanation-based decision making. *Cognition* 49: 123-163.
- Persson, T. and G. Tabellini (1999). The size and scope of government: comparative politics with rational politicians. *European Economic Review* 43: 699-735.
- Persson, T. and G. Tabellini (2003). *The economic effects of constitutions*. Massachusetts, London: MIT Press.
- Romer, D. (2003). Misconceptions and political outcomes. *Economic Journal* 113(1):1-20.
- Ruta, M. (2009). Political constraints to growth in an economic union. *Journal of Public Economics* 93(7-8): 989-997.
- Schofield, N. (2004). Equilibrium in spatial valence models of politics. *Journal of Theoretical Politics* 16:447-481.
- Shughart, W. F. II (2006). An analytical history of terrorism, 1945-2000. *Public Choice* 128(1-2):7-39.
- Shughart, W. A. II. and L. Razzolini (eds) (2001). *The Elgar Companion to Public Choice*. Cheltenham, UK and Northampton, USA: Edgar Elgar.
- Shughart, W. F. II and R. D. Tollison (2005). Public Choice in the new century. *Public Choice* 124(1): 1-18.
- Stehn, Sven Jari and Annalisa Fedelino (2009), Fiscal incentive effects of the German equalization system, IMF Working Paper 09/124. Washington, DC: International Monetary Fund.

- Stokes, D. E. (1963). Spatial models of party competition. *American Political Science Review* 57: 368-377.
- Stokes, D. E. (1992). Valence politics. In Kavanagh, D. (ed), *Electoral Politics*. Oxford: Clarendon Press: 141-162.
- Suen, W. (2004). The self-perpetuation of biased beliefs. *The Economic Journal* 114: 377-396.
- Swank, O. (1998). Towards an economic theory of party ideology. *European Journal of Political Economy* 14: 223-240.
- Swank, O. and Eisinga, R. (1999). Economic outcomes and voting behaviour in a multi-party system: An application to the Netherlands. *Public Choice* 101:195-213.
- Tetlock, P. E. (1989). Structure and function in political belief systems. In Pratkanis, A. R., Breckler, S. J. and A. G. Greenwald (eds), *Attitude Structure and Function*: 129-151. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Tetlock, P. E. (1999). Theory-driven reasoning about plausible pasts and probable futures in world politics: are we prisoners of our preconceptions? *American Journal of Political Science* 43(2): 335-366.
- Tollison, R. D. (1982). Rent seeking: a survey. *Kyklos* 35: 575-602.
- Tyran, J.-R. (2004). Voting when money and morals conflict: an experimental test of expressive voting. *Journal of Public Economics* 88(7-8): 1645-1664.
- Wittman, D. A. (1995). *The myth of democratic failure*. Chicago: University of Chicago Press.
- Zakharov, A.V. (2009). A model of candidate location with endogenous valence. *Public Choice* 138(3-4): 347-366.

Appendix

A 1. The Payoff Notation

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

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

A 2. Lemmata and Proofs

Lemma 1: *If in Game 1 $T = 1$, 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 actions¹² (η_b, η_b) and payoffs $(P_{\eta_b, \eta_b}^{A,x}, P_{\eta_b, \eta_b}^{B,x})$, irrespective of valence realization $x = \{A^-, A^+\}$.*

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

$$E(q^j, q^j) = q^j \cdot \left(q^{-j} \cdot P_{\eta_b, \eta_b}^j + (1 - q^{-j}) \cdot P_{\eta_b, \eta_g}^j \right) + (1 - q^j) \cdot \left(q^{-j} \cdot P_{\eta_g, \eta_b}^j + (1 - q^{-j}) \cdot P_{\eta_g, \eta_g}^j \right) \quad (26)$$

The Kuhn-Tucker first order condition is given by

¹² The first (second) term in parentheses denotes the played platform of party A (B).

$$q^{-j} \cdot (P_{\eta_b, \eta_b}^j - P_{\eta_g, \eta_b}^j) + (1 - q^{-j}) \cdot (P_{\eta_b, \eta_g}^j - P_{\eta_g, \eta_g}^j) \leq 0 \quad (27)$$

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

$$(P_{\eta_b, \eta_b}^{A, A^+}, P_{\eta_b, \eta_b}^{B, A^+}) = (P_{\eta_g, \eta_g}^{A, A^+}, P_{\eta_g, \eta_g}^{B, A^+}) = \left(\frac{1}{2} + v, \frac{1}{2} - v\right), \quad (P_{\eta_b, \eta_g}^{A, A^+}, P_{\eta_b, \eta_g}^{B, A^+}) = \left(\frac{1}{2} + f + v, \frac{1}{2} - f - v\right) \quad \text{and}$$

$$(P_{\eta_g, \eta_b}^{A, A^+}, P_{\eta_g, \eta_b}^{B, A^+}) = \left(\frac{1}{2} - f + v, \frac{1}{2} + f - v\right). \quad \text{If } x = A^-, \text{ payoffs are given by}$$

$$(P_{\eta_b, \eta_b}^{A, A^-}, P_{\eta_b, \eta_b}^{B, A^-}) = (P_{\eta_g, \eta_g}^{A, A^-}, P_{\eta_g, \eta_g}^{B, A^-}) = \left(\frac{1}{2} - v, \frac{1}{2} + v\right), \quad (P_{\eta_b, \eta_g}^{A, A^-}, P_{\eta_b, \eta_g}^{B, A^-}) = \left(\frac{1}{2} + f - v, \frac{1}{2} - f + v\right) \quad \text{and}$$

$$(P_{\eta_g, \eta_b}^{A, A^-}, P_{\eta_g, \eta_b}^{B, A^-}) = \left(\frac{1}{2} - f - v, \frac{1}{2} + f + v\right). \quad \text{Due to } (P_{\eta_b, \eta_b}^j - P_{\eta_g, \eta_b}^j) > 0 \text{ and } (P_{\eta_b, \eta_g}^j - P_{\eta_g, \eta_g}^j) > 0, \text{ we}$$

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 η_b is played by both parties. \square

Proof of Proposition 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 tuple (η_b, η_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).¹³ \square

¹³ 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).

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

Proof of Proposition 2: We solve the game by backwards induction. Stage 2 represents a subgame that is equal to Game 1. Hence playing strategy η_b is optimal for both parties. Therefore, we only need to deduce payoff vectors P_1 , P_5 , P_9 and P_{13} for the subgame at stage 1. If $V_t^A(\Gamma_t^A - \Gamma_t^B) = 0$, we obtain via (11):

$$\begin{aligned} P_1 &= P_{13} = \left(\frac{1}{2}(1+\delta), \frac{1}{2}(1+\delta)\right) \\ P_5 &= \left(\frac{1}{2}(1+\delta) + f - \delta v, \frac{1}{2}(1+\delta) - f + \delta v\right) \\ P_9 &= \left(\frac{1}{2}(1+\delta) - f + \delta v, \frac{1}{2}(1+\delta) + f - \delta v\right) \end{aligned}$$

The analogon to (26) is

$$E^j(q^j, q^j) = q^j \cdot (q^{-j} \cdot P_1^j + (1-q^{-j}) \cdot P_5^j) + (1-q^j) \cdot (q^{-j} \cdot P_9^j + (1-q^{-j}) \cdot P_{13}^j) \quad (28)$$

The Kuhn-Tucker first order condition thus is $\partial E^j(\cdot)/\partial q^j = f - \delta v \leq 0$. That is, as long as $f < \delta v$ the marginal effect of an increase of q^j is always negative and we obtain boundary solution $q^j = 0$ for $j = \{A, B\}$. Otherwise, $f \geq \delta v$, the marginal benefit is positive for all q^j and we obtain the boundary solution $q^j = 1$. Therefore, in equilibrium, only pure strategies are played, either $(\eta_g, \eta_g, \eta_b, \eta_b)$ or $(\eta_b, \eta_b, \eta_b, \eta_b)$. \square

Proof of Proposition 3: We solve the game by backwards induction. Following Lemma 1 both parties know that the equilibrium of the residual subgame at stage 2 is (η_b, η_b) , respectively $q^j = 1$ 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 $V_t^A(\Gamma_t^A - \Gamma_t^B) = v$, we obtain:¹⁴

¹⁴ To deduce the payoffs given in vectors P_1 , P_5 , P_9 and P_{13} use (11). For instance, the payoff of party A in P_1 is $(\frac{1}{2}+v) + \delta\left[\left(\frac{1}{2}+v\right)\left(\frac{1}{2}-v\right) + \left(\frac{1}{2}-v\right)\left(\frac{1}{2}+v\right)\right] = \frac{1}{2}(1+\delta) + v - 2\delta v^2$. That is, in election 2 the probability that party A has a valence disadvantage (because of winning election 1 and pursuing η_b) is $(\frac{1}{2}+v)$, and with counter-

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

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

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

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

Using these payoffs in (28) we obtain two different first order conditions: $\partial E^A(\cdot)/\partial q^A = f - \delta v(1+2v) \leq 0$ and $\partial E^B(\cdot)/\partial q^B = f - \delta v(1-2v) \leq 0$. Hence, as long as $f < \delta v(1-2v)$ the marginal benefit of increasing the probability of playing the populist platform η_b is negative for every value of q^j . Thus, in equilibrium, both parties choose $q^j = 0$, so the pure strategy η_g . 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 η_g ($q^A = 0$) but party B pure strategy η_b ($q^B = 1$). However, once $f \geq \delta v(1+2v)$ the marginal benefit of increasing the probability of playing η_b is positive for both parties and both choose the pure strategy η_b ($q^j = 1$) for $j = \{A, B\}$. \square

Proof of Proposition 4: Again, in the second election both parties choose the complete platform η_b , since there is no next election (Lemma 1): $\beta_2^A = \beta_2^B = 1$. Based on (25) the first-order condition for the optimal choice of β_1^A is given by:

$$\frac{\partial \Theta_1^A(\cdot)}{\partial \beta_1^A} = f + \delta v \cdot \left[2f(1-2\beta_1^A) - (1+2v_0^A) \right] = 0 \quad (29)$$

It follows:

$$\beta_1^A = \frac{1}{2} + \frac{1}{4} \cdot \left(\frac{f - \delta v(1+2v_0^A)}{f \delta v} \right) \quad (30)$$

probability $(\frac{1}{2}-v)$ it loses election 1 and has a valence advantage in election 2 (because of party B is pursuing η_b).

Therefore, $\beta_1^A = 0$ if $f < \delta v(1+2v_0)/(1+2\delta v)$ and $\beta_1^A = 1$ if $f \geq \delta v(1+2v_0)/(1-2\delta v)$. For the optimal choice of party B we simply have to substitute $+v_0^j = +v_0^A$ for $+v_0^B = -v_0^A < 0$ in (25). \square

Proposition 5: *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 5: If $V_t^A(\Gamma_t^A - \Gamma_t^B) = -v$, the relevant payoff vectors at stage 1 are given by:

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

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

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

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

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. \square

A.3 Figures

Game begins at period $t = 1$		
<i>Period t begins.</i>		
<i>Stage</i>	<i>Activities</i>	<i>Additional information</i>
1	The parties choose η_t^A resp. η_t^B simultaneously	platforms
2	Voters make their decision (given $\eta_t^A, \eta_t^B, \gamma_{it}^A, \gamma_{it}^B$)	distribution of votes; election winner
3	The election winner pursues the policies offered in the election (η_t)	$a_t(\eta_t)$
4	Voters update their expected valence for round $t+1$	$\gamma_{i,t+1}^A, \gamma_{i,t+1}^B$
<i>Period t ends.</i> <i>(equivalent to the start of period $t+1$ as long as $t+1 < T$)</i>		
Game ends at period $t = T$		

Figure 1: The structure of the game in pure strategies

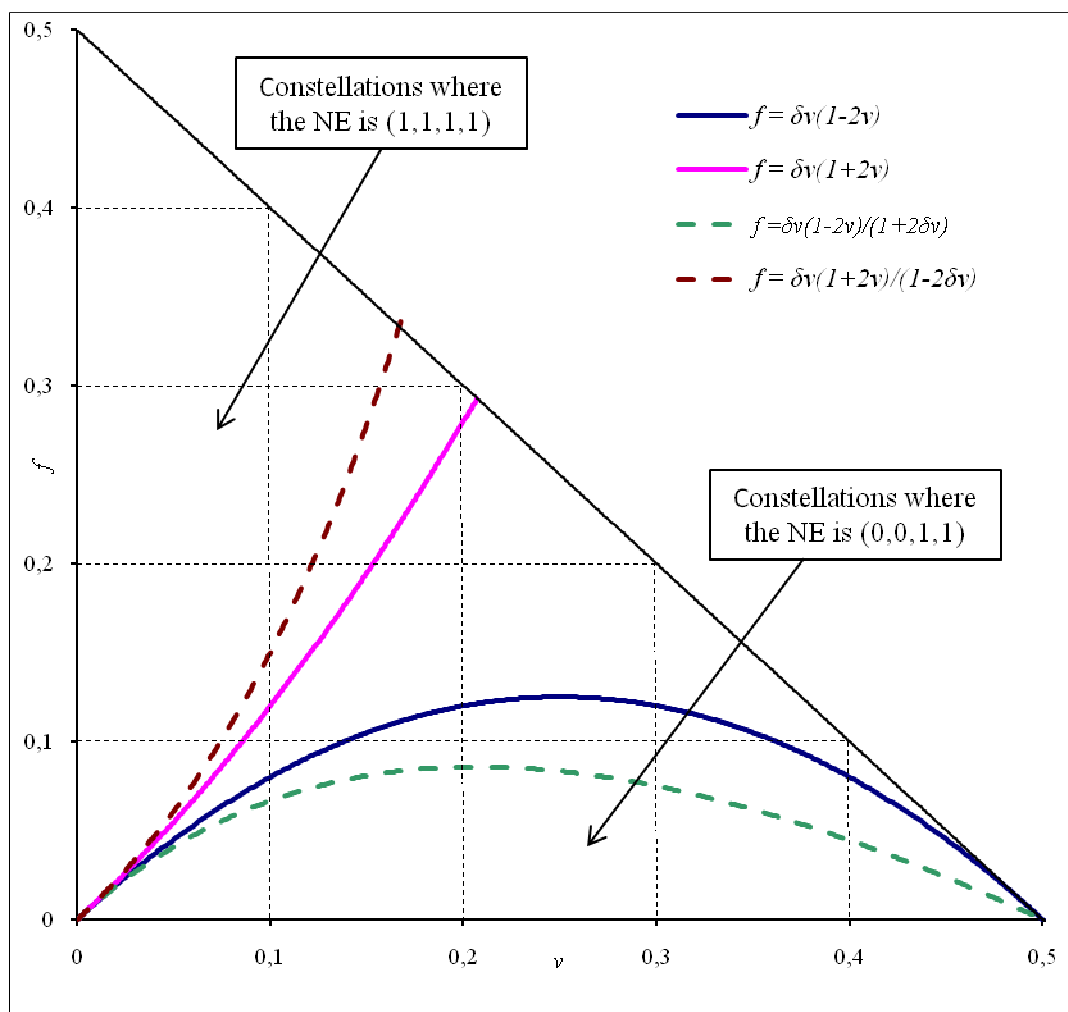


Figure 2: The relevant thresholds of Proposition 3 and 4 for pure strategy equilibria in the two-dimensional (f, v) -space ($\delta=1$ and $x=A^+$).