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**Abstract**

We model a society that values the coherence between past policy platforms and current implemented policy, and where policy platforms partially commit candidates to their future actions. If an incumbent politician seeks to be reelected, she has to use her platforms to commit to moderate policies that can be distant from her most preferred one. Commitment is related to the incoherence cost that politicians pay when they renege on promised platforms. In this context, we suggest a novel mechanism through which issuing government debt can affect electoral results. Debt is exploited by an incumbent politician, who is in favor of low spending, to damage the credibility of her opponent's policy platforms, and be reelected. A higher level of debt decreases voters' most preferred level of spending, and makes the opponent's past platform a losing policy. Even if the latter chose 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

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*"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 devices, and the strategic implementation of government debt.

Consider the following example. Under the first Reagan administration, there was a substantial increase in the stock of government debt, which was not used to increase social spending. Consequently, a fierce debate in the Democratic primaries emerged between candidates who were still in favor of Great Society policies, and candidates who rejected the "failed policies of the past".[2] The latters' main argument was that the stock of government debt made traditional social programs unpopular in terms of the necessary tax increases. Eventually, Walter Mondale, who was in favor of Great Society policies, won the primaries, but lost against Reagan in a landslide. In his policy proposals Mondale stuck to the traditional Democratic set of policies, which, in the new context of high debt, would have been financed by higher taxes.

Another interesting case is the one of the Italian government led by Silvio Berlusconi in the term 2001-2006. In this period Berlusconi's government interrupted a decreasing trend in the government debt-over-GDP ratio and started increasing it at the end of his mandate. While public debt was increased, social spending decreased. Despite this bad performance, which could suggest a large defeat by Berlusconi in the 2006 elections, his coalition almost managed to tie, and his defeat was decided by a mere 20.000 votes. Even though the left-wing candidate, Romano Prodi, proposed an electoral program that merged debt reduction and social programs, the latter were less ambitious than the past proposals supported by leftist coalitions and the whole platform was harshly criticized as either too moderate or incoherent.

[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

In this paper we suggest that Berlusconi's electoral unexpected result and Reagan's victory benefited from a strategic use of government debt, which shifted the electorate's preferences toward a lower public good provision. This shift forced the opponents to stick to losing policies or to flip-flop their policy stance.

Flip-flopping on policy proposals is often perceived as a damage to candidates' credibility and it is often emphasized by the media.[3] John Kerry's electoral campaign was severely harmed 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 in Congress could be rationalized,[4] his critics used the flip-flopping argument to cast doubt on his commitment on every policy he stood for. In UK politics, a term that illustrates the same kind of behavior with a negative connotation is "U turn". Margaret Thatcher used it for one of her most famous sentences: "You turn [U-turn] if you want to. The lady's not for turning".[5]

Flip-flopping is a source of concern and criticism also in the private labor market, especially in the case of managers, see for example Anthony (1978). Recently, Google analyzed its own job interviews and the subsequent performances of hired managers, in order to assess what are the good predictors of high managers' 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]

In a two-period model of electoral competition, we introduce a incoherence cost (flip-flopping) to be paid at the end of the second term. The cost measures the deviation of the second-period implemented policy from the history of policy proposals. From a political economy perspective, the incoherence cost acts as a commitment device for candidates, who can partially commit to their future implemented policies through their policy platforms. We also introduce a strategic device, i.e. 'government debt', that can be used in the first period by a conservative incumbent, who favors a low level of public good, to move voters' preferred policy towards a lower provision of public good. Indeed, if the incumbent creates debt in the first period that has to be repaid in the following period, all agents will prefer a lower

[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 in deviating from their policy platforms has been successfully tested in laboratory experiments (see 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

provision of public good in the second period, in order to avoid an excessive increase in taxation. We show that debt can be used by the incumbent to effectively reduce the opponent's commitment to the new policy preferred by the median voter. By issuing debt, the incumbent is able to be reelected.

Within this framework, the model delivers several interesting results. First, in equilibrium more radical politicians implement higher levels of government debt. Second, if deviations from the first-period platforms become less important (in the determination of the incoherence cost) than deviations from the second-period ones, the level of debt implemented by the incumbent becomes larger, as the opponent is less anchored to her first-period proposal. Third, the size of the incoherence cost affects the debt of moderate and extreme politicians in opposite directions. In particular, if the incumbent is more moderate (radical) than her opponent, when the incoherence cost increases, equilibrium debt decreases (increases).

The theory presented in this paper can also symmetrically explain the use of strategic surplus by a progressive politician. For example, a left-wing incumbent can seize privately owned assets, e.g. oil wells, to finance social programs. Voters become more open to social programs, because they are not financed through taxation. At the same time nationalizations can reduce private investments, harming aggregate welfare. As the opponent is anchored to old policy proposals that do not represent anymore the median citizen's will, voters are more likely to reelect the incumbent.

Although we do not provide an empirical test for our findings, the work of Grembi et al. (2016) can be used to assess our main predictions. Grembi et al. (2016) analyze the causal effect of relaxing a balanced budget constraint rule on the fiscal behavior of politicians, in small Italian municipalities. They find that politicians facing a relaxed rule increase local public debt. Most interestingly, they also find that the increase in deficit arises only for mayors who can run for a second term, and who "systematically underprovide the promised public good". Each of these findings can be rationalized by different stories (e.g. politicians with reelection incentives can pander to voters, or the political process could induce a selection of bad politicians who systematically disappoint voters by underproviding public good), but it is difficult to reconcile both results within a unique explanation.[7] Instead, the model developed in this paper accommodates both findings, and suggests that the increase in public debt is not necessarily linked to public good provision, but is instead instrumental to reduce the commitment ability of the opponent and be reelected.

[7]For instance, pandering politicians should presumably increase debt to *overprovide* public goods.

The remaining of the paper is organized as follows. In Section (2) we discuss our contribution in relation with the related literature. In Section (3) we develop the basic model and in Section (4) we characterize the equilibria. In Section (5) we introduce government debt and in the following Section we study the equilibria with debt. Section (7) concludes.

## 2 Related literature

In the political economy literature, Alesina and Tabellini (1990) and Persson and Svensson (1989) are two seminal papers on the strategic use of government debt. These theories predict that governments use debt to constrain their successors' actions, because the incumbent knows that the opponent will take over the government. Clearly, these models cannot explain why politicians who increase debt get reelected.[8] Theories of fiscal illusion (see Buchanan and Wagner (1977)), where voters retrospectively reward high spending by the incumbent, are consistent with incumbents using debt to be reelected. Setting aside possible arguments on voters' rationality, these theories are not compatible with cases in which conservative incumbents, in favor of low spending, implement this strategy. Recently Müller et al. (2016) proposed a game where right-wing governments are less fiscally responsible because their voters are less concerned with the future viability of public good provision than left-wing voters. In their model the probability of election is exogenous. Even though Müller et al. (2016) do not focus on the relationship between strategic government debt and the probability of reelection, they perform an empirical analysis, which shows 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 that is consistent both with our theory and Persson and Svensson's hypothesis.[9] Our main contribution to this literature is to develop a theory that rationalizes the reelection of conservative incumbents who increase government debt, by linking the use of debt to the ability of commitment through policy platforms.

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

[8]Caballero and Yared (2010) show that, if the probability of being replaced is low and economic volatility is high, the incumbent over-saves in the short run and over-borrows in the long run.

[9]See also Davis and Ferrantino (1996), Ventelou (2002), Kroszner and Stratmann (2005). Alesina and Passalacqua (2015) provide a comprehensive survey of the political economy of government debt.

candidates have a cost of lying. Banks (1990) and Callander and Wilkie (2007)[10] assume that candidates have a fixed future implemented policy, and can choose electoral platforms, considering that they will pay a cost which is a function of the distance between their future implemented policy and their electoral platforms. Candidates care about being elected and about the cost of lying, with no direct preference over policies. Since voters do not know the future implemented policy of politicians, the latter can use electoral platforms as signals. We contribute to this literature in three ways. First, we endogenize implemented policies, by assuming that politicians have preferences over policies and pay a cost of implementing policies that deviate from policy proposals. Second, we introduce a dynamic feature in that the incoherence cost is also a function of policy platforms of the previous term. Third, we simplify the theoretical analysis, by considering a game of complete information, that still delivers comparative statics similar to the ones investigated by Banks (1990) and Callander and Wilkie (2007).

# 3 The baseline model

The policy space is a set of points equidistant in $\mathbb{R}$, with distance $\epsilon > 0$, where $\epsilon$ is arbitrarily small.[11] The set of voters is denoted by $S$. Let $h$ denote the density function that describes the distribution of citizens' bliss points on the policy space. We denote by $M$ the median voter and by $q^M$ the bliss point of the median citizen.
Voter $i \in S$ lives for two periods and has per-period preferences on the policy space represented by the following loss function:

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

where $q \in \mathbb{R}$ is the policy implemented by the elected politician, and $q^i$ is the bliss point of voter $i$.

There are two politicians, $A$ and $B$. They have preferences over policies and are also office motivated. Let $A$ denote a candidate in favor a low provision of policy $q$, i.e. $q^A \leq q^M$, while $B$ denotes the candidate in favor a high provision of policy $q$, i.e. $q^B \geq q^M$. The politician in power receives

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

[11] As will be clear from the analysis of the model, there are subgame equilibria in which players 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 $\epsilon$ far from the threshold. While $\epsilon$ is present in the proofs, for the sake of simplicity we send $\epsilon$ to 0 in the propositions.

an ego rent $R$. We define the per-period utility of politician $P \in \{A, B\}$ as follows:

$$u^P(q, R) = -|q - q^P| + \mathbb{P}^P R,$$

where $\mathbb{P}^P$ is the probability that the politician is elected in that period.

The game is played in 2 periods. Each period is denoted by time $t \in \{1, 2\}$, with common discount rate $\beta = 1$. In the first period one of the two politicians is in power. Let us assume that $A$ is the first period incumbent, while $B$ is the first period opponent. In period 1 the incumbent $A$ implements a policy $q_1^A$. After observing $A$'s policy, $B$ proposes an alternative platform, $q_1^B$. While $B$'s alternative platform cannot affect the policy implemented in period 1, it can nevertheless be useful to build $B$'s commitment to a given future policy, as it will become clear once we will introduce the incoherence cost.[12]

At the beginning of the second period there is an election, in which the winner is determined by majority voting. If indifferent, a voter votes for each candidate with probability one-half. Before the election, both candidates declare their policy platforms $q_2^A$ and $q_2^B$. If elected, politician $P$ implements a policy denoted by $q_2^{*P} \in \mathbb{R}$.

At the end of the second period, the elected politician pays an incoherence cost $H$, which represents the discounted value of all future losses related to the politician's flip-flopping while she was in power. The incoherence cost, which is subtracted from the politician's second-period utility, can be thought of as a wage loss in the private sector, a stigma in the society or a damage in the future political career.[13] It is well known that incoherence costs can play an important role in politicians' career. As shown by Adams and Somer-Topcu (2009), past policy proposals have a long-term effect on politicians' 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 US senators when they flip-flop, and that the electoral penalties increase with the size of the change, i.e. they are convex.[14]

[12]This behavior by 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.

[13]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 for 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.

[14]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 of policy shifts can

We formalize the incoherence cost $H$ as follows:

$$H = \frac{1}{2k}\left(q_2^{*P} - \frac{q_1^P + \alpha q_2^P}{1+\alpha}\right)^2,$$

where the parameter $k > 0$ parametrizes the scale of the incoherence cost in the utility function of the politician. The term between brackets represents the distance of the second-period policy from a weighted average of the platforms of the two periods: the closer this distance, the lower will be the cost paid by the politician in her subsequent career.[15]

The parameter $\alpha > 1$ measures the memory bias associated to the second-period platform in the incoherence cost. For the first-period incumbent, who is reelected in the second period, the incoherence cost is a function of the policy implemented in the first period, $q_1^A$. For the opponent, who is elected only in the second period, the incoherence cost is a function of the alternative proposal made in the first period, $q_1^B$.

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.

The timing of the game is the following:

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

We now introduce few simplifying assumptions.

be heterogeneous with respect to the policy domain.

[15] Our choice of the specific functional form for $H$ can capture a situation in which future employers or voters do not have access to the details of the past political process, and use the distance between implemented policies and average proposals as a 'rough' measure to evaluate the politician.

- Assumption 1. We assume that $\frac{1}{2}k < R$. The value $\frac{1}{2}k$ is the largest incoherence cost that that the politician can pay in equilibrium: we assume that the incoherence cost is lower than the rent from office $R$. This condition eliminates the possibility that a politician chooses a policy platform with the sole purpose to intentionally lose the election and avoid 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 multiplicity of (uninteresting) equilibria.

- Assumption 3. We assume that both candidates' bliss points are sufficiently extremist: $|q^P - q^M| > k$. As will be clear from the equilibrium analysis, this condition makes necessary, at least for some values of the parameters, the use of platforms as commitment devices.

- Assumption 4. Politician $A$, in favor of a low provision of policy $q$, can only propose platforms lower or equal to an upper bound $u$, while $B$, in favor of a high provision of policy $q$, can only propose platforms larger or equal to a lower bound $l$. The existence of $u$ and $l$ is needed in the model with debt, as it will be clear in the related analysis. For convenience we consider $u = l = q^M$, but different levels of $u$ and $l$ do not qualitatively affect the results.[16]

# 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 $q_1^P, q_2^P$:

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

where we will refer to $q_{12}^P := \frac{q_1^P + \alpha q_2^P}{1+\alpha}$ as the 'average' platform.

The following proposition characterizes the policy implemented by the politician elected in the second period:

[16]Thus each politician can only propose platforms on her 'side' of the policy space.

**Proposition 1 (The second-period policy)** *The policy implemented in the second period is:*

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

The proof is 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, the politician implements her bliss point. If instead the distance $|q_{12}^P - q^P|$ is larger than $k$, she implements a $k$-deviation from her average platform in the direction of her bliss point. Therefore the average platform creates a partial commitment for the elected politician, who can only partially deviate from it.

Given that 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. In the following propositions we first identify the winner of the election, and then characterize the subgame equilibrium platforms $q_2^A, q_2^B$.

**Proposition 2 (The winner of the election)** *Given implemented policy $q_1^A$ and opponent's platform $q_1^B$, 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 $\frac{1}{2}$.*

The proof is in the appendix.

The intuition for this result is straightforward. Let us assume that politician $P$ would be the elected politician in the second period if both candidates proposed the median voter's bliss point. Then in equilibrium politician $P$ has to be the winner of the second-period elections. Indeed, if this were not the case, $P$ could always deviate by declaring $q^M$, and would necessarily win the elections.

**Proposition 3 (The second-period platforms)** *In the second period there are two possible cases, depending on the election result if both candidates proposed $q^M$:*

*(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 $q_2^P$ that minimizes the distance $|q^P - q_{12}^P|$, with $q_2^P$ in the set of platforms such that $|q^M - q_2^{*P}| < |q^M - q_2^{*-P}|$.*

The proof is in the appendix.

We now characterize the first-period equilibrium and analyze how the first-period policy affects voters' behavior in the second period. Let us consider what is the optimal first-period platform for the opponent $B$. By Assumption 1, the opponent chooses a policy platform $q_1^B$ in order to win the second-period election. Note that, by Assumption 3, if candidates' platforms were equal to $q^M$ in both periods, voters would be indifferent between the two candidates, as in the second period $A$'s implemented policy would be $q_2^A = q^M - k$, while $B$'s implemented policy would be $q_2^B = q^M + k$. Thus, if the incumbent sets $q_1^A = q^M$, $B$ reacts by proposing $q_1^B = q^M$ and by propositions (2) and (3), candidates tie in the second period by proposing $q_2^A = q_2^B = q^M$. Instead, if the incumbent proposes $q_1^A \neq q^M$, she would certainly lose the election. Formally, we have:

**Proposition 4 (The first-period opponent's platform)** *If $q_1^A = q^M$, $B$ chooses $q_1^B = q^M$ and ties against $A$ in the election. If $q_1^A < q^M$, $B$ wins against $A$, choosing $q_1^B$ such that $q_{12}^B = q^B$, if $q^B < 2q^M - \max\left\{q^A, \frac{q_1^A + \alpha q^M}{1+\alpha} - k\right\}$, or $q_{12}^B = 2q^M - \max\{q^A, \frac{q_1^A + \alpha q^M}{1+\alpha}\}$, if $q^B > 2q^M - \max\left\{q^A, \frac{q_1^A + \alpha q^M}{1+\alpha} - k\right\}$.*

The proof is in the appendix.

So far, we have characterized the opponent's strategy. Next, let us consider what would be the optimal choice by $A$ in the first period, conditional on losing the elections. If $A$ is not reelected, in the first period she has two options. She can either implement her bliss point maximizing her current utility, or choose a more moderate policy, in order to force $B$ to implement a more moderate policy in the second period. Note that in the latter case, $q_2^{*B} = 2q^M - \frac{q_1^A + \alpha q^M}{1+\alpha} + k$. At the margin, if $A$ chooses a moderate policy, she would reduce her utility by 1 in the first period, while she would only increase her utility by $\frac{1}{1+\alpha}$ in the second period. Thus, conditional on losing the elections, $A$ would always implement her bliss point.

Having established what would be the incumbent's behavior when she is not reelected, we can exploit the results in Propositions (3) and (4) to compute the level of utility that the incumbent would reach conditional on the electoral result, and prove the following:

**Proposition 5 (The first-period policy)** *If $A$ is sufficiently extremist:*

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

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

The proof is in the appendix.

To get the intuition of the last result, consider that a radical incumbent would suffer a large disutility by committing to the median voter's preferred policy. Thus, she deliberately chooses to lose the elections, and maximizes current utility by implementing her bliss point. Banks (1990) and Callander and Wilkie (2007) have qualitatively similar results, in that extremist candidates announce their ideal policy, because it is too costly for them to commit to moderate policies.

Let us conclude this Section by commenting on some comparative statics results. Looking at the expression for $\omega$ in Proposition (5), we can easily conclude that, when the rent $R$ from office increases, the threshold $\omega$ decreases, and the incumbent is less likely to implement her bliss point as it pays more to be reelected. Instead, an increase in $k$ has an ambiguous effect on $\omega$. 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 $q_2^{*B}$ from $q^A$, so that the incumbent has a larger 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 use a strategic variable, denoted as $b$, which moves in the second period the bliss points of all agents in a given direction. By means of $b$, the incumbent can move the median bliss point away from the first-period platform of the opponent, so as to undermine the effectiveness of the electoral platform as a commitment device.

We frame the theory in a general way, because incumbents in different contexts have different tools at their disposal, to affect voters' indirect utility. For instance, if voters consider the environment a salient issue, a 'brown' incumbent can influence voters through the release of biased information that undermines the negative effects of carbon-driven technology on climate change. As we show below, a 'natural' example for $b$ can be government debt, used to finance unproductive government expenditure that does not yield any benefit to individuals. We frequently refer to debt in the model and the analysis given its relevance in the public debate and in the political economy literature.

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

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

Let us assume that, in the past, the government has accumulated debt $b$ that must be repaid in this period. Individual and government budget constraints are the following:

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

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

It is immediate to find that individual $i$'s most preferred level of taxation is given by $\tau^i := 1 - \frac{y^i}{y}$. The most preferred level of public good is then easily computed by subtracting debt repayment from government revenues, i.e. $(\tau^i - \frac{(\tau^i)^2}{2})y - b$. Clearly, if the elected politician has increased $b$ in the previous period, individuals' preferred level of public good shifts downwards. Let us define $g^i$ as the preferred level of public good by $i$ if there was no debt: $g^i := (\tau^i - \frac{(\tau^i)^2}{2})y$, and $g^i(b)$ as the preferred level of public good with a positive debt: $g^i(b) := g^i - b$.

Let us now write the following utility:

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

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

In this extension of the game, at the end of the first period, the incumbent chooses $b$. Variable $b$ does not affect utilities in the first period, but it influences the bliss points of all players in the second period. Consistently with the loss function used 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: $q^i(b) = q^i - b$. If $b = 0$, the bliss point $q^i$ is the same in both periods. Hence, by increasing $b$ the incumbent does not affect the distance between the median voter's preferred policy and the two candidates' bliss points. Note that $b$ does not provide any advantage for the incumbent directly, but only insofar as it affects the commitment created by policy platforms.[17]

Citizen $i \in S$ has the following second period utility:

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

As in example 1, increasing $b$ moves the preferred policy of each player towards a lower provision of $q$, and it does not increase the utility of voters.[18] Moreover, differently from a model of fiscal illusion, in our framework voters are rational and forward looking, thus even if debt increased the utility of voters in the first period, this would not increase the probability of election of the incumbent, because they evaluate politicians based on their second period utility. Therefore we switch off one of the main channels explored in the literature for the successful implementation of government debt by incumbents.

We assume that, if a politician is indifferent between different levels of $b$, she implements the lowest one.

The first-period incumbent $A$ chooses $b$ at the end of the first period,

[17]If, for example, the policy space is bounded below, we can construct a simple model where a conservative incumbent can create enough debt to shift politicians and voters' preferences towards 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 is reelected. These dynamics imply that a large fraction of the electorate is in favor of the lower bound of the policy space, a situation that is rarely observed in reality. A similar approach is considered by Hodler (2011), where this issue is tackled by assuming that there are only two levels of spending, high or low.

[18]In many real life applications, $b$ could have a negative effect on voters' welfare, as shown in example (1) in the case of government debt. We do not analyze the welfare consequences of $b$, because we focus on the strategic incentive that the incumbent has in using $b$ to be reelected. Moreover including a cost of $b$ in the second period voters' utility would not change the results, because when citizens vote debt has already been implemented.

maximizing the following:

$$-|q - q^A(b)| + \mathbb{P}^A [R - H] .$$

The timing of the new game is the following:

1. The incumbent $A$ implements policy $q_1^A$;
2. The opponent $B$ makes alternative proposal $q_2^B$;
3. The incumbent chooses $b$;
4. At the beginning of period 2, all bliss points move: $q^i(b) = q^i - b$;
5. Platforms are announced, elections and policy implementation take place as before.

# 6 Equilibrium with strategic debt

As we have shown in the previous section, the incumbent politician $A$ either ties with $B$, if she is moderate: $q^A \geq \omega$, or she loses the second period election, if she is radical: $q^A < \omega$. Thus, in what follows, we study the incentive that an incumbent politician might have to implement debt aiming at winning elections in the second period. We already know what is the equilibrium behavior of $A$, if $b = 0$. We therefore characterize her equilibrium behavior, by assuming that she implements $b$ to win the second period election, and we compare her utility in the two cases, to determine the equilibrium of the game. As usual, we solve the game by backward induction.

The solutions for the implemented policy $q_2^{*P}(b)$, as a function of $q_1^P, q_2^P$, are the same as in Proposition 1 except that now the bliss point $q^P(b)$ is a function of $b$:

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

Given that we consider the conditions under which $A$ implements a positive $b$ and wins the election, $B$'s second period platform is $q_2^B = q^M(b)$, which is her equilibrium platform in case she loses. Thus, the policy implemented by $B$, in case she were elected, is as follows:

$$q_2^{*B} = \begin{cases} \frac{q_1^B + \alpha(q^M - b)}{1+\alpha} + k, & \text{if } q^B - b > \frac{q_1^B + \alpha(q^M - b)}{1+\alpha} + k, \\ q^B - b, & \text{if } \left| q^B - b - \frac{q_1^B + \alpha(q^M - b)}{1+\alpha} \right| \leq k, \\ \frac{q_1^B + \alpha(q^M - b)}{1+\alpha} - k, & \text{if } q^B - b < \frac{q_1^B + \alpha(q^M - b)}{1+\alpha} - k. \end{cases}$$

The policy $q_2^{*B}$ is a decreasing function of $b$. If $|q^B - b - \frac{q_1^A + \alpha(q^M - b)}{1+\alpha}| > k$, $q_2^{*B}$ moves to the left by $\frac{\alpha}{1+\alpha}$ for a unitary increase of $b$. This happens because the opponent is anchored to the first period electoral platform $q_1^B$. This anchor creates a wedge between $q^M(b)$, which moves to the left by 1 for a unitary increase in $b$, and $q_2^{*B}$. This wedge is what gives to the incumbent the possibility to win the second period election.[19]

For a given level of $b$, in the second period the incumbent $A$ chooses platform $q_2^A$ as close as possible to $q^A$ but such that the implemented policy $q_2^{*A}$ satisfies

$$-\left|q^M(b) - q_2^{*A}\right| > -\left|q^M(b) - q_2^{*B}\right|,$$

where $q_2^{*P}$ depends on $b, q_1^P, q_2^P$. Taking into account that $q_2^{*A} < q^M(b) < q_2^{*B}$, and solving for the level of $q_2^A$ such that the median is indifferent between the candidates, we get:

$$q^M - b = \frac{q_2^{*A} + q_2^{*B}}{2}. \tag{1}$$

Clearly, if $A$ chooses the level of platform $q_2^A + \epsilon$, where $q_2^A$ solves equation (1), she wins the elections in the second period.[20]

Next, let us show what would be the optimal level of $b$ implemented by the incumbent politician in the first period. The incumbent politician solves the following problem:[21]

$$\max_{b \in \mathbb{R}} -[q_{12}^A - k - q^A + b] - \frac{1}{2}k, \text{ if } q_{12}^A - k > q^A - b; \tag{2}$$

$$\max_{b \in \mathbb{R}} -[q^A - b - q^A + b], \text{ if } q_{12}^A = q^A - b,$$

where $q_2^A$ is determined implicitly by equation (1). The incoherence cost is equal to $\frac{1}{2}k$, if $q_{12}^A - k > q^A - b$, and it is equal to 0, if $q_{12}^A = q^B - b$, because in the latter case $A$ in the second period implements her average platform $q^A - b$.

By increasing $b$, the incumbent can exploit the wedge between $q^M(b)$ and $q_2^{*B}$ to propose a policy $q_2^A$ which is closer to her new bliss point. Therefore,

[19]Here Assumption 4 is crucial in order for an equilibrium to exist. Indeed if $q_2^B$ ranged in $\mathbb{R}$, $B$ could always implement $q_2^B$ that would erase the effect of $q_1^B$ on implemented policy $q_2^{*B}$ and strategic debt would not help incumbent $A$. If instead $q_2^B$ has a lower bound, the 'anchor effect' of $q_1^B$ is still present and $A$ wins using $b$.

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

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

there is a trade-off between $b$ and platform $q_2^A$: a higher level of $b$ 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 can increase $b$ up until she wins in the second period by proposing a policy $q_2^A$ that lets her implement her new bliss point: $q_{12}^A = q^A - b$. Substituting this average platform in equation (1) we obtain an implicit solution for the equilibrium level of debt $b^*$ as a function of $q_1^B$:

$$2(q^M - b^*) = q^A - b^* + q_2^{*B}.$$

Before the implementation of $b$, the opponent chooses alternative proposal $q_1^B$. Given that, for any $q_1^B$ incumbent $A$ implements $b$ that ensures her election in period 2, $B$ is indifferent among all alternative proposals. Thus, by Assumption 2 she proposes the median voter's bliss point: $q_1^B = q^M$. The incumbent in the first period implements $q_1^A$ in order to maximize the following utility:

$$-|q_1^A - q^A| - |q^A - b - q^A + b|.$$

Therefore the incumbent implements her bliss point: $q_1^A = q^A$.

We now consider the decision of the incumbent to either use strategic debt, or to avoid its use and behave as analyzed in the previous section. Let us consider the case of a radical incumbent: $q^A < \omega$. Her utility is strictly larger by implementing $b^*$ and winning the second period election, than the utility by implementing $b = 0$ and losing the second period election, because in both situations she implements her bliss point in the first period, but in the first case she enjoys also the second period rent $R$ and she implements her new bliss point $q_2^{*A} = q^A - b$.

A moderate incumbent, $q^A \geq \omega$, can either implement $q_1^A = q^M$ and tie in the second period election, or implement her bliss point in the first term, use debt $b^*$ and win the second period election. 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. Moreover, a moderate incumbent implements in equilibrium a more extremist policy in both periods if she can use strategic debt.

We can therefore state the following result:

**Proposition 6 (Equilibrium debt)** *In equilibrium the incumbent implements $b^* > 0$, which shifts the median voter away from the first-period platform of the opponent, and gets reelected. Specifically:*

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

The proof is in the appendix.

The next proposition summarizes the comparative statics:

**Proposition 7 (Comparative statics)** *The following holds:*

*i. The more radical is the incumbent, the larger is $b$;*

*ii. The larger is the memory bias $\alpha$ given to $q_2^P$ in the incoherence cost, the larger is $b$;*

*iii. The level of $b$ 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 sets a larger $b$, as she implements her bliss point in the first period and she 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 is the memory bias associated to the second-period electoral platform $\alpha$, the larger is $b$, since the opponent is less anchored to her first-period (losing) moderate proposal. If $\alpha$ goes to infinity, only the second period platform matters for the second-period implemented policy. In this case $b$ goes to infinity, as there is no finite level of $b$ that 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 models of electoral competition 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, a low $b$ is needed for the former to be reelected. Thus all bliss points move to the left by a small amount $b$. The new bliss point of the opponent will still be farther from the median's than $q_{12}^B + k$, which would be the implemented policy by $B$. Clearly, an increase in $k$ increases the distance between the median voter's bliss point and the opponent's implemented policy, because $q_{12}^B + k$ increases, making $B$ less attractive to the median voter. Therefore the incumbent can implement a lower $b$ to win the election. If instead the incumbent is more radical than her opponent (see figure 2), she has to implement a large $b$ to win the election. Thus all bliss points move to the left by a large amount $b$. At the same time, because of the 'anchor' effect of $q_1^B$ on $q_{12}^B$, $q_{12}^B$ moves to the left only by $\frac{\alpha}{1+\alpha} b < b$. For a sufficiently large $b$, the new bliss point of the opponent moves closer to the median than $q_{12}^B - k$, which would be the implemented policy by $B$. If $k$ increases, $B$'s implemented policy gets closer to the median voter's bliss point, because

$q_{12}^B - k$ decreases, making $B$ 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 $q_{12}^B + k$. Policy $q^A - b$ is an $\epsilon$ closer to $q^M - b$ than $q_{12}^B + k$.

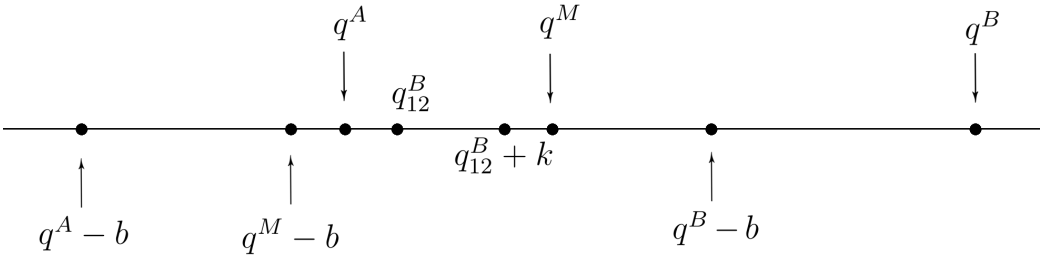
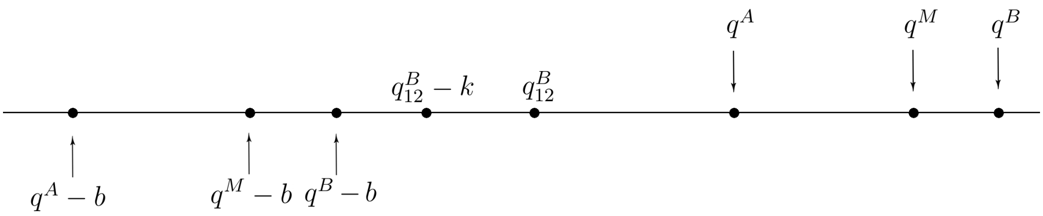



Figure 2: Equilibrium with debt, where $A$ is less moderate than $B$. $A$ wins by implementing $q^A - b$ in the second term. If elected, $B$ would implement $q_{12}^B - k$. Policy $q^A - b$ is an $\epsilon$ closer to $q^M - b$ than $q_{12}^B - k$.




The comparative statics point to a subtle aspect of the effect of $b$ on the opponent's behavior. If the opponent is radical and the incumbent implements $b$, the former loses as she would need 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 which is more moderate than her bliss point, but weaker ($q_{12}^B > q^M(b)$) than in case of no debt ($q_{12}^B = q^M$). Debt has a 'low commitment' effect on the opponent.

If the opponent is moderate and the incumbent implements $b$, the opponent loses as 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 which 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.

# 7 Conclusion

This paper analyzes the incentives of an incumbent politician to strategically use debt to reduce the opponent's commitment to moderate policies in a context where politicians pay an incoherence cost, due to deviations of the implemented policy from past platforms. The incoherence cost makes it possible for the politicians to exploit platforms to commit to moderate policies and please the median voter. If an increase in the level of debt moves voters' most preferred policy towards a lower public good provision, the opponent politician, who has always been in favor of a high public good provision, will not be able to commit to the new median voter's bliss point, as she is anchored to her old policy platform. Given that the opponent's commitment is reduced, voters anticipate that she would deviate from a more moderate platform. Thus, debt secures reelection to a conservative incumbent who prefers low provision of the public good.

Our analysis contributes to the debate on optimal fiscal rules (see Halac and Yared (2014)). While in principle flexibility in the use of government debt could increase citizens' welfare if debt acts as a countercyclical policy, it is well known that governments have perverse incentives in the creation of deficits which lead to excessive debt. This paper adds to the political economy of government debt by suggesting another reason why it could be desirable to limit governments' discretion in the creation of deficits.

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

# Appendix

**Proof of Proposition** (1)
The first order condition of the maximization problem is

$$1 - \frac{1}{k}(q - q_{12}^P) = 0, \text{if } q < q^P, \tag{3}$$

$$-1 - \frac{1}{k}(q - q_{12}^P) = 0, \text{if } q \geq q^P. \tag{4}$$

The solution is

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

When the following conditions are both satisfied: $q_{12}^P + k \geq q^P$, $q_{12}^P - k < q^P$, the lhs of first order condition (3) is positive for $q < q^P$. Indeed $1 - \frac{1}{k}(q - q_{12}^P) > 0$ implies $q < q_{12}^P + k$, which is satisfied, because $q < q^P < q_{12}^P + k$. Similarly the lhs of first order condition (4) is negative for $q \geq q^P$. Hence the maximum is in $q = q^P$.

□

**Proof of Proposition** (2)
Let us first prove that it is in the interest of both candidates to propose policies in order to win the 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 argued that the largest value of $H$ is $\frac{1}{2}k$. By assumption 1 $R$ is larger than $\frac{1}{2}k$, therefore $-|q^P - q_2^{*P}| + R - H > -|q^P - q_2^{*-P}|$. Similarly, if candidates can choose between losing or tying, they rather tie: $\frac{1}{2}\left[-|q^P - q_2^{*P}| + R - H\right] - \frac{1}{2}|q^P - q_2^{*-P}| > -|q^P - q_2^{*-P}|$.

Secondly, let us 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 $q_2^P$ becomes closer to $q^M$. Therefore by proposing $q_2^P = q^M$, candidate $P$ maximizes $-|q^M - q_2^{*P}|$. Let us consider the case in which the median voter strictly prefers candidate $P$, when both candidates propose $q^M$. Let us prove that there is no equilibrium where the two candidates proposes policies $q_2^A, q_2^B$ which entail 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 $-|q^M - q_2^{*P}|$, which 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 it must be that candidate $P$ is elected. If instead the median voter is indifferent between the two candidates, if they propose $q^M$, then each candidate is elected with probability $\frac{1}{2}$ and no candidate has an incentive to deviate.

□

**Proof of Proposition** (3)
The first case has already been shown in the proof of Proposition (2). Let us consider the second case. The loser is indifferent between any proposal,

because she is not elected, thus she does not influence the implemented policy. Therefore by assumption she implements $q^M$. The winner chooses $q_2^P$ to minimize the distance $|q^P - q_{12}^P|$ conditional on winning, because she receives a larger utility from policy and she reduces the incoherence cost. Note that this implies that, if politician $P$ can win implementing her bliss point $q^P$, she proposes electoral platform $q_2^P$ such that $q_{12}^P = q^P$. Thus politician $P$ does not propose electoral platform $|q_{12}^P - q^P| < k$ and $q_{12}^P \neq q^P$, because she implements $q_2^{*P} = q^P$, but she pays a positive incoherence cost.

□

**Proof of Proposition** (4)
If $q_1^A = q^M$, and $q_1^B = q^M$, both candidates propose electoral platforms $q_2^A = q_2^B = q^M$ in the second period and they tie. $B$ has no incentive to deviate, by implementing $q_1^B > q^M$, because by Proposition (2) she would lose the election: $q^M - k > 2q^M - \frac{q_1^B + \alpha q^M}{1+\alpha} - k$. Let us consider the case $q_1^A < q^M$. In this situation $B$ wins the election, because there exist $q_1^B$ and $q_2^B$ such that the median voter is better off by voting for $B$, for example $q_1^B = q_2^B = q^M$. Given that $A$ is a sure loser, she implements $q_2^A = q^M$.

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

If $q^A \geq \frac{q_1^A + \alpha q^M}{1+\alpha} - k$, $A$ implements $q^A$, if elected. In order to win $B$ has to implement a policy larger than $2q^M - q^A$. If $q^B < 2q^M - q^A$, she makes an alternative proposal in the first period, so that her average platform is equal to her bliss point: $q_{12}^B = q^B$, which ensures her victory. If instead $q^B \geq 2q^M - q^A$, she makes an alternative proposal in the first period, so that she wins in the second period: $q_{12}^B + k = 2q^M - q^A - \epsilon$. In the statement of Proposition (4) we consider $\epsilon \to 0$.

□

**Proof of Proposition** (5)
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 (4) where $q_1^A$ is substituted with $q^A$. As shown in Proposition (4), $B$ in equilibrium either wins or ties against $A$. If $A$ does not lose, the best she can do is to implement $q_1^A$ in order to tie against $B$: $q_1^A = q^M$. 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 define the four following expressions:

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

Let us consider what is the utility of $A$, in case she chooses to lose the election. If $A$ loses, she implements her bliss point: $q_1^A = q^A$. Therefore, by Proposition (4), 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 $q^B$. $A$ 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:

$$\begin{cases} q^A < x, \\ q^A < y, \\ q^A < z. \end{cases} \tag{5}$$

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:

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

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:

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

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

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

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:

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

which implies:

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

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 finish the proof, we make use of the following Lemma:

**Lemma 1** *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 prove that $y \leq x \leq z$ is not satisfied: $y \leq x \Leftrightarrow (2+\alpha)q^M - (1+\alpha)(q^B - k) \leq q^M - \frac{1+\alpha}{\alpha}k \Leftrightarrow q^B > q^M + \frac{1+\alpha}{\alpha}k, x \leq z \Leftrightarrow q^M - \frac{1+\alpha}{\alpha}k \leq 2q^M - q^B - \left(R - \frac{1}{2}k\right) \Leftrightarrow q^B \leq q^M + \frac{1+\alpha}{\alpha}k - \frac{1}{2}(R - \frac{1}{2}k)$. 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 (5) reduces to $q^A < y$, system (6) reduces to $y \leq q^A < u$, and system (7) is not satisfied. Therefore $A$ choses to lose the election if $q^A < u$. If $z \leq x$ and $y > z$, it implies that $z > u$ and $y > u$. System (5) reduces to $q^A < z$, system (6) and system (7) are not satisfied. Therefore $A$ choses to lose the election if $q^A < z$. If $z > x$, it implies $y > x$. If also $y \leq z$, it implies that $z \leq u$ and $y \leq u$. System (5) reduces to $q^A < x$, system (6) reduces to $y \leq q^A < u$, and system (7) reduces to $x \leq q^A < z$. Therefore $A$ choses to lose the election if $q^A < u$. If $z > x$, it implies $y > x$. If also $y > z$, it implies that $z > u$ and $y > u$. System (5) reduces to $q^A < x$, system (6) is not satisfied, and system (7) reduces to $x \leq q^A < z$. Therefore $A$ choses to lose the election if $q^A < z$. Moreover in all cases the following holds: $q^A < \max\{z, u\}$.

□

**Proof of Proposition (6)**

We first prove that problem (2) leads to solution $b^*$, and secondly we provide an explicit formula for $b^*$. We find the maximizers in the two cases: $q^A_{12} = q^A - b$ and $q^A_{12} - k \geq q^A - b$, and then we compare the two utilities to find the maximizer that solves problem (2). If $q^A_{12} = q^A - b$, $A$ simply implements $b^*$ that solves equation $2(q^M - b^*) = q^A - b^* + q_2^{*B}$. Platform $q^A_2$, for the case $q^{*A}_{12} - k \geq q^A - b^*$, is determined implicitly by equation (1) as

$$q^A_{12} = \begin{cases} 2(q^M - b) - \frac{q^M + \alpha(q^M - b)}{1+\alpha} - k + k, & \text{if } q^B - b > \frac{q^B_1 + \alpha(q^M - b)}{1+\alpha} + k, \\ 2(q^M - b) - q^B + b + k, & \text{if } \left| q^B - b - \frac{q^B_1 + \alpha(q^M - b)}{1+\alpha} \right| \leq k, \\ 2(q^M - b) - \frac{q^M + \alpha(q^M - b)}{1+\alpha} + k + k, & \text{if } q^B - b < \frac{q^B_1 + \alpha(q^M - b)}{1+\alpha} - k. \end{cases}$$

The derivative of the objective function is:

$$2 - \frac{\alpha}{1+\alpha} - 1, \text{ if } \left| q^B - b - \frac{q^M + \alpha(q^M - b)}{1+\alpha} \right| > k, \tag{8}$$

$$2 - 1 - 1, \text{ if } \left| q^B - b - \frac{q^M + \alpha(q^M - b)}{1+\alpha} \right| \leq k. \tag{9}$$

The derivative (8) is positive. The derivative (9) 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; 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 $q_{12}^A - k > q^A - b$, where $q_2^A$ satisfies equation (1). Therefore it is $\bar{b} - \epsilon$ such that $\bar{b}$ solves $q_{12}^A - k = q^A - \bar{b}$. Note that, by substituting $q_{12}^A - k = q^A - \bar{b}$ in equation (1), we obtain $2(q^M - \bar{b}) = q^A - \bar{b} + q_2^{*B}$. Thus $\bar{b} - \epsilon = b^* - \epsilon$. Let us prove that $b^* - \epsilon$ (and implementing $q_2^A$ such that $q_{12} - k > q^A - (b^* - \epsilon)$) provides a lower utility than $b^*$ (and implementing $q_2^A$ such that $q_{12}^A = q^A - b^*$). The utility in the former case is equal to $-\epsilon - \frac{1}{2}k$, because the incumbent's average platform is such that $q_{12}^A - k > q^A - (b^* - \epsilon)$ and the incumbent has to pay to 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 (2).

Secondly, we provide an explicit formula for $b^*$:

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

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

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

This analysis is performed, by sending $\epsilon$ to zero, which gave us the possibility to assume that if $A$ implements $b^*$, she wins even though 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 (1) as an inequality:

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

$$\begin{cases} b^* > (1+\alpha)\left(q^M - q^A - k\right), & \text{if } b^* < (1+\alpha)(q^B - q^M - k), \\ b^* > (1+\alpha)\left(q^M - q^A + k\right), & \text{if } b^* > (1+\alpha)(q^B - q^M + k). \end{cases} \tag{10}$$

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 (10), 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 implements $b^* + \epsilon$ such that $b^*$ satisfies $b^* = (1+\alpha)\left(q^M - q^A + k\right)$. By sending $\epsilon$ to zero we obtain the results stated in Proposition (6). 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, $\left|q^A - q^M\right| > k$.

$\square$

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