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Published Version:
Bellettini G., Roberti P. (2020). Politicians’ coherence and government debt. PUBLIC CHOICE, 182(1-2), 73-91 [10.1007/s11127-019-00669-5].

Availability:
This version is available at: https://hdl.handle.net/11585/716157 since: 2020-02-28

Published:
DOI: http://doi.org/10.1007/s11127-019-00669-5

This is a pre-print of an article published in Public Choice. The final authenticated version is available online at: https://doi.org/10.1007/s11127-019-00669-5

Politicians' coherence and government debt*

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July 21, 2018

*Acknowledgements: We would like to thank Giovanni Andreottola, Frank Bohn, Emilio Calvano, Vincenzo Denicolò, Arye L. Hillman, Andrea Mattozzi, Antonio Nicolò, Nicola Pavoni, and Heinrich W. Ursprung for helpful comments and suggestions. We also benefited from comments by participants to the 24th Silvaplana Workshop in Political Economy and to the internal seminar at the University of Bologna.

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Abstract

We model a society that values the coherence between past policy platforms and current implemented policy. Policy platforms partially commit candidates to their future actions, because of the incoherence cost politicians pay when they renege on promised policies. If an incumbent politician seeks to be reelected, she has to use her platforms to commit to moderate policies that could be distant from her most preferred one. In this context, we suggest a novel mechanism by which issuing government debt can affect electoral results. Debt is exploited by an incumbent politician who favors low spending to damage the credibility of her opponent's policy platforms and be reelected. A higher debt level decreases the voters' most preferred spending level and renders the opponent's past moderate platform a losing policy. Even if the latter chooses to update her proposal, she would not be able to credibly commit to it, given the incoherence cost associated to changing proposals.

JEL-Classication: D72, H63, D78

Keywords: voting, strategic debt, commitment, coherence

"By the end of my first term, I will reduce the Reagan budget deficit by two-thirds. Let's tell the truth. It must be done, it must be done. Mr. Reagan will raise taxes, and so will I."

Walter Mondale[1]

1 Introduction

In this work, we provide a rationale for the reelection of politicians who create wasteful government deficits. In particular, we offer a possible explanation for some puzzling anecdotal evidence by linking two features of the policymaking process extensively investigated in the political economy literature: the use of electoral platforms as commitment device, and the strategic implementation of government debt.

Consider the following example. During its first term, the Reagan administration increased substantially the stock of government debt. Consequently, a fierce debate emerged in the Democratic primaries between candidates who continued to favor the Great Society programs and those who rejected the "failed policies of the past".[2] An argument put forward by the latter was that the existing debt made large social programs unpopular, given the increase in the tax burden necessarily associated to these policies. Eventually, Walter Mondale, who stuck to the traditional Democratic platform, won the primaries but lost against Reagan in a landslide.

Another interesting case is that of the Italian government led by Silvio Berlusconi between 2001 and 2006. In this period, while public debt in-

[1] See http://edition.cnn.com/ALLPOLITICS/1996/conventions/chicago/facts/famous.speeches/mondale.84.shtml

[2] Quote by Gary Hart. See http://www.nytimes.com/1984/04/07/us/hart-presses-for-support-in-wisconsin-s-caucuses.html

creased, social spending decreased. Despite this potentially unpopular performance, which could suggest a large defeat for Berlusconi in the 2006 elections, his coalition almost managed to tie, and was defeated by a mere 20,000 votes. Although the left-wing candidate Romano Prodi proposed an electoral program that merged debt reductions with social programs, the latter were far less ambitious than the past proposals supported by leftist coalitions, and the whole platform was harshly criticized as either too moderate or incoherent.

In this paper we suggest that Berlusconi's unexpected electoral result and Reagan's victory might be explained by a strategic use of government debt that shifted the electorate's preferences toward a lower level of public good provision. This shift forced the opponents to choose between sticking to losing policies or flip-flopping on their policy stance.

Flip-flopping on policy proposals is often perceived as a damage to the credibility of candidates, as often emphasized by the media.[3] John Kerry's electoral campaign was severely affected by his saying, "I actually did vote for the $87 billion, before I voted against it", referring to his vote on the Iraq war funding. Although his seemingly contradictory voting behavior could be rationalized,[4] his critics used a flip-flopping argument to cast doubt on his commitment for every policy he stood for. In UK politics, a term for the same kind of behavior with a negative connotation is "U turn". Margaret Thatcher used it in one of her most famous sentences: "You turn [U-turn] if you want to. The lady's not for turning".[5]

[3]See, for instance, http://www.theguardian.com/politics/2013/nov/28/coalition-u-turn-list-full.

[4]FactCheck.org stated that his policy statements on Iraq were actually consistent; see http://www.factcheck.org/bush_ad_twists_kerrys_words_on_iraq.html

[5]The hypothesis that politicians face a cost when deviating from their policy platforms

Flip-flopping is a source of concern and criticism also in the private labor market, especially for managers (see, for example, Anthony 1978). Recently, Google analyzed its own job interviews and the subsequent performances of hired managers to assess the good predictors of high performance. They concluded that "for leaders, it's important that people know you are consistent and fair in how you think about making decisions and that there's an element of predictability".[6] These examples suggest the existence of a cost that individuals, and in particular politicians, pay when they show incoherence in behavior. This cost seems at least partially independent from the reasons that induced individuals to be incoherent.

Motivated by the previous arguments, in this paper we develop a two-period electoral competition model with two politicians, who are both office and policy motivated. In the first period the incumbent implements a policy (say, public good), while the opponent makes a counterproposal. In the second period, both politicians announce a platform and voters elect one of them, who then implements a policy, trading-off her preferences for policy with the cost of deviating from her electoral promises. Indeed, at the end of the game, the politician in power pays an incoherence (flip-flopping) cost. This non-monetary cost measures the deviation of the second-period implemented policy from the history of policy proposals and is meant to capture all possible damages (wage loss in the private sector, social stigma, damage in the political career, etc.) that might hurt the politician in the future.[7]

has been successfully tested in laboratory experiments by Corazzini et al. (2014).

[6]See http://www.nytimes.com/2013/06/20/business/in-head-hunting-big-data-may-not-be-such-a-big-deal.html?pagewanted=1&_r=3&&pagewanted=all

[7]Our definition of coherence is reminiscent of Downs' (1957,105) notion of responsibility in politics: "a party is *responsible* if its policies in one period are consistent with its actions (or statements) in the preceding period".

From a political economy perspective, the incoherence cost acts as a commitment device for candidates who can (at least partially) commit to their future implemented policies through their platforms.

Moreover, we introduce a strategic device, say government debt, that can be used in the first period by a "right-wing" incumbent, who favors a low level of the public good, to move voters' preferred policy toward lower public good provision and reduce the opponent's commitment power. Specifically, if the incumbent issues debt in the first period that has to be repaid in the following period, all agents will prefer lower provision in the second period to avoid excessive taxation. Thus, the incumbent can use debt to effectively reduce the opponent's ability to commit to the new median voter's most preferred policy and increase her chances to be reelected. In other words, the incoherence cost can be exploited by the incumbent to make it difficult (or impossible) for the opponent to credibly update her proposal in response to the incumbent's strategic behavior.

Our model delivers several interesting results. First, in equilibrium, more radical "right-wing" politicians (whose bliss points are faraway from the median voter's) implement higher levels of government debt. Second, as deviations from first-period platforms become less relevant in the determination of the incoherence cost relative to those from second-period platforms, the level of debt implemented by the incumbent becomes larger, because the opponent is less anchored to her first-period (losing) proposal. Hence her commitment power is less sensitive to debt, which needs to increase to ensure the incumbent's victory. Third, the size of the incoherence cost affects the debt of moderate and radical politicians in opposite directions. In particular, if the incumbent is more moderate (radical) than her opponent, when the incoherence cost increases (decreases), the equilibrium debt decreases (increases).

Our theoretical framework can also symmetrically explain a politician's strategic use of surpluses. For example, a "left-wing" incumbent could seize privately owned assets, say oil wells, to finance social programs, knowing that voters are more willing to support social programs that are not financed through taxation.[8]

The remainder of the paper is organized as follows. Section (2) discusses our contribution in relation with the related literature. Section (3) develops the basic model, and Section (4) characterizes the equilibria. In Section (5) we introduce government debt, and in Section (6) we study the equilibria with debt. Section (7) concludes the paper.

2 Related literature

Alesina and Tabellini (1990) and Persson and Svensson (1989) are two seminal papers in the political economy literature on the strategic use of government debt. These studies predict that incumbent politicians use debt to constrain their successors' actions when they know that the opponents will take over the government. Clearly, these models cannot explain why politicians who increase debt get reelected.[9]

[8]The empirical work of Grembi et al. (2016) is consistent with our main predictions. They find that politicians facing a relaxed fiscal rule increase local public debt, and that the increase arises only for mayors who run for a second term and who "systematically underprovide the promised public good." Consistently with these findings, our model suggests that an increase in public debt is not necessarily linked to public good provision, but is rather instrumental to reducing the opponent's credibility to please the median voter.

[9]According to Caballero and Yared (2010), if the probability of being replaced is low and the economic volatility is high, the incumbent oversaves in the short run and overborrows in the long run.

Fiscal illusion theories (see Buchanan and Wagner 1977), where voters retrospectively reward the high spending of an incumbent, are consistent with incumbents using debt to get reelected. However these theories cannot explain cases in which debt is issued by an incumbent who is in favor of low spending.

Recently, Müller et al. (2016) proposed a game where right-wing governments are fiscally less responsible because their constituencies are less concerned with the viability of public good provision than the left-wing constituencies. Although they do not focus on the relationship between strategic government debt and the probability of reelection (which is exogenous), in their empirical analysis they show that Republican presidents issue more debt than Democrats. Pettersson-Lidbom (2001) finds that Swedish right-wing local governments accumulate debt when they face a high probability of electoral defeat, a finding consistent with both our theory and Persson and Svensson's hypothesis. Differently from these contributions, we develop a theory that rationalizes the reelection of right-wing incumbents who increase government debt by linking the use of debt to the ability to credibly commit through policy platforms.[10]

The use of electoral platforms as commitment devices has been traditionally included in formal electoral competition models by assuming that

[10]See also Davis and Ferrantino (1996), Katsimi (1999), Ventelou (2002), and Kroszner and Stratmann (2005). Alesina and Passalacqua (2016) provide a comprehensive survey of the political economy of government debt. Interestingly, Falcó-Gimeno and Jurado (2011) investigate how minorities strategically influence the level of debt of weak governments. Beetsma and Bovenberg (2003) show that European countries can strategically overaccumulate debt to induce the union's central bank to relax monetary policy. We do not consider common-pool incentives to accumulate debt, see Battaglini and Coate (2007) and Borge (2005).

candidates incur a cost for lying. Banks (1990) and Callander and Wilkie (2007)[11] assume that candidates have a fixed future implemented policy and set electoral platforms taking into account that they pay a cost that is a function of the distance between their future implemented policy and their electoral platforms. Candidates care about being elected and the cost of lying, and have no direct preference over policies. Since voters do not know the future policies of politicians, the latter can use electoral platforms as signals. We contribute to this literature in three ways. First, we endogenize the implemented policies, assuming that politicians have preferences over policies and pay a cost whenever implemented policies differ from policy platforms. Second, we introduce a dynamic feature by which incoherence cost is also a function of the previous term platforms. Third, we simplify the theoretical analysis by considering a game of complete information that delivers comparative statics similar to the ones investigated by Banks (1990) and Callander and Wilkie (2007).

3 The baseline model

The game is played in 2 periods: each period is denoted by time $t \in \{1, 2\}$. The economy is populated by citizens (voters) and two politicians: they all have a common time discount rate $\beta = 1$.

The set of voters is denoted by S. Voter $i \in S$ is born at the beginning of period 2 and lives for one period. The policy space is a set of points equidistant in $\mathbb{R}$, with distance $\epsilon > 0$, where ϵ is arbitrarily small.[12] Voters'

[11] See also Backus and Driffill (1985), Harrington Jr (1993), Persson and Tabellini (1999), Besley and Case (1995), Hummel (2010), and Agranov (2016). Andreottola (2016) provides a theory of flip-flopping driven by signaling concerns.

[12] As will become clear in the next Section, there are subgame equilibria in which players

preferences on the policy space are represented by the following loss function:

$$u^i(q_2) = -|q_2 - q^i|,$$

where $q_2 \in \mathbb{R}$ is the policy implemented by the elected politician at time 2 and q^i is the bliss point of voter i. We denote by q^M the bliss point of the median citizen M, as determined by the distribution of the citizens' bliss points on the policy space.

The two politicians, A and B, are born at time 1 and live for two periods. They have preferences over policies but are also office motivated.[13] Let A denote a "right-wing" candidate favoring a low provision of policy q, that is, $q^A \leq q^M$, and B denote a "left-wing" candidate favoring a high provision of policy q, that is, $q^B \geq q^M$. The politician in power receives an ego rent R. The per-period utility of politician $P \in \{A, B\}$ is:

$$u_t^P(q_t, R) = -|q_t - q^P| + x_t^P R,$$

where x_t^P takes value 1 if politician P is in power in period t, and 0 otherwise.

We assume that, at the beginning of the first period, politician A is in power. Thus, A is the first-period incumbent and B is the first-period opponent. In period 1, the incumbent A implements policy q_1. After observing A's policy, B proposes an alternative platform, p_1^B.[14] As it will become clear

would like to play actions that are infinitely close to a threshold. By considering a discrete policy space, players can play actions that are an ϵ far from the threshold. While parameter ϵ will be explicitly taken into account in the proofs, for the sake of simplicity we let $\epsilon = 0$ in the propositions.

[13]See Hillman (2013) and Hillman and Ursprung (2016) for an overview on political ego-rents.

[14]The model can easily be modified to have elections in the first period, in which case the alternative platform is the platform proposed by the candidate who lost the first period

shortly, while B's alternative platform cannot affect the policy implemented in period 1, it is nevertheless useful to build B's commitment to a given future policy.[15] We also assume that voters, although living only in period 2, have perfect information about policies implemented by A and proposed by B in period 1.

At the beginning of the second period, there is an election in which the winner is determined by majority voting. An indifferent voter has a one-half probability of voting for each candidate. Before the election, both candidates declare their policy platforms p_2^A and p_2^B. The elected politician P implements policy q_2.

At the end of the second period, the elected politician P pays an incoherence cost H representing the discounted value of all future losses related to the politician's flip-flopping while in power. This cost, which is subtracted from the politician's second-period utility, can be considered a wage loss in the private sector, a social stigma, or a damage in the future political career.[16] The overall utility of politician P is therefore given by:

$$-|q_1 - q^P| + x_1^P R - |q_2 - q^P| + x_2^P (R - H).$$

It is well known that incoherence costs play an important role in politicians' career. As Adams and Somer-Topcu (2009) has shown, past policy

election.

[15]This behavior of the opponent is reminiscent of shadow cabinets, a form of opposition widely present in advanced democracies that criticizes government policies and offers an alternative program.

[16]If we imagined a continuation game that started at the end of the second period, the players of this game (for instance, the voters of a future election to a different office or the politician's future employer) would simply consider the politician's incoherence at the end of the second period of our game and would evaluate it negatively when choosing their action.

proposals have a long-term effect on political reputation. Doherty et al. (2016) show that people consider flip-flopping from earlier policy positions less negative than flip-flopping from more recent positions. DeBacker (2015) shows that voters penalize the US senators who flip-flop, and that electoral penalties tend to increase with the size of the change.[17]

Based on this evidence, we formalize the incoherence cost H paid by the elected politician in period 2 as follows:

$$H = \frac{1}{k} f\left(\left|q_2 - p_{12}^P\right|\right),$$

where f is a strictly increasing, convex and twice differentiable function ($f(0) = 0, f'(0) = 0, \lim_{x\to\infty} f'(x) = \infty$), $k > 0$ parameterizes the scale of the incoherence cost in the politician's utility function, and $p_{12}^P := \frac{p_1^P + \alpha p_2^P}{1+\alpha}$ represents the "average" platform, where p_1^A is defined equal to q_1.

Note that, if the first-period incumbent is reelected in the second period, the incoherence cost is a function of the policy implemented in the first period, q_1. If the opponent is elected in the second period, the incoherence cost is a function of the alternative proposal made in the first period, p_1^B. The term in brackets represents the distance between the second-period policy and the weighted average of the two periods' platforms: the closer this distance, the lower is the cost the politician incurs in her subsequent career.[18]

Parameter α, which enters in the "average" platform, measures the memory bias associated to the second-period platform in the incoherence cost.

[17] Tomz and Van Houweling (2014) find similar empirical results and use them to propose a theory of political polarization. Tavits (2007) shows that the cost of policy shifts can be heterogeneous with respect to the policy domain.

[18] Our choice of specific functional form for H can capture a situation in which future employers or voters cannot access the details of past political processes and use the distance between the implemented policies and average proposals as a "rough" measure to evaluate politicians.

It is immediate to show that, if $\alpha = 0$, platform p_2 is irrelevant, because only p_1 affects the incoherence cost. In fact, we will show that the main insights of the game hold for $\alpha = 0$: we discuss in the equilibrium analysis how the presence of a second-period policy proposal can affect players' behavior. Note that if $\alpha \to \infty$ and $k = 0$, candidates pay an infinite cost for deviating from their second-period electoral platform; in this case, the second-period election subgame becomes a standard Hotelling–Downs model of electoral competition where candidates fully commit to their second-period policy platform. For the sake of simplicity, in what follows we will assume f to be a quadratic function, i.e. $f(\cdot) = \frac{1}{2}(\cdot)^2$, but all results would hold with a more general cost function.[19]

The timing of the game is as follows:

1. The first-period politician A implements policy q_1;
2. Opponent B declares an alternative proposal p_1^B;
3. At the beginning of period 2, the candidates declare their policy platforms p_2^A and p_2^B;
4. Election takes place;
5. The second-period elected politician P implements policy q_2;
6. The second-period politician pays the incoherence cost H.

We now introduce a few simplifying assumptions.

[19] An alternative measure of incoherence cost could be the weighted average distance of the implemented policy from each policy proposal: $\frac{1}{k} f(\frac{1}{1+\alpha}|q_2 - p_1^P| + \frac{\alpha}{1+\alpha}|q_2 - p_2^P|)$. This measure would replicate the cost function we adopted, when $q_2 - p_1^P$ and $q_2 - p_2^P$ have the same sign. Our preferred specification delivers qualitatively similar results, but is much more tractable.

- Assumption 1. We assume that $\frac{1}{2}k < R$, where $\frac{1}{2}k$ is the largest incoherence cost that a politician can pay in equilibrium. This condition eliminates the possibility for a politician to choose a policy platform with the sole purpose of losing the election and avoiding paying the incoherence cost.

- Assumption 2. We assume that if a politician is indifferent between actions that include the median voter's bliss point q^M, she implements q^M. This assumption prevents the multiplicity of (uninteresting) equilibria.

- Assumption 3. We assume that the bliss points of both candidates are sufficiently extreme: $|q^P - q^M| > k$. This condition makes it necessary for politicians to use platforms as commitment devices, at least for some range of parameter values.

- Assumption 4. Politician A, who is in favor of a low provision of policy q, can propose platforms only lower or equal to an upper bound υ, whereas B, who is in favor of a high provision of policy q, can propose platforms only larger or equal to a lower bound λ. We need υ and λ in the model with debt, as it will be clear in the related analysis. For simplicity, we consider $\upsilon = \lambda = q^M$, but different levels of υ and λ do not qualitatively affect the results.

4 Equilibrium

In this section, we characterize the pure-strategy subgame perfect Nash equilibrium (SPNE) of the model, using backward induction. The elected politician P at $t = 2$ implements a policy that maximizes her utility, which depends on her previous actions. Formally, we have:

$$q_2^P = \arg\max_{q_2 \in \mathbb{R}} -\left|q_2 - q^P\right| - \frac{1}{2k}\left(q_2 - p_{12}^P\right)^2.$$

The following proposition characterizes the policy implemented in the second period:

Proposition 1 (The second-period policy) *The policy implemented in the second period by politician P is*

$$\begin{cases} q_2^P = q^P, & \text{if } |q^P - p_{12}^P| \leq k, \\ q_2^P = p_{12}^P - k, & \text{if } q^P < p_{12}^P - k, \\ q_2^P = p_{12}^P + k, & \text{if } q^P > p_{12}^P + k. \end{cases}$$

The proof is given in the appendix.

In equilibrium, politician P trades off her policy preferences with the cost of deviating from her average platform. If her average platform is sufficiently close to her bliss point q^P, then the politician implements her bliss point. If, however, the distance $|p_{12}^P - q^P|$ is larger than k, she implements a k-deviation from her average platform in the direction of her bliss point.[20] Therefore, the average platform creates a *partial* commitment for the elected politician, who can only deviate from it to some degree.

Given that the voters' preferences are single peaked, the median voter's most preferred candidate wins the second-period elections. Therefore, we can immediately conclude that the candidate whose implemented policy is closer to the median voter's bliss point q^M wins the second-period election.

[20] With a more general incoherence cost f, the politician would implement a deviation of $(f')^{-1}(k)$ from her average platform in the direction of her bliss point, where f' is the first derivative of f.

Hereafter, we skip the details of the subgame perfection analysis, and we describe the unique perfect Bayesian equilibrium.[21] The electoral competition between the two candidates and the presence of electoral platforms as commitment devices discipline the incumbent in the first period. Indeed, the opponent best responds to the incumbent by proposing policies sufficiently moderate to win the election in the second period. The incumbent therefore has two choices: either she implements the median voter's bliss point in the first period, proposes the same policy as electoral platform in the second period and is reelected with positive probability, or she loses the second period election. In this case the opponent wins the election by proposing a platform which lets her implement the closest policy to her bliss point, among the ones that beat the incumbent's policy. We can thus write:

Proposition 2 (The first-period policy) *If A's preferred policy is sufficiently extreme,*

$$q^A < \omega := \max\left\{2q^M - q^B - \frac{1}{2}\left(R - \frac{1}{2}k\right), q^M - \frac{1+\alpha}{2\alpha}\left(R + \frac{3}{2}k\right)\right\},$$

she implements her bliss point in the first period, that is, $q_1 = q^A$*, and loses the second-period election. Otherwise, she implements* $q_1 = q^M$ *and is reelected with probability* $\frac{1}{2}$*.*

The proof is given in the appendix.

For an intuition of the last result, note that a radical incumbent suffers a large disutility by committing to the median voter's preferred policy. Thus, she deliberately chooses to lose the elections and maximizes her current utility by implementing her bliss point.[22]

[21] See Propositions (A1), (A2) and (A3) in the Appendix.

[22] Banks (1990) and Callander and Wilkie (2007) reach qualitatively similar results where candidates with extreme preferred policies announce their ideal policy because it is too costly for them to commit to moderate policies.

We conclude this section by commenting on some comparative statics results. Given the expression for ω in Proposition (2), we can easily conclude that when the office rent R increases, the threshold ω decreases and the incumbent is less likely to implement her bliss point because reelection is more valuable. An increase in k has an ambiguous effect on ω. On the one hand, it increases the incoherence cost, thereby decreasing the incentive to win the elections. On the other hand, it increases the distance of opponent's implemented policy from q^A, increasing the incumbent's incentive to avoid losing the elections.

5 Government debt as a strategic variable

In this section, we extend the model by enabling the first-period incumbent politician to strategically use a variable that moves the second-period bliss points of all agents in a given direction. By means of this variable the incumbent can shift the median bliss point away from the first-period platform of the opponent, undermining the effectiveness of the opponent's electoral platform as a commitment device.

Our running example for this strategic variable is government debt, that we chose for its relevance in public debate and in the political economy literature. However, our model is general enough to be suitable to analyze other strategic tools that could affect voters' indirect utility. For instance, if voters considered the environment a salient issue, a "brown" incumbent can influence them through the release of biased information, undermining the negative effects of carbon-driven technology on climate change, and shifting the preferences of the electorate toward a lower level of climate protection policy.

In this extension of the game, the incumbent chooses debt at the end of the first period. Thus, it is irrelevant whether debt increases the utility of voters and politicians in the first period, because voters are rational and consider only their second-period utility when making their choice. It is instead crucial that debt influences the bliss points of all players in the second period.

Consistently with the loss function in the previous section, we assume that for each citizen $i \in S$ and for the two candidates A and B, the bliss point $q^i(b)$ in the second period depends on $b \in \mathbb{R}$ as follows: $q^i(b) = q^i - b$. A larger debt moves the preferred policy of each player toward a lower provision of q. This assumption is rather intuitive. Consider a voting model à la Meltzer and Richard (1981) where citizens vote over redistribution. If part of the redistributive taxation has to be used to pay the past stock of debt, all voters preferred level of taxation will be lower.[23] Notice that, by issuing debt, the incumbent does not affect the distance between the median voter's preferred policy and the two candidates' bliss points. Therefore, debt is not advantageous to the incumbent directly but, as we will show below, insofar as it affects the degree of commitment induced by policy platforms.[24]

[23] See Example A1 in the Appendix.

[24] We assume that the policy space is not bounded (below), to avoid the mechanic reelection of the incumbent. Otherwise, we could construct a simple model where a "right-wing" incumbent can create enough debt to shift the politicians and voters' preferences toward a low (future) policy, so that the incumbent's bliss point becomes the lower bound of the policy space and the median voter's preferred policy becomes mechanically closer to the incumbent's preferred policy. In this case, the incumbent would be reelected. This outcome implies that a large fraction of the electorate favors the lower bound of the policy space, a situation rarely observed in reality. A similar mechanism has been investigated by Hodler (2011), who assumes that the level of spending can take only two values, high and low.

Therefore citizen $i \in S$ has the following second-period utility:

$$u^i(q_2) = -|q_2 - q^i(b)|.$$

Similarly, the overall utility of politician P is

$$-|q_1 - q^P| + x_1^P R - |q_2 - q^P(b)| + x_2^P (R - H).$$

The timing of the new game is as follows:

1. Incumbent A implements policy q_1;

2. Opponent B makes an alternative proposal p_1^B;

3. The incumbent chooses b;

4. At the beginning of period 2, all bliss points move such that $q^i(b) = q^i - b$;

5. Platforms are announced, and elections and policy implementation take place as in the baseline model.

Finally, we assume that if a politician is indifferent between different levels of debt, she implements the lowest one.

There are at least two features of the model with debt that are worth discussing.

First, the game lasts only two periods. This assumption greatly simplifies the equilibrium analysis. However, as long as the government could not default on the outstanding debt, the results presented in the following section would hold with a longer but finite time horizon or even with an infinite time horizon, as long as debt could not be rolled over completely to the next period.

Second, we consider rational voters, who do not vote retrospectively: voters do not punish incumbents for their past behavior, that is, for issuing debt. Indeed, the objective of this work is to show the incentives of incumbents to use debt strategically, taking advantage of incoherence costs associated to policy flip-flopping. If issuing debt in period 1 implied a political cost for the incumbent, that goes beyond its effect on the second period equilibrium policy, the incumbent would obviously be less willing to use debt strategically.

6 Equilibrium with strategic debt

As shown in the previous section, the incumbent politician A either ties with B if she is moderate ($q^A \geq \omega$), or loses the second-period election if she is radical ($q^A < \omega$). Thus, in what follows, we study an incumbent politician's incentive to implement debt in order to win elections in the second period. We already know the equilibrium behavior of A when $b = 0$; here we will characterize her equilibrium behavior when she implements debt b to win the second-period election. We then compare her utility in the two cases, to determine the pure-strategy subgame perfect Nash equilibrium of the game. As usual, we solve the game via backward induction.

The solutions for the implemented policy $q_2^P(b)$ as a function of p_1^P, p_2^P are the same as in Proposition (1), except that now the bliss point $q^P(b)$ is a function of b:

$$q_2^A = \begin{cases} p_{12}^A + k, & \text{if } q^A - b > p_{12}^A + k, \\ q^A - b, & \text{if } \left|q^A - b - p_{12}^A\right| \leq k, \\ p_{12}^A - k, & \text{if } q^A - b < p_{12}^A - k. \end{cases}$$

When the median voter chooses between A and B, she compares the policy implemented by the two candidates, in case they were elected. Given that we focus on the case in which the incumbent implements a positive debt to win the election, the opponent's second-period platform is $p_2^B = q^M(b)$.[25] Hence B's equilibrium implemented policy, in case she were elected, is

$$q_2^B = \begin{cases} \frac{p_1^B+\alpha(q^M-b)}{1+\alpha} + k, & \text{if } q^B - b > \frac{p_1^B+\alpha(q^M-b)}{1+\alpha} + k, \\ q^B - b, & \text{if } \left| q^B - b - \frac{p_1^B+\alpha(q^M-b)}{1+\alpha} \right| \leq k, \\ \frac{p_1^B+\alpha(q^M-b)}{1+\alpha} - k, & \text{if } q^B - b < \frac{p_1^B+\alpha(q^M-b)}{1+\alpha} - k. \end{cases} \tag{1}$$

The policy q_2^B is a decreasing function of debt. If $|q^B - b - \frac{q_1+\alpha(q^M-b)}{1+\alpha}| > k$, q_2^B moves to the left by $\frac{\alpha}{1+\alpha}$ for a unitary increase of debt. This is because the opponent is anchored to the first-period electoral platform p_1^B. This anchor creates a wedge between the new median voter's bliss point, which moves to the left by 1 for a unitary increase in debt, and the policy implemented by B. This wedge is what enables the incumbent to win the second-period election.[26]

For a given level of debt, in the second period incumbent A chooses platform p_2^A such that the policy she will implement is as close as possible to her new bliss point, conditional on keeping the median voter quasi-indifferent between the two candidates. The implemented policy q_2^A makes the median voter indifferent if it satisfies

$$q^M - b = \frac{q_2^A + q_2^B}{2}. \tag{2}$$

Clearly, if A chooses a platform which lets her implements a policy q_2^A which is an ϵ higher than the one that solves equation (2) she wins the second-period

[25] This is her equilibrium platform when she loses.

[26] Here, Assumption 4 is crucial for an equilibrium to exist. Indeed, if p_2^B ranges in $\mathbb{R}$, B can always implement a value of p_2^B that would erase the effect of p_1^B on the implemented policy q_2^B, and strategic debt would not help incumbent A. If, however, p_2^B has a lower bound, the "anchor effect" of p_1^B is still present and A can win using debt.

elections.[27]

Next, we show the optimal level of debt implemented by the incumbent politician in the first period, still assuming that the incumbent uses debt to win the election. The incumbent solves the following problem:

$$\max_{b\in\mathbb{R}} \begin{cases} -(p_{12}^A - k - q^A +) - \frac{1}{2}k, & \text{if } p_{12}^A - k > q^A - b; \\ -(q^A - b - q^A + b), & \text{if } p_{12}^A = q^A - b, \end{cases} \tag{3}$$

where the incumbent's platform p_2^A is implicitly determined by equation (2). The incoherence cost is equal to $\frac{1}{2}k$ when the incumbent implements a k-deviation from her average platform; it is equal to 0 when A in the second period implements her average platform.[28]

By issuing debt, the incumbent exploits the wedge between the new median voter's bliss point and the opponent's implemented policy, to propose a platform p_2^A that is closer to her new bliss point. Debt and policy platform p_2^A are strategic substitutes: a higher level of debt reduces the need to commit to a moderate policy through the electoral platform in period 2 in order to win the second-period election. The incumbent selects a level of debt such that she wins the second-period election by proposing a policy platform, p_2^A, that lets her implement her new bliss point without paying any incoherence cost: $p_{12}^A = q_2 = q^A - b$. By substituting this average platform in equation (2), we obtain an implicit solution for the equilibrium level of debt b^* as a function of p_1^B:

$$2(q^M - b^*) = q^A - b^* + q_2^B,$$

[27] We consider $\epsilon \to 0$ in the remaining analysis.

[28] We do not specify p_{12}^A for the case $p_{12}^A + k < q^A - b$ because, under no circumstance, the incumbent implements q_1 such that her second-period implemented policy $p_{12}^A + k$ is farther from q^M than $q^B(b)$.

where q_2^B depends on debt b^* as shown in equation (1).

Before the implementation of debt, the opponent chooses the alternative proposal p_1^B. Given that, for any p_1^B, the incumbent implements debt b^* so as to ensure her election in period 2, the opponent is indifferent between all alternative proposals. Thus, by Assumption 2, she proposes the median voter's bliss point: $p_1^B = q^M$. The incumbent in the first period implements policy q_1 in order to maximize $-|q_1 - q^A| - |q^A - b^* - q^A + b^*|$. Therefore, the incumbent implements her bliss point: $q_1 = q^A$.

Now, we can solve the incumbent's choice to issue debt or rather avoid its use and behave as in the previous section. Consider first the case of a radical incumbent ($q^A < \omega$). It can be easily verified that, when she implements debt b^* and wins the second-period election, she reaches a strictly higher level of utility than when she sets $b = 0$ and loses the second-period election. This is so because, in both situations, she implements her bliss point in the first period, but in the former case she also enjoys the second-period rent R and her new bliss point $q_2^A = q^A - b^*$.

Consider now a moderate incumbent ($q^A \geq \omega$) who can either implement the median voter's bliss point and tie in the second-period election, or implement her bliss point in the first term, set debt b^*, and win the second-period election. Clearly, she chooses the latter option because it gives her a larger utility from policy in both periods and she enjoys rent R with probability 1.

Thus, we can conclude that the incumbent will certainly set a positive debt. As for the equilibrium level of debt, we can prove the following result.

Proposition 3 (Equilibrium debt) *In equilibrium, the incumbent issues a positive debt $b^* > 0$, that shifts the median voter away from the first-period platform of the opponent, and gets reelected. The equilibrium debt is given* *by:*

$$b^* = \begin{cases} (1+\alpha)\left(q^M - q^A - k\right), & \textit{if } q^A > 2q^M - q^B, \\ (1+\alpha)\left(q^M - q^A + k\right), & \textit{if } q^A \leq 2q^M - q^B. \end{cases}$$

The proof is given in the appendix.

The next proposition summarizes the comparative statics, which follow directly from the expression of the equilibrium level of debt b^* in Proposition (3).

Proposition 4 (Comparative statics) *The following holds:*

i. The more radical the incumbent, the larger is debt;

ii. The larger the memory bias α given to the second period platform p_2^P in the incoherence cost, the larger is debt;

iii. The level of debt decreases (increases) with k if the incumbent is more moderate (radical) than her opponent.

The intuition for the last three results is as follows. A more radical incumbent, i.e. a politician with a lower q^A, sets a larger debt because she implements her bliss point in the first period and needs to move the median voter's bliss point farther away from the opponent's first-period moderate proposal and closer to her own first-period policy.

Moreover, the larger the memory bias associated to the second-period electoral platform α, the larger is debt. Indeed, for $\alpha = 0$, the opponent cannot adapt her proposal after the incumbent has issued debt. Therefore the incumbent can win with relatively low debt. If α increases, the opponent is less anchored to her first-period (losing) moderate proposal, and there is need of more debt for the incumbent to be reelected. If α goes to infinity, only the second-period platform matters for the second-period implemented policy. In this case, b goes to infinity because no finite level of debt allows the incumbent to win. This case nests the Hotelling–Downs model of electoral competition, which is characterized by $\alpha \to \infty$ and $k = 0$. Thus, standard electoral competition models with full commitment cannot deliver the main result of this paper.

Finally, consider figure 1 below. If the incumbent is more moderate than her opponent, i.e. $q^A > 2q^M - q^B$, the former needs a low debt to be reelected. Thus, all the bliss points move to the left by a small amount, b. The policy implemented by B is $p_{12}^B + k$, because the new bliss point of the opponent will still be on the right of $p_{12}^B + k$. Clearly, a rise in k increases the distance between the median voter's bliss point and the opponent's implemented policy, because $p_{12}^B + k$ increases: B becomes less attractive to the median voter. Therefore, the incumbent can implement a lower debt to win the election. If, however, the incumbent is more radical than her opponent (see figure 2), she has to implement a large debt to win the election. Thus, all bliss points move to the left by a large amount, b. At the same time, the "anchor" effect of p_1^B on p_{12}^B moves p_{12}^B to the left only by $\frac{\alpha}{1+\alpha}b < b$. For a sufficiently large debt, the opponent's new bliss point moves to the left of $p_{12}^B - k$, which becomes the policy implemented by B. If k increases, B's implemented policy gets closer to the median voter's bliss point, because $p_{12}^B - k$ decreases: B becomes more attractive to the median voter. Thus, the incumbent must choose a larger b to win the election.

Figure 1: Equilibrium with debt, where A is more moderate than B. A wins by implementing $q^A - b$ in the second term. If elected, B would implement $p_{12}^B + k$. Policy $q^A - b$ is an ϵ closer to $q^M - b$ than $p_{12}^B + k$.

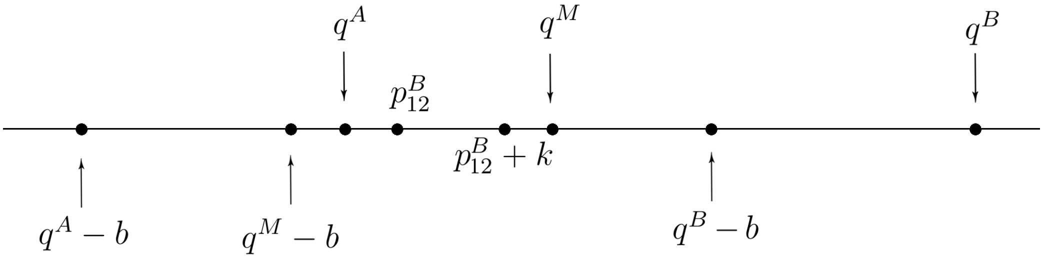
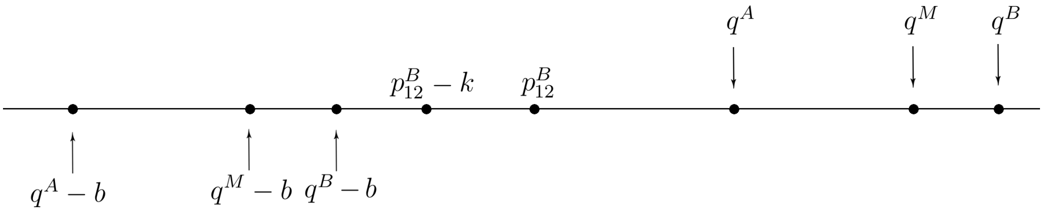


Figure 2: Equilibrium with debt, where A is less moderate than B. A wins by implementing $q^A - b$ in the second term. If elected, B would implement $p_{12}^B - k$. Policy $q^A - b$ is an ϵ closer to $q^M - b$ than $p_{12}^B - k$.



Comparative statics point to a subtle aspect of how debt affects the opponent's behavior. If the opponent is radical and the incumbent issues debt, the former loses because she needs to commit to the new median's bliss point, but her average platform is anchored to the "old" median. In this case, the average platform is still a commitment device, because B commits to a policy that is more moderate than her bliss point but weaker ($p_{12}^B > q^M(b)$) than when there is no debt ($p_{12}^B = q^M$). Debt has a "low commitment" effect on the opponent.

If the opponent is moderate and the incumbent issues debt, the opponent loses because her average platform, which is anchored to the old median, is farther from the new median's preferred policy than her bliss point. The average platform creates a commitment to a policy that is less attractive to the median than her bliss point q^B. In this case, debt has a "commitment to a losing policy" effect on the opponent.

Among the comparative statics analyzed in Proposition (4), the relationship between the extremism of incumbents and the use of strategic debt can be linked to the motivating examples in the introduction. In particular, the present model suggests that the increase in government debt during the first term of US President Reagan can be related to the conservative approach of Reagan on economic policy, as a larger deficit was needed to move voters towards very conservative positions. Moreover, the same comparative statics can be used to relate the growing political polarization observed since the 1970s in major Western democracies (Baldassarri and Gelman (2008)) and the simultaneous increase in the stock of government debt (Alesina and Passalacqua (2016)).

7 Concluding remarks

This paper analyzes an incumbent politician's incentive to strategically use debt and reduce the opponent's credibility to implement moderate policies when politicians pay an incoherence cost for deviations of implemented policy from past platforms. If a larger stock of debt moves voters' most preferred policy toward a lower public good provision, the opponent who has always promised higher public good provision will not be able to commit to the new median voter's bliss point, because she is anchored to her old policy platform.

As the opponent's commitment is reduced, debt secures the reelection of a right-wing incumbent who prefers a lower provision of public good.

Our analysis can contribute to the debate on optimal fiscal rules (see Liansheng 2010, Collignon 2012 and Halac and Yared 2014). While, in principle, flexibility in the use of government debt can increase citizens' welfare when debt acts as a countercyclical policy, governments are well known to have perverse incentives that create deficits and lead to excessive debt. This paper adds to the political economy of government debt by suggesting another reason for the desirability to limit government's discretion in the creation of deficits.

Although we focused on government debt, we believe that our theoretical framework can be applied to other tools that an incumbent politician can exploit to decrease the commitment ability of her opponent. For instance, the incumbent can influence citizen preferences through the strategic manipulation of information on the consequences of specific policy interventions. At the same time, citizens may decide not to trust politicians. Exploring an asymmetric information game in this context is an interesting direction for future work.

Appendix

Proof of Proposition (1)

The first-order condition of the maximization problem is

$$1 - \frac{1}{k}(q_2 - p_{12}^P) = 0, \text{if } q_2 < q^P, \tag{4}$$

$$-1 - \frac{1}{k}(q_2 - p_{12}^P) = 0, \text{if } q_2 \geq q^P. \tag{5}$$

The second period utility function of the ruling politician is concave, because the second derivative is $-1/k < 0$. The solution is therefore

$$q_2^P = p_{12}^P + k, \text{if } p_{12}^P + k < q^P,$$
$$q_2^P = p_{12}^P - k, \text{if } p_{12}^P - k \geq q^P.$$

When both the following conditions are satisfied, $p_{12}^P + k \geq q^P$, $p_{12}^P - k < q^P$, the lhs of the first-order condition (4) is positive for $q_2 < q^P$. Indeed, $1 - \frac{1}{k}(q_2 - p_{12}^P) > 0$ implies that $q_2 < p_{12}^P + k$, which is satisfied, because $q_2 < q^P < p_{12}^P + k$. Similarly, the lhs of the first-order condition (5) is negative for $q_2 \geq q^P$. Hence, the maximum is in $q_2^P = q^P$.

$\square$

Proposition A1 (The winner of the election) *Given implemented policy q_1 and the opponent's platform p_1^B, the winner of the second-period election is the candidate preferred by the median voter if both candidates proposed the median voter's bliss point q^M in $t = 2$. If both candidates propose q^M but the median voter is indifferent between them, each candidate is elected with probability $\frac{1}{2}$.*

Proof of Proposition (A1)

We first prove that it is beneficial for both candidates to propose policies in order to win an election. If candidate P loses the second-period election, she receives utility $-|q^P - q_2^{-P}|$. If she wins the election, she receives $-|q^P - q_2^P| + R - H$. We argue that the largest value of H is $\frac{1}{2}k$. By Assumption 1, R is larger than $\frac{1}{2}k$, and therefore $-|q^P - q_2^P| + R - H > -|q^P - q_2^{-P}|$. Similarly, if candidates can choose between losing and tying, they would rather choose to tie: $\frac{1}{2}\left[-|q^P - q_2^P| + R - H\right] - \frac{1}{2}|q^P - q_2^{-P}| > -|q^P - q_2^{-P}|$.

Second, we identify the candidate who wins the second-period election. The distance between q^M and the equilibrium policy q_2^P stated in Proposition (1) weakly decreases as p_2^P becomes closer to q^M. Therefore, by proposing $p_2^P = q^M$, candidate P maximizes $-|q^M - q_2^P|$. Now, consider the case in which the median voter strictly prefers candidate P when both candidates propose q^M. We prove that there does not exist any equilibrium in which the two candidates propose policies p_2^A, p_2^B such that candidate P is not elected. Candidate P can deviate by proposing q^M and be elected. Indeed, by proposing q^M, P increases the utility of the median voter $-|q^M - q_2^P|$ that becomes larger than the utility $-|q^M - q_2^{-P}|$. Moreover, as shown in the beginning of this proof, P increases her utility by deviating and winning. Therefore, in any voting equilibrium, we find that candidate P has to be elected. However, if the median voter is indifferent between the two candidates when they both propose q^M, then each candidate is elected with a probability $\frac{1}{2}$ and no candidate has an incentive to deviate.

□

Proposition A2 (The second-period platforms) *In the second period, depending on the median voter behavior in a hypothetical election where both candidates propose q^M, there are two possible cases:*

(i) If the median voter would be indifferent, both candidates propose the median voter's bliss point.

(ii) Otherwise, the losing candidate proposes the median voter's bliss point. The winning candidate P proposes p_2^P that minimizes the distance $|q^P - p_{12}^P|$ with p_2^P in the set of platforms such that $|q^M - q_2^P| < |q^M - q_2^{-P}|$.

Proof of Proposition (A2)

The first case has already been explained in the proof of Proposition (A1).

Let us now consider the second case. The loser is indifferent between any proposal because she is not elected, and thus does not influence the implemented policy. Therefore, by assumption, she implements q^M. The winner chooses p_2^P to minimize the distance $|q^P - p_{12}^P|$ conditional on winning, because she receives a larger utility from policy and reduces the incoherence cost. From this, the implication is that if politician P can win by implementing her bliss point q^P, she proposes electoral platform p_2^P such that $p_{12}^P = q^P$. Thus, politician P does not propose electoral platform $|p_{12}^P - q^P| < k$ and $p_{12}^P \neq q^P$, because she implements $q_2^P = q^P$ but pays a positive incoherence cost.

$\square$

Proposition A3 (The first-period opponent's platform) *If $q_1 = q^M$, B chooses $p_1^B = q^M$ and ties against A in the election. If $q_1 < q^M$, B wins against A, choosing p_1^B such that $q_2^B = q^B$ if $q^B < 2q^M - \max\left\{q^A, \frac{q_1+\alpha q^M}{1+\alpha} - k\right\}$, or $q_2^B = 2q^M - \max\{q^A, \frac{q_1+\alpha q^M}{1+\alpha} - k\}$ if $q^B > 2q^M - \max\left\{q^A, \frac{q_1+\alpha q^M}{1+\alpha} - k\right\}$.*

Proof of Proposition (A3)

If $q_1 = q^M$ and $p_1^B = q^M$, both candidates propose electoral platforms $p_2^A = p_2^B = q^M$ in the second period and they tie. B has no incentive to deviate by implementing $p_1^B > q^M$ because, by Proposition (A1), she would lose the election: $q^M - k > 2q^M - \frac{p_1^B+\alpha q^M}{1+\alpha} - k$. Let us now consider the case of $q_1 < q^M$. In this situation, B wins the election because p_1^B and p_2^B exist such that the median voter is better off by voting for B; for example, $p_1^B = p_2^B = q^M$. Given that A is a sure loser, she implements $p_2^A = q^M$.

If $q^A < \frac{q_1+\alpha q^M}{1+\alpha} - k$, A implements $\frac{q_1+\alpha q^M}{1+\alpha} - k$, if elected. In order to win, B has to implement a policy lower than $2q^M - \frac{q_1+\alpha q^M}{1+\alpha} + k$. If $q^B < 2q^M - \frac{q_1+\alpha q^M}{1+\alpha} + k$, she makes an alternative proposal in the first period such that her average platform is equal to her bliss point, $p_{12}^B = q^B$, ensuring her victory. If instead $q^B \geq 2q^M - \frac{q_1+\alpha q^M}{1+\alpha} + k$, she makes an alternative proposal in the first period such that she wins in the second period: $p_{12}^B + k = 2q^M - \frac{q_1+\alpha q^M}{1+\alpha} + k - \epsilon$. This average platform exists because $q_1 < q^M$.

When $q^A \geq \frac{q_1+\alpha q^M}{1+\alpha} - k$, A implements q^A if elected. In order to win, B has to implement a policy lower than $2q^M - q^A$. If $q^B < 2q^M - q^A$, she makes an alternative proposal in the first period such that her average platform is equal to her bliss point, $p_{12}^B = q^B$, ensuring her victory. If instead $q^B \geq 2q^M - q^A$, she makes an alternative proposal in the first period such that she wins in the second period: $p_{12}^B + k = 2q^M - q^A - \epsilon$. In the statement of Proposition (A3), we consider $\epsilon \to 0$.

$\square$

Proof of Proposition (2)

If A loses, her utility is as follows:

$$-0 - \left(q_2^B - q^A\right) + R,$$

where q_2^B is determined by Proposition (A3) and q_1 is substituted with q^A. From Proposition (A3), B either wins or ties against A in equilibrium. If A does not lose, the best she can do is to implement q_1 and tie against B: $q_1 = q^M$. If A ties against B, her utility is as follows:

$$-(q^M - q^A) - \frac{1}{2}\left(q^M - k - q^A - R + \frac{1}{2}k\right) - \frac{1}{2}\left(q^M + k - q^A\right) + R.$$

Let us now define the following four expressions:

$$
\begin{aligned}
x :=& q^M - \frac{1+\alpha}{\alpha}k,\\
y :=& (2+\alpha)q^M - (1+\alpha)(q^B - k),\\
z :=& 2q^M - q^B - \frac{1}{2}\left(R - \frac{1}{2}k\right),\\
u :=& q^M - \frac{1+\alpha}{2\alpha}\left(R + \frac{3}{2}k\right).
\end{aligned}
$$

We consider the utility of A in case she chooses to lose the election. If A loses, she implements her bliss point: $q_1 = q^A$. Therefore, by Proposition (A3), if $q^A < \frac{q^A+\alpha q^M}{1+\alpha} - k$ and $q^B < 2q^M - \frac{q^A+\alpha q^M}{1+\alpha} + k$, B implements q^B. Furthermore, A chooses to lose if

$$-2q^M + 2q^A - \frac{1}{4}k + \frac{1}{2}R < -q^B + q^A.$$

The previous three inequalities can be simplified as follows:

$$
\begin{cases}
q^A < x,\\
q^A < y,\\
q^A < z.
\end{cases}
\tag{6}
$$

If $q^A < \frac{q^A+\alpha q^M}{1+\alpha} - k$ and $q^B \geq 2q^M - \frac{q^A+\alpha q^M}{1+\alpha} + k$, B implements $2q^M - \frac{q^A+\alpha q^M}{1+\alpha} + k - \epsilon$. A chooses to lose if

$$-2q^M + 2q^A - \frac{1}{4}k + \frac{1}{2}R < -2q^M + \frac{q^A + \alpha q^M}{1+\alpha} - k + \epsilon + q^A.$$

The previous three inequalities can be simplified as follows:

$$
\begin{cases}
q^A < q^M - \frac{1+\alpha}{\alpha}k,\\
q^A \geq (2+\alpha)q^M - (1+\alpha)(q^B - k),\\
q^A < q^M - \frac{1+\alpha}{2\alpha}\left(R + \frac{3}{2}k - 2\epsilon\right).
\end{cases}
$$

The first inequality is implied by the third inequality ($u < x$) because $\epsilon \to 0$ and $R - \frac{1}{2}k > 0$. Indeed, the following holds: $q^M - \frac{1+\alpha}{2\alpha}\left(R + \frac{3}{2}k - 2\epsilon\right) < q^M - \frac{1+\alpha}{2\alpha}\left(R + \frac{3}{2}k - 2\epsilon\right) + \frac{1+\alpha}{2\alpha}\left(R - \frac{1}{2}k\right) = q^M - \frac{1+\alpha}{\alpha}(k - 2\epsilon)$. Thus, the system reduces to the following:

$$\begin{cases} q^A \geq y, \\ q^A < u. \end{cases} \tag{7}$$

If $q^A \geq \frac{q^A + \alpha q^M}{1+\alpha} - k$ and $q^B < 2q^M - q^A$, B implements q^B. In this situation, A chooses to lose if the following holds:

$$\begin{cases} q^A \geq q^M - \frac{1+\alpha}{\alpha}k, \\ q^A < 2q^M - q^B, \\ q^A < 2q^M - q^B - \frac{1}{2}\left(R - \frac{1}{2}k\right). \end{cases}$$

Because the second inequality is implied by the third inequality, the system reduces to the following:

$$\begin{cases} q^A \geq x, \\ q^A < z. \end{cases} \tag{8}$$

If $q^A \geq \frac{q^A + \alpha q^M}{1+\alpha} - k$ and $q^B \geq 2q^M - q^A$, B implements $2q^M - q^A - \epsilon$. In this situation, A chooses to lose if

$$-2q^M + 2q^A - \frac{1}{4}k + \frac{1}{2}R < -2q^M + q^A + \epsilon + q^A,$$

which implies that

$$\frac{1}{2}\left(R - \frac{1}{2}k\right) < \epsilon.$$

The last inequality is not satisfied if $\epsilon \to 0$. Thus, if $q^A \geq q^M - \frac{1+\alpha}{\alpha}k$ and $q^A \geq 2q^M - q^B$, A ties in the election.

To complete the proof, we use the following lemma:

Lemma A1 *The following holds:*

1. $y \leq u \Leftrightarrow z \leq u \Leftrightarrow y \leq z$;

2. $y \leq x \leq z$ *is not satisfied.*

Let us prove the first point: $y \leq u \Leftrightarrow (2+\alpha)q^M - (1+\alpha)(q^B - k) \leq q^M - \frac{1+\alpha}{2\alpha}\left(R + \frac{3}{2}k\right) \Leftrightarrow \alpha(q^M - q^B) + (\frac{3}{4} + \alpha)k + \frac{1}{2}R \leq 0, z \leq u \Leftrightarrow 2q^M - q^B - \frac{1}{2}\left(R - \frac{1}{2}k\right) \leq q^M - \frac{1+\alpha}{2\alpha}\left(R + \frac{3}{2}k\right) \Leftrightarrow \alpha(q^M - q^B) + (\frac{3}{4} + \alpha)k + \frac{1}{2}R \leq 0, y \leq z \Leftrightarrow (2+\alpha)q^M - (1+\alpha)(q^B - k) \leq 2q^M - q^B - \frac{1}{2}\left(R - \frac{1}{2}k\right) \Leftrightarrow \alpha(q^M - q^B) + (\frac{3}{4} + \alpha)k + \frac{1}{2}R \leq 0$.

We next prove that $y \leq x \leq z$ is not satisfied: $y \leq x \Leftrightarrow (2+\alpha)q^M - (1+\alpha)(q^B - k) \leq q^M - \frac{1+\alpha}{\alpha}k \Leftrightarrow q^B > q^M + \frac{1+\alpha}{\alpha}k, x \leq z \Leftrightarrow q^M - \frac{1+\alpha}{\alpha}k \leq 2q^M - q^B - \frac{1}{2}\left(R - \frac{1}{2}k\right) \Leftrightarrow q^B \leq q^M + \frac{1+\alpha}{\alpha}k - \frac{1}{2}(R - \frac{1}{2}k)$. Given that $q^M + \frac{1+\alpha}{\alpha}k > q^M + \frac{1+\alpha}{\alpha}k - \frac{1}{2}(R - \frac{1}{2}k)$, the two inequalities cannot be satisfied at the same time.

Finally, if $z \leq x$ and $y \leq z$, it implies that $z \leq u$ and $y \leq u$. System (6) reduces to $q^A < y$, system (7) reduces to $y \leq q^A < u$, and system (8) is not satisfied. Therefore, A chooses to lose the election if $q^A < u$. If $z \leq x$ and $y > z$, it implies that $z > u$ and $y > u$. System (6) reduces to $q^A < z$, and systems (7) and (8) are not satisfied. Therefore, A chooses to lose the election if $q^A < z$. If $z > x$, it implies that $y > x$. If further $y \leq z$, it implies that $z \leq u$ and $y \leq u$. System (6) reduces to $q^A < x$, system (7) reduces to $y \leq q^A < u$, and system (8) reduces to $x \leq q^A < z$. Therefore, A chooses to lose the election if $q^A < u$. If $z > x$, it implies that $y > x$. If further $y > z$, it implies that $z > u$ and $y > u$. System (6) reduces to $q^A < x$, system (7) is not satisfied, and system (8) reduces to $x \leq q^A < z$. Therefore, A chooses to lose the election if $q^A < z$. Moreover, in all cases, the following holds: $q^A < \max\{z, u\}$.

$\square$

Proof of Proposition (3)

We first prove that problem (3) leads to solution b^*, and then provide an explicit formula for b^*. We find maximizers in two cases: $p_{12}^A = q^A - b$ and $p_{12}^A - k \geq q^A - b$, and then compare the two utilities to find the maximizer that solves problem (3). If $p_{12}^A = q^A - b$, A simply implements b^* that solves equation $2(q^M - b^*) = q^A - b^* + q_2^B$. Platform p_2^A is determined for the case $p_{12}^A - k \geq q^A - b^*$ implicitly by equation (2) as

$$p_{12}^A = \begin{cases} 2(q^M - b) - \frac{q^M + \alpha(q^M - b)}{1+\alpha} - k + k, & \text{if } q^B - b > \frac{p_1^B + \alpha(q^M - b)}{1+\alpha} + k, \\ 2(q^M - b) - q^B + b + k, & \text{if } \left| q^B - b - \frac{p_1^B + \alpha(q^M - b)}{1+\alpha} \right| \leq k, \\ 2(q^M - b) - \frac{q^M + \alpha(q^M - b)}{1+\alpha} + k + k, & \text{if } q^B - b < \frac{p_1^B + \alpha(q^M - b)}{1+\alpha} - k. \end{cases} \tag{9}$$

The derivative of the objective function $-[p_{12}^A - k - q^A + b] - \frac{1}{2}k$, where p_{12}^A is substituted by expression (9), with respect to b is

$$2 - \frac{\alpha}{1+\alpha} - 1, \text{ if } \left| q^B - b - \frac{q^M + \alpha(q^M - b)}{1+\alpha} \right| > k, \tag{10}$$

$$2 - 1 - 1, \text{ if } \left| q^B - b - \frac{q^M + \alpha(q^M - b)}{1+\alpha} \right| \leq k. \tag{11}$$

While derivative (10) is positive, derivative (11) is zero. Inequality $|q^B - b - \frac{q^M + \alpha(q^M - b)}{1+\alpha}| \leq k$ is equivalent to $(1+\alpha)(q^B - q^M - k) \leq b \leq (1+\alpha)(q^B - q^M + k)$. Thus, if $b < (1+\alpha)(q^B - q^M - k)$, the derivative is positive; if $(1+\alpha)(q^B - q^M - k) \leq b \leq (1+\alpha)(q^B - q^M + k)$, the derivative is zero; and if $b > (1+\alpha)(q^B - q^M + k)$, the derivative is positive. Thus, the maximum of the function is the largest value of b such that $p_{12}^A - k > q^A - b$, where p_2^A satisfies equation (2). Therefore, it is $\bar{b} - \epsilon$ such that $\bar{b}$ solves $p_{12}^A - k = q^A - \bar{b}$. Note that by substituting $p_{12}^A - k = q^A - \bar{b}$ in equation (2), we obtain $2(q^M - \bar{b}) = q^A - \bar{b} + q_2^B$. Thus, $\bar{b} - \epsilon = b^* - \epsilon$. We next prove that $b^* - \epsilon$ (and implementing p_2^A such that $q_{12} - k > q^A - (b^* - \epsilon)$) provides a lower utility than b^* (and implementing p_2^A such that $p_{12}^A = q^A - b^*$). The utility in the former case is equal to $-\epsilon - \frac{1}{2}k$, because the incumbent's average platform is such that $p_{12}^A - k > q^A - (b^* - \epsilon)$, and the incumbent has to pay the incoherence cost $\frac{1}{2}k$. In the latter case, it is equal to 0. Given that $\frac{1}{2}k > 0$, the utility is larger when A implements b^*, which is the solution to problem (3).

Next, we provide an explicit formula for b^*:[29]

$$\begin{cases} 2(q^M - b^*) = q^A - b^* + \frac{q^M + \alpha(q^M - b^*)}{1+\alpha} + k, & \text{if } b^* < (1+\alpha)(q^B - q^M - k), \\ 2(q^M - b^*) = q^A - b^* + \frac{q^M + \alpha(q^M - b^*)}{1+\alpha} - k, & \text{if } b^* > (1+\alpha)(q^B - q^M + k), \end{cases} \Leftrightarrow$$

$$b^* = \begin{cases} (1+\alpha)\left(q^M - q^A - k\right), & \text{if } q^M - q^A - k < q^B - q^M - k, \\ (1+\alpha)\left(q^M - q^A + k\right), & \text{if } q^M - q^A + k > q^B - q^M + k, \end{cases} \Leftrightarrow$$

$$b^* = \begin{cases} (1+\alpha)\left(q^M - q^A - k\right), & \text{if } q^A > 2q^M - q^B, \\ (1+\alpha)\left(q^M - q^A + k\right), & \text{if } q^A < 2q^M - q^B. \end{cases}$$

We perform this analysis by considering ϵ to be zero; this allows us to assume that if A implements b^*, she will win even if the median is indifferent between the two candidates. In the knife-edge case $q^A = 2q^M - q^B$, we instead need to consider condition (2) as an inequality:

$$\begin{cases} 2(q^M - b^*) > q^A - b^* + \frac{q^M + \alpha(q^M - b^*)}{1+\alpha} + k, & \text{if } b^* < (1+\alpha)(q^B - q^M - k), \\ 2(q^M - b^*) > q^A - b^* + \frac{q^M + \alpha(q^M - b^*)}{1+\alpha} - k, & \text{if } b^* > (1+\alpha)(q^B - q^M + k), \end{cases} \Leftrightarrow$$

[29] Note that, if $(1+\alpha)(q^B - q^M - k) \leq b \leq (1+\alpha)(q^B - q^M + k)$, B implements $q^B - b$, which substituted in equation (2) leads to $2(q^M - b) = q^A - b + q^B - b$. b cancels out, thus there is no solution to the incumbent's problem. Thus the incumbent chooses b such that $|q^B - b - \frac{q^M + \alpha(q^M - b)}{1+\alpha}| > k$.

$$\begin{cases} b^* > (1+\alpha)\left(q^M - q^A - k\right), & \text{if } b^* < (1+\alpha)(q^B - q^M - k), \\ b^* > (1+\alpha)\left(q^M - q^A + k\right), & \text{if } b^* > (1+\alpha)(q^B - q^M + k). \end{cases} \tag{12}$$

Thus, the incumbent implements $b^* + \epsilon$ such that b^* satisfies the previous conditions with equality. If $q^A = 2q^M - q^B$, it implies $q^M - q^A = q^B - q^M$. Therefore, among the conditions stated in system (12), only the following is satisfied:

$$b^* > (1+\alpha)\left(q^M - q^A + k\right), \text{ if } b^* > (1+\alpha)(q^B - q^M + k),$$

Thus, if $q^A = 2q^M - q^B$, politician A implement $b^* + \epsilon$ such that b^* satisfies $b^* = (1+\alpha)\left(q^M - q^A + k\right)$. By considering ϵ to be zero, we obtain the results stated in Proposition (3). Finally, note that b^* in equilibrium is non-negative: if $q^A < 2q^M - q^B$, $q^M - q^A + k$ is larger than or equal to zero because $q^M - q^A \geq 0$. If $q^A > 2q^M - q^B$, $q^M - q^A - k$ is larger than zero, because, by Assumption 3, $\left|q^A - q^M\right| > k$.

□

Example A1

Assume that citizens (whose mass is equal to 1) are indexed by their income y^i and have linear utility over private consumption c^i and a public good g:

$$u(c^i, g) = c^i + g.$$

Assume that, in the past, the government accumulated debt b that must be repaid in this period. The individual and government budget constraints are as follows:

$$\begin{aligned} y^i(1-\tau) &= c^i, \\ (\tau - \frac{\tau^2}{2})y &= g + b, \end{aligned}$$

where τ is the proportional tax rate, $\frac{\tau^2}{2}$ is the deadweight cost of taxation, y is the aggregate income, and b is the stock of debt accumulated in the past that has to be repaid in the current period.

One can immediately find that individual i's most preferred taxation level is given by $\tau^{*i} := 1 - \frac{y^i}{y}$. The most preferred public good level is then easily computed by subtracting the debt repayment from government revenues, that is, $g^{*i}(b) = (\tau^i - \frac{(\tau^i)^2}{2})y - b$.

Clearly, if the elected politician increased b in the previous period, the individuals' preferred public good level would shift downward. Let us now write the following utility function:

$$u^{*i}(g) = c^i - c^{*i} + g - g^{*i}(0) = [c^i(g) + g - (c^{*i} + g^{*i}(b))] - b,$$

where $c^i(g) = y^i(1 - \tau(g))$ and $\tau(g)$ is τ such that the government budget constraint is satisfied with equality. Utility u^* is equivalent to u, because we subtracted a constant $c^{*i} + g^{*i}(0)$. Note that the function within the square brackets is concave and has a maximum in 0 when the government implements the individual optimal public good level $g = g^i(b)$. Moreover, u^* is decreasing in b, because b reduces the amount of taxation devoted to public good.

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