Political Budget Cycles:
Can Disinformation Explain Country Group Differences?

Frank Bohn

Nijmegen Center for Economics (NiCE)
Institute for Management Research
Radboud University Nijmegen

P.O. Box 9108, 6500 HK Nijmegen, The Netherlands
http://www.ru.nl/nice/workingpapers
Abstract

This paper studies the impact of disinformation on the political budget cycle. An opportunistic incumbent is given two instruments for improving re-election chances: (i) deficit-financed transfers; and (ii) manipulated budget predictions to disinform voters. The intuitive conjecture that more uninformed voters magnify the budget cycle is confirmed if policymakers are very diverse in terms of competence (possibly new democracies or developing countries), but more questionable in countries with less variable government competence (possibly established OECD democracies). These results hold under various disinformation cost and distributional assumptions, thereby offering a theoretical explanation for recent empirical findings on country-group specific political budget cycles.

JEL classification: D72, E32, H62, (E62, D83)

Keywords: political business cycle; political forecast cycle; deficit bias; fiscal policy; propaganda; near-rationality.
1 Introduction

Politicians have long been suspected of manipulating electoral outcomes to their own advantage by creating short-term economic boosts and/or by improving citizens’ economic conditions just before an election. Yet, the evidence for such opportunistic political business cycles (PBCs) is mixed. First, monetary policy-induced cycles as originally suggested by Nordhaus (1975) are clearly rejected empirically.\(^1\) Second, there is plenty of evidence on electoral manipulations in fiscal policies.\(^2\) Third, some recent studies suggest, however, that political budget cycles can only be observed in particular country groups or countries with specific characteristics: developing countries (Block, 2002, Schuknecht, 1996 and 2000, Shi and Svensson, 2006, and Vergne, 2009), new democracies (Brender and Drazen, 2005), countries with low levels of fiscal transparency (Alt and Lassen, 2006). A survey on the literature on ”context-conditional cycles” is provided by Francese (2002). An empirical study for Russia by Akhmedov and Zhuravskaya (2004) confirms that democracy and government transparency matter for the political budget cycle. As a common feature, all these papers observe (explicitly or implicitly) that political budget cycles are smaller or non-existent in established OECD democracies.

From a theoretical point of view, it is, however, not clear why and under which circumstances electoral manipulations should occur. Is it possible that the aforementioned country groups exhibit political budget cycles for similar reasons? Before answering this question we should first try to understand why it may at all be conceivable that rational voters can be fooled by opportunistic governments. Expansionary short run boosts are known to produce negative consequences in the longer term since they create inflation and/or increase the debt burden. Rational voters should foresee the incumbent’s incentives to manipulate, ignore the manipulation and vote, instead, on the basis of expected economic outcomes after

---

\(^1\) See, for instance, Alt and Crystal (1983), Faust and Irons (1999), and summary evidence quoted by Drazen (2001).

\(^2\) Cycles of debt are found by, for instance, Alesina, Cohen and Roubini (1992 and 1993) and Alesina and Roubini (1990), and confirmed by Drazen (2001); the notion of cycles in public expenditures and, particularly, transfers is supported by, for instance, Schuknecht (1996 and 2000), Block (2002), Drazen (2001) and Vergne (2009); and cycles in expenditure shares are suggested by Drazen and Eslava (2010).
the election.\(^3\) To formalise this idea, Rogoff and Sibert (1988) and Rogoff (1990) suggest to make the future economic performance dependent on today’s competence of the incumbent. To increase re-election chances an opportunistic incumbent would try to appear more competent than she really is.\(^4\) Hence a politician would not have an incentive to manipulate, if voters could correctly infer her current competence from her current actions.

In particular, two types of information asymmetries have been suggested to rationalise budgetary manipulations. First, in Rogoff and Sibert (1988), for instance, policymakers know about their own competence before it is revealed to voters who face an adverse selection problem. By expanding the public goods provision policymakers can send to voters a more positive signal about their competence, thereby increasing their re-election chances. Second, Shi and Svensson (2006) model a pure moral hazard story, instead. The incumbent cannot use an informational advantage to signal competence, because neither politicians nor voters can observe the current competence level of the government.\(^5\) If all voters were fully informed about the economy, voters would be able to infer government competence before elections, irrespective of government actions. Benefitting from the (assumed) ignorance of part of the electorate the incumbent has an incentive to appear as competent as possible. Uninformed voters can be fooled, thereby affecting the incumbent’s re-election chances.

While convincing conceptual innovations, both models have some unattractive features. As for Rogoff and Sibert (1988), it is not necessary or not possible, respectively, to affect re-election chances, if the incumbent is very competent or very incompetent. However,

\(^3\) Brender (2003) even finds that refraining from short-termism may actually increase a politician’s re-election chances. In an empirical study of Israeli local elections he can show that responsible fiscal policies had a significant positive effect in the 1998 local elections, though not in two prior elections. His result is confirmed for a larger sample of countries in Brender and Drazen (2008).

\(^4\) In a partisan model of the political business cycle such as Blomberg and Hess (2003), the role of competence is to enable the government to conduct its partisan policies in the most beneficial way, i.e. to cut taxes without large spending cuts, if it is a right wing government, or to raise public services without large tax increases, if it is a left wing government. – If higher competence means better policies, Caselli and Morelli (2004) go one step further. In their opportunistic PBC, they argue with Plato that "the city where those who rule are least eager to do so will be the best governed". This is so because competent policymakers have more outside options.

\(^5\) The other extreme is assumed by Messner and Polborn (2004): the agent’s competence is public information
manipulations are more effective in the middle region as is typical for signalling models. Hence more average competence makes it worth while for the government to signal a higher level of competence. Such a hump-shaped relationship does not seem to corroborate with intuition because it implies that very incompetent governments would not cheat at all. In Shi and Svensson (2006), the government would increase the deficit in order to cheat on voters because they are uninformed and can, therefore, not observe the deficit ex ante. Nonetheless, those same uninformed voters are able to rationally anticipate the correct deficit ex post, although they cannot extract the relevant information between ex ante and ex post considerations in any way. According to Grossman (1977), for instance, informed and uninformed agents must hold different beliefs in the equilibrium. As a result of the model logic in Shi and Svensson (2006), the government does manipulate the deficit, but cannot increase its re-election chances. It must manipulate more when the share of uninformed voters goes up, but without being able to raise electoral support.

This paper presents two explicit models that contain the same four elements. First, there is a political budget cycle model based on transfers rather than public goods as, for instance, in Rogoff (1990) and Shi and Svensson (2006). The focus on transfers was motivated by the empirical evidence, but also allows for a simpler model structure. The government can improve its re-election chances by increasing deficit-financed transfers before elections and cutting transfers to repay the pre-election deficit after elections. Second, re-election chances depend on the voters’ perception of competence as suggested by Rogoff and Sibert (1988). Third, the cycle does not occur because of signalling (due to the incumbent’s information advantage) as in Rogoff (1990), but because there are two differentially informed groups of voters as suggested by Shi and Svensson (2006). For simplicity, one group is fully informed and the other group is susceptible to government disinformation (or, synonymously, propaganda). Forth, both groups of voters do hold different beliefs, even in the equilibrium.

---

6 Grossman’s assertion was made in the context of a financial market model. Informed and uninformed agents can only hold identical beliefs in the equilibrium, if there is an observable economic variable, which contains the entire information the uninformed agent could otherwise not have observed. In his model, a price may (or may not) fulfil this role, but in Shi and Svensson’s (2006) model there is no such variable.

7 Disinformation is not unintentional misinformation, i.e. incorrect information. Instead, disinformation
It is the not fully informed voters who give rise to a political transfer and deficit cycle.

Similar to Alesina and Roubini with Cohen (1997) this paper argues that if the government can appear more competent by raising the level of transfers, then it should appear even more competent, if it can convince (at least some) voters of being able to do so without incurring large deficits. Ursprung (1994) finds that "the electorate can be influenced [by disinformation] to a certain degree." In Congleton (1986) the voter perception can be affected by the number of repetitions of certain messages. More on this discussion on page 9. This paper assumes that influencing the electorate may be very costly, but will always be possible. Government efforts to manipulate information produce either reputation costs (model 1, section 2) or budgetary costs (model 2, section 4). In Kartik (2009) lying is also costly, but his model studies the strategic interaction between the sender and the receiver of false information (as pioneered by Crawford and Sobel, 1982). In contrast, this paper analyses the effect of disinformation on the political budget cycle while assuming that the government can make use of a disinformation technology to affect voters’ perceptions and, thereby, re-election chances. Abstracting from the sender-receiver game (or the influence of the media) allows me to focus on the consequences for the political budget cycle, if disinformation is not totally ineffective.

Giving the government a fiscal as well as a disinformation instrument for improving re-election chances reverses some of the previous theoretical results in the literature. In particular, the intuitive link – as obtained by Shi and Svensson (2006) – between increasing the share of voters, who are uninformed about the deficit, and reinforced budget and deficit cycles does not work any longer. This paper could, therefore, help explain why, empirically, budget cycles are less pronounced or non-existent in established OECD democracies, but strong in developing countries, new democracies and/or countries with low levels of fiscal transparency - as suggested by the aforementioned empirical papers, which focus on one of

can be defined as the deliberate and malicious dissemination of false or misleading information. The term propaganda has a slightly different meaning and is typically preferred when the purpose of influencing a large number of people is stressed. Nonetheless, this paper uses the terms disinformation and propaganda synonymously.
these aspects at a time or combine them as Akhmedov and Zhuravskaya (2004) who find “sizable budget cycles” in Russia, which could be classified as a new democracy with limited fiscal transparency.

It is intuitive that increasing the share of uninformed voters should allow policymakers to expand manipulations. The main findings of this paper do imply that increasing the share of informed voters dampens the budget cycle, but only in countries where policymakers are very diverse in terms of competence. (A stereotypical newly democratic country as well as some developing countries have typically got politicians exhibiting very diverse skills and abilities. Such a country can be characterised by a dispersed competence distribution.) However, in countries with less variable government competence, increasing the information level of citizens reduces the budget cycle by less, maybe even exacerbates it. Such a compressed distribution around the mean may be typical for many established OECD democracies where political elites have similar backgrounds. For instance, in the UK many politicians of all parties studied at Oxford or Cambridge, in France they typically attended a Grande Ecole. Although similar education does not necessarily result in similar competence, it does hint at it given that these politicians acquire similar skills and abilities. In other OECD countries like the US or Turkey, where money matters more for political success, government competence may be more dispersed.

The key result can only be explained because the chance of winning the election can be increased by government manipulations. This is empirically confirmed by Akhmedov and Zhuravskaya (2004), but contested in (the theory part of) Shi and Svensson (2006). In the model presented here, the competence distribution actually determines how effective government manipulations are in increasing the incumbent’s re-election chances. Consider an increase of the share of uninformed voters at the equilibrium. This increases the chance of winning ceteris paribus, but may increase or decrease the marginal winning probability (determined by the slope of the competence distribution at the equilibrium as shown lateron) and thus require reoptimisation. In case of a decrease of the marginal probability of winning, the policymaker may want to reduce costly repayment costs, i.e. lower the deficit. This
means a reduction of the political budget cycle. The qualitative result is fairly robust and holds for alternative standard distributional assumptions like the Normal, Laplace or triangular. It also holds for variations in the disinformation costs: contemporary versus next period costs; and reputation versus budget costs.

The remainder of the paper is structured as follows. A simple model combining political budget cycles with disinformation is introduced in Section 2. Reputation costs to disinformation occur after elections. In Section 3, several propositions are derived (with indications for the proofs provided in the appendix), related to results previously obtained in the literature, and discussed in the context of some standard distributional assumptions. Section 4 introduces contemporaneous disinformation costs to be paid out of the budget and agents who are uninformed about these costs. Section 5 concludes with a summary of the findings, a discussion of policy and empirical implications and suggestions for future research.

2 A Disinformation Model with Reputation Costs After Elections

Throughout this paper the incumbent can improve her re-election chances because a share \( \psi \) of the electorate is assumed to be susceptible to government manipulations. The government in power has two instruments for appearing more competent: (i) it can increase deficit-financed transfers before elections and cut transfers to repay the pre-election deficit after elections; and (ii) it can reduce the deficit perception by spreading disinformation. In this model the government incurs a reputation cost \( \text{after} \) elections, if the dissemination of disinformation is detected. In the model of Section 4, \( \text{contemporaneous} \) budgetary costs to disinformation are considered and additional groups of voters are distinguished. Both models share that every alternate period an incumbent politician and a challenger representing different parties run for office. Politicians’ motivation is purely opportunistic. Nonetheless, voters’ utility does not hinge on economic considerations alone, but also on a more or less strong personal predisposition or sympathy for one of the candidates.\(^8\) Let us now turn to

---

\(^8\) Henceforth the terms voter and individual (agent) are used interchangeably. Similarly, the terms politician and policymaker are used as synonyms. Furthermore, we associate the incumbent with party \( a \)
the details of the model with disinformation costs after elections.

Preferences, budget constraint and competence

The utility function for any voter $i$ reflects both economic and non-economic components:

$$U_t^i = \sum_{s=t}^{\infty} [c_s + \alpha t^i z_s],$$

(1)

The economic component $c_s$ (consumption) and the sympathy component $\theta^i z_s$ are additively-separable with relative weight $\alpha$ in each period. Discounting between periods could be added, but does not contribute to substance nor exposition. To keep the model tractable, another simplification is that utility is linear in consumption.\(^9\) Utility derived from sympathy is constrained to $\theta^i z_s \in [-\frac{1}{2}, \frac{1}{2}]$ since $z_t$ is either $-\frac{1}{2}$ (when party $a$ is elected) or $+\frac{1}{2}$ (when party $b$ is elected); and the personal sympathy parameter $\theta^i$ is uniformly distributed over the interval $[-1, 1]$.\(^{10}\) The sympathy component represents any attribute of the candidates that does not affect economic policies, be it their stance on societal issues or their good looks.

Both politicians $j = a, b$ face a utility function similar to the one for voters consisting, again, of an economic and a non-economic component. The non-economic component is, however, different and includes both a political rent and a political cost. The politician’s utility function is thus:

$$V_{t}^j = \sum_{s=t}^{\infty} [c_s + X_s - \lambda_s P_s].$$

(2)

\(^9\) From the graphical illustration (Figure 3, see page 32) of the resulting maximisation problem (A.16) it is clear that discounting and decreasing marginal utility in consumption (convex indifference curves) would not affect the key finding that result reversion is possible (see Propositions 2 and 3). – Linear utility in private consumption has been used before, when it does not affect the key mechanism, for instance, in Battaglini and Coate (2008). The more standard assumption of making private and public goods consumption additively-separable and imposing a constant marginal utility on public goods can, arguably, be more problematic, because it is sometimes not clear how that assumption actually affects the results.

\(^{10}\) If individual $i$ has somewhat more sympathies for party $a$, say at $\theta^i = -\frac{1}{2}$, then her utility derived from sympathy is positive ($\frac{1}{4}$), if party $a$ is elected ($z_i = -\frac{1}{2}$); but it is negative ($-\frac{1}{4}$), if party $b$ is elected ($z_i = \frac{1}{2}$).
The policymaker receives ego rent $X_t$ only, if she is in power in period $t$. She incurs a cost, if it is discovered in that period that she was spreading disinformation as an incumbent in the previous period and, thereby, influencing the previous period deficit perception of share $\psi$ of the electorate. The expected disutility depends on exogenous detection probability $\lambda_t$ and endogenous propaganda costs in money terms, $P_t$. There is a one-to-one relationship between $P_t$ and the incumbent’s optimal choice of the manipulation of deficit perception in the previous period (to be modelled further down). For simplicity, we make two assumptions: (i), the incumbent’s dishonesty is forgotten after more than one period; and (ii), the magnitude of propaganda costs does not depend on whether the previous period incumbent is still in power or lost the elections.\(^{11}\)

Voters’ and politicians’ consumption alike are constrained by each agent’s constant net-of-tax income $y$ and period-specific transfers $t_t$:

$$c_t = y + t_t. \quad (3)$$

The government budget constraint is

$$t_t = D_t - R(D_{t-1}) + \eta^j_t. \quad (4)$$

Transfers are deficit-financed intertemporal transfers, not income redistribution.\(^{12}\) Providing additional government subsidies or benefits enables the policymaker in power to appear more

\(^{11}\) More cynically, (i) could be seen as voters being willing to punish politicians for dishonesty, but not wishing to hold a grudge against a specific politician over a longer period of time, because they know that all politicians are prepared to cheat them anyway. As for (ii), those costs may be different in nature: if in power, costs may accrue due to the loss of political capital; if out of power, these costs may have more to do with diminished revolving-door opportunities.

\(^{12}\) Instead of equations (3) and (4) a fuller fiscal model could be used, but results are identical. In that case, let variable $y$ be gross income and $t_t$ depict net transfers, i.e. $t_t$ is negative and the absolute value of $t_t$ represents taxes minus transfers. Taxes would be used to finance a fixed amount of public goods. The question would then be: how much can we reduce the tax burden by deficit finance? Many political debates can be interpreted in this way, for instance the July 2011 show-down in the US. Republicans resist tax increases and Democrats expenditure cuts despite dire debt conditions. An even more pointed example is the discussion in July 2008 in Germany about a commuter tax relief (Pendlerpauschale) which had been abolished not long before. For obvious political reasons some politicians, especially from the Bavarian CSU party, which faced an upcoming election, wanted to reintroduce this tax relief at the expense of achieving a balanced budget later rather than sooner.
competent since current period skills are not observable. Transfers depend on current deficit, $D_t$, minus repayment for (accumulated) previous deficit, $R(D_{t-1})$, but they are also affected by the incumbent’s positive or negative competence shock.\textsuperscript{13} Repayment function $R(D_{t-1})$ is assumed to be common knowledge and has some intuitive properties which guarantee that the government wants to repay the deficit as quickly as possible: $R(0) = 0$, $R'(0) = 1$, and $R''(D_{t-1}) > 0$ for all $D_{t-1} \geq 0$. Competence $\eta^t_j$ consists of a skills shocks for the current period and another one for the previous period:

$$\eta^t_j = \mu^t_j + \mu^t_{j-1}.$$  \hfill (5)

Hence competence persistence is modelled as an MA(1) process.\textsuperscript{14} Each skills shock $\mu^t_j$ is a random variable with mean 0, distribution function $F(\mu^t_j) = F(\bullet)$ and density function $f(\mu^t_j) = f(\bullet) = F'(\bullet)$ which is (weakly) monotonously increasing up to the mean.\textsuperscript{15} Past shocks are common knowledge, but current or future shocks are unknown to both policymakers and private agents. Since policymakers do not have an informational advantage, there is only moral hazard and no adverse selection.

**Disinformation**

It seems plausible that a government, which is willing to use fiscal policy for manipulating the whole economy, would a fortiori also be willing to foster the dissemination of false

\textsuperscript{13} For $\eta^t_j > 0$, (net) transfers $t_t$ would surpass the net deficit, $D_t - R(D_{t-1})$. In a developing country, we could interpret $\eta^t_j$ as the government’s ability to secure foreign aid, which does not have to be repaid. In any country, it may also reflect its ability to seize and exploit profitable investment opportunities.

\textsuperscript{14} Limited persistence is a compromise. It allows some persistence while acknowledging that competence also changes over time as new tasks for politicians emerge. For persistence longer than 1 period, the model would not be easily solvable. Rogoff’s suggestion of an MA(1) process is one of two conditions (the other being the aforementioned assumption of repayment being costly) for splitting the model into separate 2-period cycles as is so common in this literature. Each cycle consists of an election period and an off-election period. The timing of events and the role of these assumptions is outlined further down. – The strategic implications in an explicitly intertemporal setting are brought out by Milesi-Ferretti and Spolaore (1994).

\textsuperscript{15} For more unusual density functions (for instance, with $F''(\mu^t_a) < 0$ for some $\mu^t_a \leq 0$), we could get ambiguous results. However, the limiting case of $F''(\mu^t_a) = 0$ for some $\mu^t_a \leq 0$ or even over the entire range (uniform distribution) is acceptable.
or misleading information. But is government disinformation in the context of fiscal policy empirically relevant? And if so, is it theoretically feasible that such disinformation affects the political budget cycle? As for the empirical aspect, Lipford (2001) is – to my knowledge – the first one to clearly distinguish two issues. First, there is a general tendency of governments – at all times – to present the state of fiscal affairs in an overly optimistic light. She quotes Brennan and Buchanan (1980), according to whom “politicians will want to overestimate the benefits of government programs and underestimate the current and future taxes required to pay for those programs.” Second, there is a specific inclination during election years to produce even more optimistic public finance forecasts. She cites, for instance, Miller (1994) and Alesina and Roubini with Cohen (1997) who argue that the government may deliberately want to misinform the public about the true state of the budget in an election year, thereby justifying higher transfers or expenditures to raise its re-election chances.

The government’s attempt to use public and/or research agencies to misrepresent the fiscal situation in a country is called ”electoral forecast cycles” by Brück and Stephan (2006). Boylan (2008) argues that, in particular prior to elections, revenue forecasts are based on favourable estimates of the macroeconomic environment and unrealistic growth assumptions. As a consequence, pre-election budgets are overly optimistic, thus resulting in unexpected deficits. His panel data analysis for all 50 US states reveals significant coefficients for under-reporting of pre-election deficit figures. Krause and Corder (2007) claim that ”less stable [US federal] agencies are more likely to accommodate political pressures for forecast optimism”. There is also strong evidence for manipulations in other OECD countries, but also some mixed evidence. To my knowledge no econometric study has been conducted for develop-

---

16 There is plenty of supporting, but also some mixed evidence. General ”budget propaganda” is already reported by Porrirt (1910) for early twentieth century England. Blackley and DeBoer (1993) claim that there is a ”substantial bias in outlay proposals”, but not in economic forecasts or revenue estimates for US federal budgets prior to 1989. In contrast, Boylan (2008) finds biases in forecasts for an array of US state budget variables from 1982 to 2005 and attributes them to both economic and political factors.

17 Heinemann (2006) contributes evidence for official forecasts of Germany’s federal budget from 1969 to 2003. His results support the idea that deficit forecasts are more optimistic prior to elections. Similar, though weaker evidence is obtained for German states by Bischoff and Gohout (2010). Couture and Imbeau (2009) find evidence for a pre-election revenue bias (in Canadian provinces from 1986-2004), Paleologou (2005) for a pre-election expenditure and revenue, but not for a deficit bias (for UK budget forecasts from
oping countries yet, but Kyobe and Danninger (2005) claim that discretionary adjustments of forecast figures are certainly not uncommon. All the aforementioned evidence suggests that many governments try to influence budget forecasts more or less directly, especially prior to elections.

Deliberate misinformation can produce distortions, even if agents are fully rational. Eichenberger (1996) argues that incorrect ("dirty") information increases the variance and has "systematic effects at the aggregate level" because of asymmetries in "political decision-making processes". Congleton (2001) discusses biased rational expectations, especially in cases when not all possibilities are known explicitly ("the dimensionality of the event space is, itself, to be learned"). Ursprung (1994) finds that a government can influence an uninformed, but rational electorate to some degree. If we are willing to acknowledge that not all voters deal with manipulated information in a fully rational way (especially when it comes to deficits and some other budgetary data), the effect should be even larger. Even if voters anticipate that governments try to misrepresent fiscal data, governments seem to particularly increase their efforts prior to election years. Would all voters anticipate that? How would voters know that they should trust "stable agencies" (who might be more independent) more than less stable ones (Krause and Corder, 2007)? In a country where the media are controlled by the government, many people suspect government disinformation, but will all voters be fully rational? Why else is censorship and media control such an important issue in developing countries? Caplan (2002, 2006) documents that it is not surprising that agents hold biased beliefs on the economy and economic policies. This paper assumes

18 They report on the revenue forecasting practices in 34 low-income countries. Their study is based on a questionnaire circulated to IMF fiscal economists in 2003. While most countries score low on the quality and the accountability of the forecasting process, discretionary adjustments seem to be particularly severe in countries with low levels of governance.

19 In democratic countries this may well go the other way. Hetherington (1996) suggests that the US media were undermining Bush’s re-election bid by "Forming Voters’ National Economic Evaluations in 1992". But the opposite may be true in Italy, where part of the media are controlled by Berlusconi, or in the UK, where all parties strive to obtain the backing from the Murdoch press empire.
that the government has an edge over the opposition in that it can affect the perception of at least some part of the electorate (however costly that may be).20

**Government manipulation and timing of events**

Every period, transfers, last period’s deficit and last period’s competence can be observed by all voters. A share of voters \((1 − \psi, \text{with } 0 \geq \psi \geq 1)\) also observe the government’s policy choice of current period deficit, \(D_t\). If the government policy could be observed by all voters, the government would gain nothing from manipulating the deficit and from trying to disinform voters in order to affect their perception of the deficit. The moral hazard problem arises because a share of voters \(\psi\) is not fully informed. They can, therefore, not infer government competence in election period \(t\) and hence not form unbiased beliefs about the incumbent’s performance after elections. Instead, it is assumed that the government can disinform these voters, thereby affecting (as a simplification, in fact, determining) their perceived deficit, \(\hat{D}_t\). Obviously, it would be more realistic to model explicitly the interdependence between government propaganda, communication among individuals and efforts by the media to uncover the governments deception – as already discussed in the introduction. Here, it is only captured that propaganda becomes costlier and costlier the larger the wedge between actual (equilibrium) deficit, \(D^*\) (to be determined further down), and perceived deficit, \(\hat{D}_t\). If the deception is detected, the incumbent suffers some disutility in the following period (as captured in the politicians’ utility function 2). Formally, we can conceive the propaganda cost as a function of the government-controlled perceived deficit:

\[
P_{t+1} = \Phi(\hat{D}_t),
\]

with \(\Phi'(\hat{D}_t) < 0\) and \(\Phi''(\hat{D}_t) > 0\). However, it is easier to solve and interpret this model and compare it with the alternative model presented in Section 4, when we consider the inverse

---

20 This assumption could also be interpreted in terms of near-rational behaviour (Akerlof and Yellen, 1985, and Mankiw and Reis, 2002): a share of the electorate is willing to forego being fully informed. The effect for the individual is negligible, but relevant on the macro level, especially because the government can exploit the individuals’ reluctance to get informed.
function:

\[ \text{D} := \text{D}_t = \text{D}(P_{t+1}). \]  

(7)

The incumbent has thus full control over \( \text{D}_t \), the perception of deficit by a share \( \psi \) of voters. She uses disinformation which bears a cost in the following period only, and only if detected. Nonetheless, equation (7) is referred to as disinformation technology with \( P_{t+1} \geq 0 \) being interpreted as investment. The properties of equation (6) imply \( \text{D}'(P_{t+1}) < 0 \) and \( \text{D}''(P_{t+1}) > 0 \), i.e. disinformation investment is effective and reduces the perceived deficit, but with a decreasing marginal effect. Some additional plausible assumptions are suggested to obtain unambiguous results: \( \text{D}(0) = D^* \) (without disinformation even uninformed voters correctly anticipate the equilibrium level of deficit) and \( \text{D}(\infty) = 0 \) (disinformation cannot make uninformed voters belief in a surplus instead of a deficit).

The timing of events is as follows. In election period \( t \), the incumbent chooses deficit level \( D_t \), thus providing transfers for the public according to equation (4). She also determines perceived deficit \( \text{D} \) (which may result in costs \( P_{t+1} \) according to disinformation technology 7). Voting individuals observe transfer level \( t \) and past skills shock \( \mu_{t-1} \). Only fully informed voters also observe \( D_t \) and can deduce current skills \( \mu_t \). They can, therefore, extract information about the future competence of the incumbent. Uninformed voters can only form expectations based on perceived deficit \( \text{D} \). Then, all voters cast their vote based on their different beliefs and information sets. What matters is that some voters are imperfectly informed.

In period \( (t + 1) \), the winner (incumbent or challenger) takes office. With probability \( \lambda \), the period \( t \) incumbent suffers disutility \( P_{t+1} \) for the propaganda she spread in period \( t \). Voters are no longer relevant for the period \( (t + 1) \) policymakers’ decision making because they cannot vote in period \( (t + 1) \). Politicians have no incentive for manipulating the deficit and/or disinforming voters. They want to repay the previous period deficit because the deficit is costly\(^ {21} \) and voters cannot sanction the policymaker for reducing transfers.

\(^{21}\) Repayment is guaranteed, technically, because the marginal utility of additional deficit (through its
i.e. effectively levying additional taxes to finance deficit repayment. Given that voters are only concerned about politicians’ competence after the election it does not matter that individuals anticipate in election period \( t \) that any politician will repay the deficit in the off-election period \( t+1 \). Note also that voters do not consider expected utility in \((t + 2)\) in their voting decision in \( t \), because even fully informed voters cannot distinguish between the incumbent and her challenger in \((t + 2)\) (competence is an MA(1) process only). Politicians, too, are not concerned about the more distant future, because they have no instrument for affecting utility or re-election chances in \((t + 2)\).

3 Results and Discussion

The model is solved in four steps – with details given in the appendix. First, we can determine the probability that an individual agent votes for the incumbent, to whom we refer as party \( a \), without loss of generality. Second and on this basis, we can derive the probability for the incumbent to win the election for a given level of transfers, which depends on the deficit level, the disinformation investment and the competence level of the incumbent. Third, we can maximise the incumbent’s expected utility over any 2-period cycle, i.e. period \( t \) utility plus period \((t + 1)\) utility in case of winning the election multiplied by the probability of winning (as determined in step 2) plus period \( t + 1 \) utility in case of losing multiplied by the probability of losing. To characterise the optimal level of deficit and disinformation investment we derive two first order conditions (FOCs). The maximisation problem can also be illustrated graphically. Forth, perturbation results are obtained by using the Implicit Function Theorem. We are interested in marginal effects of changes in the political rent \( X \), detection probability \( \lambda \) or of shifts between the two groups of voters on the government’s optimal choice both of the deficit \( D^* \) (in \( t \)) and of its investment in propaganda \( P^* \) (in \( t + 1 \)).

1-for-1 effect on transfers and, finally, on consumption) is 1 (given that the discount factor is 1), whereas the marginal cost \( (R'(D)) \) and, therefore, the marginal disutility is greater than 1. The unity marginal utility assumption is also used by Shi and Svensson (2006) for the same purpose as here, albeit with respect to the public goods consumption. – With less restrictive assumptions, we could get a rising trend in debt.
Proposition 1 - Some Obvious Results: Ego Rents and Detection Probability.

A. Higher political rents increase optimal borrowing and disinformation investment at the equilibrium:

\[ (i) \frac{dD^*}{dX} > 0 \quad (ii) \frac{dP^*}{dX} > 0. \]

B. Higher probability of being found out to use disinformation leads to shifts from disinformation investment to borrowing at the equilibrium:

\[ (iii) \frac{dD^*}{d\lambda} > 0 \quad (iv) \frac{dP^*}{d\lambda} < 0. \]

As for part A, if the ego rent of being in power increases, then, intuitively, the incentive to distort the economy also increases. The incumbent is more willing to incur the costs both for increasing the deficit (repayment cost \( R(D_t) \)) and for lowering the perception of the deficit (viz. increasing disinformation cost \( P_{t+1} \)) in order to appear more competent in the eye of voters. Result (i) confirms the theoretical and empirical finding obtained in Shi and Svensson (2006). Result (ii) extends the same logic to the disinformation instrument. In part B, we make one of the two instruments more expensive and get the standard result of a shift from the more costly disinformation instrument (result (iv)) to the less costly deficit instrument (result (iii)).

Proposition 2 - Changing the Share of Voters Who Are Susceptible to Disinformation.

A. A larger share of voters who are susceptible to disinformation increases optimal borrowing and disinformation at the equilibrium, if and only if the competence density function is inelastic at the equilibrium:

\[ (i) \frac{dD^*}{d\psi} > 0 \quad (ii) \frac{dP^*}{d\psi} > 0. \]

B. If and only if the competence density function is elastic at the equilibrium, the results reverse:

\[ (iii) \frac{dD^*}{d\psi} < 0 \quad (iv) \frac{dP^*}{d\psi} < 0. \]
This result can only be explained because the chance of winning the election can be affected by the government (in contrast to the Shi and Svensson (2006) model). The competence distribution actually determines how effective government manipulations are in increasing the incumbent’s re-election chances. Consider an increase of the share of uninformed voters at the equilibrium. This increases the chance of winning ceteris paribus, but may increase or decrease the marginal winning probability (determined by the slope of the competence distribution at the equilibrium) and thus require reoptimisation. In case of a decrease of the marginal probability of winning, the policymaker may want to reduce costly repayment costs, i.e. lower the deficit. This means a dampening of the political budget cycle.

The ”if and only if” condition for obtaining the results of part A of Proposition 2 can be written as

\[
F'[\psi(\hat{D} - D^*_t)] + \psi F''[\psi(\hat{D} - D^*_t)](\hat{D} - D^*_t) > 0. \tag{8}
\]

It is clear that first term is positive and the second one typically negative (and always non-positive) as long as \( \hat{D} < D^*_t \) (while taking note of the (weak) monotonicity assumption for \( F' \) up to the mean). For \( F''[\bullet] = 0 \), for instance if the distribution is uniform, the second term completely vanishes and condition (8) holds. The second term also disappears, if \( \hat{D} = D^*_t \) in equilibrium, i.e. all agents (including those who are susceptible to disinformation) would correctly perceive the actual deficit. This would be the case for prohibitive disinformation costs which make it impossible for the incumbent to increase her re-election chances by trying to appear more competent than she actually is. She would not even try to manipulate the deficit. This case is very different from a seemingly similar situation in Shi and Svensson (2006). In their paper, \( \hat{D} = D^*_t \) in the equilibrium is not an outcome, but an assumption. They postulate that the government would increase the deficit to cheat on voters because they are uninformed and can, therefore, not anticipate the deficit ex ante. However, in their model those same uninformed voters are, nonetheless, able to rationally anticipate the correct deficit ex post, although they cannot extract the relevant information between ex
ante and ex post considerations in any way.\textsuperscript{22} As a result, the government does manipulate
the deficit, but cannot increase its re-election chances because $\hat{D} = D_t^*$ at the equilibrium
and the critical competence value always remains at its mean of zero. All this is an artifact
of their model assumptions and implies that the possibility of reverse results according to
Proposition 2, part B, is ruled out in their model.

In contrast, a key result of this paper is that an increase in voters who are susceptible to
disinformation does not necessarily lead to a larger budget cycle. Condition (8), which
guarantees larger cycles when the share of voters who are susceptible to disinformation is
increased (see also discussion in the appendix), basically occurs when the competence is
very dispersed and its density function very flat. Condition (8) can be rewritten as

$$\frac{F'}{F''} > \psi(D_t^* - \hat{D})$$

which simplifies under standard distributional assumptions to:

- $\sigma^2 > [\psi(D_t - \hat{D})]^2$ in case of a normal distribution;
- $b > [\psi(D_t - \hat{D})]$ in case of a Laplace distribution;
- $a > 2[\psi(D_t - \hat{D})]$ in case of a triangular distribution.\textsuperscript{23}

\textsuperscript{22} The objection, for instance, by Grossman (1977) has already been discussed in the introduction and
footnote 6.

\textsuperscript{23} This relates to symmetrical distributions with the following properties: normal distribution with mean
0, variance $\sigma^2$ and density function $f(\mu^2_t) = f(\mu) = \frac{1}{2\pi \sigma} e^{-\frac{\mu^2}{2\sigma^2}}$; Laplace distribution (double exponential
distribution) with mean 0, variance $2b^2$ and density function $f(\mu^2_t) = f(\mu) = \frac{1}{2b} e^{|\mu|}$ (for $\mu < 0$); triangular
distribution with support $[-a,a]$, mean 0, variance $\frac{a^2}{6}$ and density function $f(\mu^2_t) = f(\mu) = \frac{\mu + a}{a^2}$. 

17
Note that condition 9 simplifies to a similar expression for each one of the aforementioned probability distributions:

\[ \text{Variance} > g_{\text{dist}}(\text{manip}). \]  

The effect (function \( g_{\text{dist}} \) depending on each distribution) of the manipulation \( \text{manip} \) on the critical competence value must be smaller than the variance of the competence distribution. Suppose voters believe that the distribution of government competence is very dispersed, i.e. the density function is concentrated near the mean (small \( \sigma \) or \( b \) or \( a \)). In this case, the condition is only fulfilled, if manipulations of deficit and perceived deficit are very small in the equilibrium, i.e. \( (D_t - \bar{D}) \) small. The more dispersed the government competence is believed to be, the more likely is it that we obtain the intuitive result of Proposition 2, part A. In Section 5, implications of competence dispersion on the political budget cycle are discussed by comparing the competence distributions we may expect in developed vs. developing countries or new vs. old democracies. But first, it is shown that the findings hold and can even be broadened in a different and more elaborate model.
4 A Disinformation Model with Contemporaneous Budget Costs

In this section, two ways of modelling contemporaneous disinformation costs are suggested. First, the dishonesty by the incumbent may be discovered with probability \( \lambda \) at the end of election period \( t \) (and not in \( t+1 \) as suggested thus far). This would change the interpretation slightly, but not change equation (2) or any other equation. As long as we keep the simplifying assumption of no discounting, results will not change. Second, propaganda costs could be modelled as budgetary costs. One could think of costs \( C_t \) for repressing unfavourable media reports or for buying off agencies for coming up with favourable budget forecasts. This model requires a number of changes, but produces qualitatively the same findings plus some additional insights – to be outlined in the following.

Disinformation costs in the budget constraint

Assuming that disinformation costs are budget-relevant, the government budget constraint becomes:

\[
t_t = D_t - R(D_{t-1}) - C_t + \eta_t.
\]

(11)

If we assume that the incumbent does not face any additional disutility from disinformation such as modelled in the previous sections, then her utility function reduces to:

\[
V_t^j = \sum_{s=t}^{\infty} [c_s + X_s].
\]

(12)

As before, some voters are fully informed, others are not. However, fully informed implies that they can observe both policy choices by the government, i.e. the level of deficit, \( D_t \), as well as the amount of money invested in disinformation measures, \( C_t \) (henceforth also called propaganda costs or disinformation investment). If the government policy could be observed by all voters, the government would gain nothing from manipulating the deficit or from disinforming voters. Again, the moral hazard problem arises because a share of voters is
not fully informed. They can, therefore, not infer government competence in election period $t$ and hence not form unbiased beliefs about the incumbent’s performance after elections. The perception of deficit, $\tilde{D}_t$, by a share of voters can be influenced by the government’s investment, $C_t \geq 0$, according to the following disinformation technology – now much more straightforwardly than in the previous model:

$$\tilde{D} := \tilde{D}_t = \tilde{D}(C_t),$$

with (as in the previous model) $\tilde{D}(0) = D^*, \tilde{D}(\infty) = 0$, $\tilde{D}'(C_t) < 0$ and $\tilde{D}''(C_t) > 0$, i.e. disinformation is effective and reduces the perceived deficit, but with a decreasing marginal effect. Again, it is assumed that the government has thus full control over $\tilde{D}_t$. Having established that voters can be disinform about the deficit, what do voters know about the disinformation technology? Only a share of voters can observe it and draw conclusions about the government’s choice of disinformation investment $C_t$. All others are uninformed about the costs of government propaganda and have to form expectations $\hat{C}_t$. To keep the model simple and still fairly general, it is postulated that voters who are uninformed about propaganda costs do typically not anticipate the equilibrium value, $C^*$, but have some idea, possibly a very good guess, of how much the government invests in disinformation:

$$\hat{C} := \hat{C}_t = kC_t, \quad 0 < k < 1.$$

(14)

Note that there is a conceptual difference between voters who are uninformed with respect to deficit level $D$ and propaganda costs $C$. Voters who are susceptible to being disinform about the level of deficit will be called disinformed voters from now on. Those who are uninformed about $C$, the investment in disinformation, will be called uninformed voters.

---

24 Many complications are feasible, but none of them contributes to the main trust of this paper or the understanding of its qualitative results. It is no problem to include the rational expectations case, i.e. to impose the equilibrium condition $\hat{C}_t = C_t^*$ after optimisation (which is conceptually different to setting $k = 1$ in equation 14). It would also be possible to discuss a society, which is overly sceptical towards propaganda by its leaders, i.e. $k > 1$. As a result, the perturbation result $\frac{dD^*}{d\omega}$ in Proposition 5 would become ambiguous, i.e. could potentially change signs. More complex, but also no real problem would be to consider some interaction term for voters who are both disinformed with respect to deficit and uninformed with respect to disinformation.
The beliefs of disinformed voters, $\hat{D}_t$, are endogenously controlled by the government (though it may be more expensive for some governments than for others to achieve the desired level of disinformation). In contrast, uninformed voters cannot observe the equilibrium level, but form beliefs $\hat{C}_t$, because they have some exogenously given idea of how much the government is willing to invest in disinformation. Overall, the electorate is made up of 4 groups of voters:

- fully informed voters: share $(1 - \psi - \omega - \xi)$;
- disinformed voters who are informed about propaganda costs: share $\psi$;
- uninformed voters who are informed about the deficit: share $\omega$;
- disinformed and uninformed voters: share $\xi$.

The timing of events is similar to before. The incumbent chooses deficit level $D_t$ and disinformation investment, $C_t$, in election period $t$, thus providing transfers for the public according to equation (11). Only fully informed voters observe both $D_t$ and $C_t$ and can deduce current skills $\mu^a_t$. Disinformed and/or uninformed voters cannot extract information about the future competence of the incumbent. As before, the winner repays period $t$ deficit in period $t + 1$. Analogous to the previous model, we can obtain the government maximisation problem:

$$
\max_{D_t, C_t} \quad y + D_t - C_t + \mu^a_{t-1} + X \\
y - R(D_t) \\
+ [1 - F[(\psi + \xi)(\hat{D} - D_t) + (\omega + \xi)(C_t - \hat{C}_t)]] X.
$$

(15)

Note that the probability for winning is now $[1 - F[(\psi + \xi)(\hat{D} - D_t) + (\omega + \xi)(C_t - \hat{C}_t)]]$. As before, underestimating the deficit makes voters believe that the government is more competent than it actually is. (Technically, the critical competence value is shifted to the

25 Note also that there is a real world difference in the magnitude of (rather large) actual and perceived deficit on the one hand and (rather small) actual and perceived costs of disinformation. This allows us to make the assumption $(\hat{D} - D_t) + (C_t - \hat{C}) < 0$, although $\hat{D} - D_t < 0$, but $C_t - \hat{C} > 0$. 

21
left – as shown in Figure 2 on page 30.) However, underestimating propaganda costs has the opposite effect because voters think that the government has more resources available for financing transfers.

**Confirmed findings and some additional ones**

It is straightforward to replicate the perturbation result for ego rents. As in the previous model, a higher ego rent makes it more worth while to resort to manipulations of the deficit or the deficit perception (by using disinformation). Perturbation results with respect to changes in shares of types of voters do not carry over one for one though. On the one hand, this is not possible because now there are also voters who are uninformed about the amount of disinformation investment (in addition to those susceptible to disinformation – now called disinfomed voters). On the other hand, the qualitative finding of a possibility for reverse results is confirmed, with conditions similar to the one obtained in the previous model.

**Proposition 3** - Changing the Share of Voters Who are Susceptible to Disinformation.

A larger share of disinfomed voters increases optimal borrowing and disinformation at the equilibrium only under certain conditions:

A. Consider increasing the share of voters $\psi$ who are disinfomed about the deficit, but informed about propaganda costs:

\[
(i) \quad \frac{dD^*}{d\psi} > 0 \iff \frac{F'}{F^n} > (\psi + \xi)[D^*_t - \hat{D}].
\]

\[
(ii) \quad \frac{dC^*}{d\psi} > 0 \iff \frac{F'}{F^n} > \frac{(\omega + \xi) + (\psi + \xi)\hat{D'}}{(\psi + \xi)\hat{D}'} (\psi + \xi)[D^*_t - \hat{D}] + (\psi + \xi)[C^*_t - \hat{C}].
\]

B. Consider increasing the share of voters $\xi$ who are both disinfomed about the deficit and uninformed about propaganda costs:

\[
(iii) \quad \frac{dD^*}{d\xi} > 0 \iff \left\{ \begin{array}{l}
\frac{F'}{F^n} > (\psi + \xi)[(\hat{C} - C^*_t) + (D^*_t - \hat{D})] \\
\wedge \psi > \omega.
\end{array} \right.
\]
\[ (iv) \quad \frac{dC^*}{d\xi} > 0 \iff \ \begin{cases} \frac{F'}{F''} > \frac{(\omega + \xi + (\psi + \xi)\tilde{D}')(\psi + \xi)}{(\psi + \xi)^2 + (\psi + \xi)D'} \left( \hat{C} - C^*_i \right) + (D^*_i - \hat{D}) \\ \land \omega > \psi. \end{cases} \]

The conditions look similar to condition (9) used for Proposition 2. Again, for standard distributions they can be rewritten as an inequality of the kind of condition (10) before:

\[ \text{Variance} > h_{\text{dist}}(\text{manip}). \]

The effect (function \( h_{\text{dist}} \) depending on each distribution) of the manipulation \( \text{manip} \) on the critical competence value must be smaller than the variance of the competence distribution. In part A, only the effect of voters underestimating the deficit matters since the share of \( \psi \) changes (disinformed but not uninformed voters). In part B, the effect of underestimating deficit and propaganda costs matters since a change in \( \xi \) reflects voters who are both disinformed and uninformed. In part B, the conditions are "only" sufficient and there is an additional condition about the relative shares of disinformed and uninformed voters.\(^{26}\) If these conditions are fulfilled, the government can increase its voting probability by increasing the manipulations. However, it is also possible that increasing the share of uninformed voters, be they informed or uninformed about propaganda costs, can reduce budget cycle manipulations.

Let us now turn to the share of voters who are uninformed about propaganda costs. This matters in two respects. First, Proposition 4 states that the possibility of reverse results according to Propositions 2 and 3 is strengthened by increasing the share of uninformed voters:

\(^{26}\) If there are more disinformed voters, then the effect on deficit may be positive. If there are more uninformed voters, the effect on propaganda costs may be positive. Note, however, that the conditions in part B imply that it is never optimal for the government to increase both disinformation and the deficit at the same time. It may, however, be optimal to decrease both of them.
Proposition 4 - Changing the Share of Voters Who are Uninformed about Propaganda Costs - Reinforcing Reverse Results.

If the conditions in Proposition 3 are not fulfilled and \( \frac{dD^*}{d\psi} < 0 \) and \( \frac{dD^*}{d\xi} < 0 \), the decrease of optimal borrowing (caused by an increased share of disinfomed voters) is augmented when the share of voters who are uninformed about propaganda costs increases at the equilibrium:

\[
(i) \quad \frac{dD^*}{d\psi} < 0 \quad (ii) \quad \frac{dD^*}{d\psi} < 0 \quad \text{for} \quad x = \omega, \xi.
\]

How can we explain Proposition 4? Voters who are uninformed about propaganda costs do not know how much the government invests in disinformation and underestimate the government’s costs for it. Ignoring an additional burden on the budget means that they expect higher transfers than realistically possible. They are disappointed about low levels of transfers and conclude that the government must be less competent than it actually is. This reduces the government’s probability to win the elections. With more voters who are uninformed about propaganda costs, it is costlier for the government to invest in disinformation in order to reduce the perceived deficit. Now, let us look at Proposition 4 again. The government will not only not increase optimal deficit (when the density function is sufficiently steep), but decrease it more vigorously.

The last proposition looks at the direct effect of the share of voters who are uninformed about propaganda costs:

Proposition 5 - Changing the Share of Voters Who are Uninformed about Propaganda Costs - Stand-Alone Effects.

A larger share of voters who are uninformed about propaganda costs increases the optimal deficit, but decreases the optimal investment in disinformation at the equilibrium:

\[
(i) \quad \frac{dD^*}{d\omega} > 0 \quad (ii) \quad \frac{dC^*}{d\omega} < 0.
\]

Proposition 5 (ii) can be explained along the lines of our explanation for Proposition 4. More voters (who are uninformed about propaganda costs) conclude that the government
is less competent. Disinformation becomes costlier and is reduced by the government in the optimum. However, less disinformation means higher perceived deficit. To counterbalance part of the effect, the government finds it optimal to increase the deficit. Hence Proposition 5 (i).

5 Conclusion

This paper argues that governments, which engage in economic manipulations do a fortiori engage in political manipulations. In particular, there is evidence that governments try to obscure their fiscal manipulations and, in doing so, are able to increase the chance of winning the elections. The findings of a simple budget cycle model capturing the effect of disinformation on elections challenge previous theoretical results on the impact of uninformed voters on the fiscal cycle. The new findings are confirmed, even if disinformation is modelled differently and in a more complex setting. We obtain additional effects, but they only strengthen the relevance of the new findings. The qualitative results are also robust with respect to alternative distributional assumptions. It turns out that the distribution of the policymaker’s competence actually determines how effective government manipulations are in increasing the incumbent’s re-election chances. Consider an increase of the share of uninformed voters (i.e. voters who are susceptible to disinformation) at the equilibrium. This increases the chance of winning ceteris paribus, but may increase or decrease the marginal winning probability (determined by the slope of the competence distribution at the equilibrium) and thus require reoptimisation. In case of a decrease of the marginal probability of winning, the policymaker may want to reduce costly repayment costs, i.e. lower the deficit. This means a reduction of the political budget cycle.

The main finding of this paper is that the prima facie intuitive link between more voters, who are uninformed about the deficit, and reinforced budget and deficit cycles does not always work. This is relevant for policy and for empirical research, if we acknowledge that there may be fundamental differences in the characteristics of political elites in different
countries and groups of countries. Stereotypical newly democratic countries as well as some
developing countries typically have politicians exhibiting very diverse skills and abilities.
Such a country can be characterised by a dispersed distribution of competence of its political
elite. In this case, reducing the share of disinformed voters would help alleviate the budget
cycle problem – the intuitive result. However, the situation is different in a stereotypical
established OECD democracy. There, government competence is typically less dispersed as
already argued in the introduction. In that case, increasing information may lead to a less
dampening effect on the budget cycle, no effect at all, or even exacerbate the cycle. Changing
the share of disinformed voters in established OECD democracies should certainly not have
effects as clear-cut as in developing countries or new democracies. This could explain the
aforementioned empirical findings in the literature: more prominent cycles in developing
countries and/or new democracies. Shi and Svensson’s (theoretical) explanation is that the
larger share of not fully informed voters in developing countries produces larger budget
cycles. This paper offers an alternative explanation for the same phenomenon. Even if
the share of voters who are disinformed about the deficit were the same, newly democratic
or developing countries could still exhibit larger budget cycles because of more dispersed
government competence.

This interpretation leads to testable empirical predictions. Suppose competence were really
more dispersed in newly democratic countries as well as some developing countries. Then
we could test within a country group the impact of differential shares of voters who are
informed about the deficit. Within the group of developing or newly democratic countries,
those countries with a higher share of dis\textit{in}formed voters should exhibit larger budget cycles
compared to other newly democratic or developing countries. Conversely for advanced
OECD democracies, we should not see such a clear-cut effect of changes in the share of
disinformed voters. The difficulty of such an empirical analysis would be to find good
proxies or instruments. Maybe, the dispersion of government competence, the government
skills shocks, could be instrumented – at least for some countries – with capital flight or
another financial variable; the share of informed voters could be captured by data on literacy,
economic freedom, freedom of the press, or information flows (the latter was, for instance, used by Dreher, 2006).

The paper also evokes a theoretical extension. Disinformation could be included in a signalling model of the Rogoff and Sibert (1988) and Rogoff (1990) type, where the government observes the competence prior to private agents. The interaction ("lying") between fully informed and not fully informed agents captured in models of strategic communication (such as Kartik, 2009) could be applied to the interaction between the government and both groups of private agents. It would be interesting to see, if our ambiguous result about the effect of the share of disinformed voters on the budget and deficit cycle obtains when disinformation is incorporated in such a signalling model of the political budget cycle.

Appendix

The appendix presents indications for the four steps of the model solution plus a graphical illustration of the maximisation problem.

Step 1: Probability of voting for the incumbent

We consider an individual voter, no matter if fully informed or susceptible to disinformation with respect to the deficit level (the latter are henceforth called disinformed voters). She votes for incumbent \( a \), if

\[
E_t[c_{a,t+1}^a + \alpha \theta^i(-\frac{1}{2})] > E_t[c_{b,t+1}^b + \alpha \theta^i(+\frac{1}{2})].
\]  

(A.1)

Depending on who is in power, \( t+1 \) consumption will typically differ because of differences in policymakers’ competence and individuals’ expectations about it:

\[
E_t[c_{a,t+1}^a] = E_t[y] + E_t[t_{a,t+1}^a]; \quad E_t[c_{b,t+1}^b] = E_t[y] + E_t[t_{b,t+1}^b];
\]  

(A.2)

\[
t_{t+1}^j = -R(D_t) + \eta_{t+1}^j.
\]  

(A.3)
Period \( t + 1 \) government budget constraint \((A.3)\) says that the period \( t \) deficit must be repaid in period \( t + 1 \).\(^{27}\) As a result, \( t + 1 \) transfers are negative (i.e. taxes) corresponding to deficit repayment modulo the effect of the policymaker’s competence. Individuals have no idea about the skills shock of either potential policymaker in \( t + 1 \). Nor do they know the skills shock of the challenger in period \( t \), and, therefore, expect 0. However, they can use the incumbent’s period \( t \) deficit policy to draw conclusions about her skills shock in period \( t \) (see further down).

\[
E_t[\mu^a_t] = -E_t[R(D^*_t)]. \quad \text{(A.4)}
\]

\[
E_t[\mu^c_t] = -E_t[R(D^*_t)] + E_t[\mu^c_t]. \quad \text{(A.5)}
\]

where \( D^*_t \) denotes the incumbent’s optimal period \( t \) choice for the deficit (to be determined further down). Combining equations \((A.1)\) to \((A.5)\) we can obtain a condition for an individual to vote for incumbent \( a \):

\[
E_t[\mu^a_t] > \alpha \theta^a.
\]

Using the distribution of the skills shock we can determine the probability \((Pr)\) of any voter, be she fully informed or disinformed, to vote for incumbent \( a \):

\[
Pr[E_t[\mu^a_t] - \alpha \theta^i \geq 0] = \frac{E_t[\mu^a_t] - (-\alpha)}{\alpha - (-\alpha)} = \frac{E_t[\mu^a_t]}{2\alpha} + \frac{1}{2}. \quad \text{(A.6)}
\]

**Step 2: Incumbent’s probability of winning**

Now, we can determine the probability \( Prob \) that incumbent \( a \) obtains 50% of the votes in period \( t \) elections. It is the probability that the number of voters times their individual probability \( Pr \) to vote for incumbent \( a \) (as determined in equation A.6) is greater or equal to \( \frac{1}{2} \). However, the individual probability \( Pr \) is different for fully informed and disinformed voters because their expectations of period \( t \) skills, \( E_t[\mu^a_t] \), differ. Here is the probability for the incumbent to win the election:

\[
\text{Prob} \left\{ \begin{array}{c}
(1 - \psi) \left[ \frac{E^{\text{inf}}_t[\mu^a_t]}{2\alpha} + \frac{1}{2} \right] + \psi \left[ \frac{E^{\text{disinf}}_t[\mu^a_t]}{2\alpha} + \frac{1}{2} \right] \\
\quad \text{fully informed} \end{array} \geq \frac{1}{2} \right\}.
\]

\(^{27}\) Remember that policymakers will not borrow in period \( t + 1 \) because there is no election at the end of that period. See the discussion in the paragraph on the timing of events on page 13.
So why is there a difference in expectations for fully informed and disinformed voters? Consider the government budget constraint for period $t$:

$$ t_t = D_t + \eta_t \quad (A.8) $$

Remember that policymakers will not borrow or disinform in off-election periods because appearing more competent does not affect the duration of the incumbent’s time in office. Without deficit in off-election period $(t - 1)$ there is no repayment in election period $t$. Let us now rewrite equation (A.8):

$$ \eta_t = t_t - D_t $$

For fully informed voters we obtain:

$$ E_t^{inf} [\mu_t^a] = \mu_t^a = t_t - D_t - \mu_{t-1}^a \quad (A.9) $$

The point is that fully informed voters can determine $E_t^{inf} [\mu_t^a]$ deterministically, because they can observe $D_t$. By contrast, disinformed voters must form an estimate of the incumbent’s skills, $\widehat{\mu}_t^a$, based on their perceived deficit level, $\widehat{D}_t$:

$$ \widehat{\mu}_t^a = t_t - \widehat{D}_t - \mu_{t-1}^a $$

or

$$ \widehat{\mu}_t^a = t_t - D_t - \mu_{t-1}^a + D_t - \widehat{D}_t $$

$$ \mu_t^a \text{ from (A.9)} $$

$$ E_t^{disinf} [\mu_t^a] = \mu_t^a + D_t - \widehat{D}_t \quad (A.10) $$

Disinformed voters overestimate the incumbent’s competence by $D_t - \widehat{D}_t$. Using equations (A.9) and (A.10) we can now determine the probability that incumbent $a$ receives 50% of the votes in period $t$:

$$ \text{Prob} \left\{ (1 - \psi) \left[ \frac{\mu_t^a}{2\alpha} + \frac{1}{2} \right] + \psi \left[ \frac{\mu_t^a + D_t - \widehat{D}_t}{2\alpha} + \frac{1}{2} \right] \geq \frac{1}{2} \right\} $$

$$ = \text{Prob} \left\{ \frac{\mu_t^a}{2\alpha} + \psi \frac{D_t - \widehat{D}_t}{2\alpha} + \frac{1}{2} \geq \frac{1}{2} \right\} $$

$$ = \text{Prob} \left\{ \mu_t^a \geq \psi (\widehat{D}_t - D_t) \right\} \quad (A.11) $$

$$ = 1 - F \left[ \psi (\widehat{D}_t - D_t) \right], \quad (A.12) $$

where $F(\bullet)$ is the distribution function of the skills shock.
The marked area towards the right (light grey or yellow [if in colour]) under the density function depicted in Figure 2 corresponds to the probability described by equation (A.11) and by the distribution function representation in equation (A.12). The expected competence overall (combine equations A.9 and A.10) is always greater than the actual competence, if the perceived deficit is smaller than the actual deficit ($\hat{D} < D_t$). Then the probability (see equation (A.12) or the light grey [or yellow] area under the density function) is always greater than $\frac{1}{2}$. We can see that producing or increasing a deficit (or reducing $\hat{D}$, the perception thereof) increases the government’s chance to be re-elected.

**Step 3: Incumbent’s maximisation problem**

Now, we can maximise incumbent $a$’s utility over the entire election cycle, i.e. periods $t$ and $t + 1$. Period $t + 1$ utility is the sum of the utilities for winning and losing the election weighted by the probability determined in step 2:

$$
\text{max}_{D_t, P_{t+1}} V = \text{max}_{D_t, P_{t+1}} V_t^a + V_{t+1}^a =
$$

$$
\max_{D_t, P_{t+1}} \left\{ E_t\left\{ y + D_t + \eta_t^a + X \right\} \right. \\
+ \left. E_t\left\{ 1 - F[\psi(\hat{D} - D_t)] \right\} \left[ y - R(D_t) + \eta_t^{a+1} + X - \lambda_{t+1}P_{t+1} \right] \right\}
$$

Given that the incumbent knows her past, but not her present and future skills (and not the skills shock of the challenger) the maximisation problem looks as follows:

$$
\text{max}_{D_t, P_{t+1}} y + D_t + \mu_t^a + X
$$

$$
+ y - R(D_t) - \lambda_{t+1}P_{t+1}
$$

$$
+ [1 - F[\psi(\hat{D} - D_t)] ] X
$$

(A.13)
Having verified the second order conditions for a well-behaved maximisation problem we can focus on the two first order conditions (FOCs):

\[ 1 - R'(D^*_t) + \psi F'(\psi(\hat{D} - D^*_t)) X = 0, \quad (A.14) \]

\[ - \lambda_{t+1} - \psi \hat{D}' F'(\psi(\hat{D} - D^*_t)) X = 0, \quad (A.15) \]

where \( F'[\bullet] = f[\bullet] \) refers to the probability density function.

As for the interpretation of the first FOC, \( 1 - R'(D^*_t) \) is the marginal direct net effect of deficit, which is negative, because deficit including repayment is costly. Deficit is optimally chosen by the government, when the negative marginal direct net effect equals the positive marginal effect on the expected ego rent. This is the impact of a marginal change of deficit on competence and, thereby, on the probability of receiving the ego rent, multiplied by the ego rent. The second FOC is similar with two differences: (i), the negative marginal direct effect of disinformation investment equals \(-\lambda\), the probability of being detected in the post-election period; and (ii), the positive indirect effect through competence now depends on the effect of disinformation on perceived deficit \( \psi \hat{D}' \), where \( \hat{D}' \) is the negative slope of the disinformation technology at the equilibrium. Given \( F'[\bullet] > 0 \) it is clear from the FOCs that it is optimal for the government to always use both its instruments, i.e. manipulate the deficit and disinform voters. For \( \lambda = 0 \), propaganda must be used without bounds, thus producing \( \hat{D}(\infty) = \hat{D}'(\infty) = 0 \), which implies that deficit manipulations are maximally effective.

**Illustration of maximisation problem**

To get an idea of the maximisation problem we make the following simplifying assumptions: equally distributed competence (which means that we cannot obtain reverse results); zero previous period competence (\( \mu'_{t-1} = 0 \)); no chance of being detected (\( \lambda = 0 \)) which implies that propaganda is costless and will be used maximally, thereby ensuring that disinfomed voters will believe in zero deficit (\( \hat{D} = 0 \)). The maximisation problem simplifies:

\[ \max_{D_t, P_{t+1}} \quad y + D_t + X \]

\[ + y - R(D_t) + [1 - F[\psi(0 - D_t)]]X \quad (A.16) \]
Without discount rate the incumbent tries to achieve the highest overall return, i.e. the (dashed) minus 45° line furthest away from the origin. The diagram captures the optimum for three situations. If all voters are fully informed ($\psi_0 = 0$), increasing $D$ has no effect on winning the elections and will not result in a higher probability of receiving ego rent $X$ in period 2 (expected future ego rent). The flat $\psi_0$ line depicts the (hypothetical) period 2 return $y + [1 - F[0]]X = y + \frac{1}{2}X$ (for any period 1 return $y + X + D$), if we ignore any deficit repayment costs. However, any increase of $D$ will only be painful, because the repayment in period 2 will be larger than the original $D$, thereby reducing the overall return. This is captured by the downward sloping "total return for $\psi_0$" line. As a result, the incumbent will choose equilibrium E. Any increase in the share of disinform voters $\psi$ will rotate the
hypothetical period 2 return curve counterclockwise because the deficit manipulation will now increase the expected ego rent in period 2, thereby leading to equilibria A (for $\psi_1$) and C (for $\psi_2$). The graph can also be used to illustrate the difference to the Shi and Svensson (2006) assumption of rational expectations. Point A is the equilibrium for $\psi_1$ since $\hat{D} = 0$. If $\hat{D}$ were rationally expected, we would end up in point B where there is deficit manipulation, but without any effect on the expected ego rent in period 2.

**Step 4: Propositions: Perturbation results and the "if and only if" condition**

Indications on the results of Section 2 and 3:

\[
\frac{dD}{dX} = -\frac{1}{|H|} \left[ V_{PP} \frac{\partial V_D}{\partial X} - V_{DP} \frac{\partial V_P}{\partial X} \right] > 0
\]

\[
\frac{dD}{d\lambda} = -\frac{1}{|H|} \left[ V_{PP} \frac{\partial V_D}{\partial \lambda} - V_{DP} \frac{\partial V_P}{\partial \lambda} \right] > 0
\]

\[
\frac{dD}{d\psi} = -\frac{1}{|H|} \left[ V_{PP} \frac{\partial V_D}{\partial \psi} - V_{DP} \frac{\partial V_P}{\partial \psi} \right]
\]

\[
\frac{dP}{dX} = -\frac{1}{|H|} \left[ V_{PD} \frac{\partial V_D}{\partial X} - V_{DD} \frac{\partial V_P}{\partial X} \right] > 0
\]

\[
\frac{dP}{d\lambda} = -\frac{1}{|H|} \left[ V_{PD} \frac{\partial V_D}{\partial \lambda} - V_{DD} \frac{\partial V_P}{\partial \lambda} \right] < 0
\]

\[
\frac{dP}{d\psi} = -\frac{1}{|H|} \left[ V_{PD} \frac{\partial V_D}{\partial \psi} - V_{DD} \frac{\partial V_P}{\partial \psi} \right]
\]

The determinant of the Hessian is $|H| = V_{DD}V_{PP} - V_{PD}^2$. (The results of Section 4 are derived analogously and can be obtained from the author upon request.)

"If and only if" condition (8) requires that the density responds little to changes in competence (relative to the density-competence ratio at the equilibrium), i.e. the density function $f[\psi(\hat{D} - D^*_t)]$ ($= F'[\mu^*_t]$) is inelastic at the equilibrium. Condition (8) can be rewritten accordingly:

\[-1 < f'[\psi(\hat{D} - D^*_t)] \frac{f}{f'} \iff -1 < \frac{df}{d\mu^*_t}.\]

Condition (8) is actually the derivative of a derivative:

\[
\frac{d}{d\psi} \frac{d(1 - F[\psi(\hat{D} - D_t)])}{dD} > 0,
\]

(A.20)
where \(1 - F[\psi(\hat{D} - D_t)]\) is the (positive) probability of winning and thus receiving the ego rent; and

\[
\frac{d(1 - F[\psi(\hat{D} - D_t)])}{dD} = \psi F'[\psi(\hat{D} - D_t^*)]
\]

is the (positive) marginal winning probability of deficit \(D\). Inequality A.20 means that a marginal increase in the share of disinform voters must increase the marginal winning probability of \(D\). If \(D\) is more productive with respect to obtaining the ego rent, then the government can afford higher marginal repayment costs \(R'(D_t)\) according to FOC (A.14). If increasing \(D\) is more productive, reducing the perceived deficit \(\hat{D}\) is also more productive (given that \(D\) and \(\hat{D}\) have opposite signs in the density function). According to FOC (A.15) the government can thus also afford to increase propaganda investment \(P\) (thereby reducing \(-\hat{D}'\), the absolute value of the marginal perceived deficit).

References


