Political cycles : the opposition advantage*

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Abstract

We propose a two dimensional infinite horizon model of public consumption in which investments are decided by a winner-take-all election. Investments in the two public goods create a linkage across periods and parties have different specialities. We show that the incumbent party vote share decreases the longer it stays in power. Parties chances of winning do not converge and, when the median voter is moderate enough, no party can maintain itself in power for ever. Finally, the more parties are specialized and the more public policies have long-term effects, the more political cycles are likely to occur.
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In modern democracies, the alternation of political parties in power is a frequent phenomenon. Why isn't there a greater persistence of parties in power ? How can one explain the turnover of parties in government ? How can one explain political cycles ? We propose a theoretical model of political cycles, where the share of a party's vote decreases with the time it controls government. This effect, that we call "the opposition advantage", is different from the well known incumbent effect. Indeed, the incumbency effect measures the advantage given to the incumbent candidate competing with a challenger. The opposition effect measures the advantage of a candidate affiliated to the opposition party, when he competes against a candidate of the party in power, who is not necessarily the incumbent politician.

We propose an explanation of the opposition advantage and show that it can be a cause for political and policy cycles. We propose an infinite horizon model of repeated elections with two parties built on two main assumptions: policies have long-term effects[1], but are not irreversible, and parties have comparative advantages for the provision of two public goods. The two goods are imperfectly substituable for voters. For example, citizens need good education and security at the same time. When voters are moderate, they may wish that both parties govern, but they can only elect one of them at a time. In this context, the opposition party can offer more moderate policies. Indeed, the opposition can propose to keep the incumbent party policy long-term effect and satisfy voters in focusing on the public good that it has a comparative advantage upon. On the contrary, the party in power cannot benefit from the comparative advantage of the opposition party. These two arguments suggest that the opposition party may be advantaged.

Our analysis has to be distinguished from studies focusing on politicians' careers and swings in their popularity. A large strand of this literature deals with the "Incumbency advantage"[2]. This theory is supported by overwhelming evidence, both in Senate elections and in elections to the House of representatives. Some of the major factors of the incumbency advantage are

[1]Many public goods have long-term effect. Important examples are national defense activities, welfare programs, environmental clean-up, buiding states schools, roads ....

[2]Ansolabehere and Snyder (2002) provide an excellent survey of the incumbency advantage literature, and an empirical contribution on state and federal elections in U.S. for the period 1942-2000. They find strong support for the incumbency advantage in state executives elections and conclude that explanations specific to the legislators incumbency advantage are not convincing.

redistricting[3], seniority systems[4], and the lack of collective responsibility[5].

Scholars explain political cycles with psychological arguments[6], the main one being disappointment. The "Negativity effect" theory[7] is built on the following remark: voters' decisions are based on the incumbent's past performance and negative pieces of information have a greater impact than positive pieces of information. There exist two different explanations for this observation, the first one suggests that voters have a high esteem for powerful figures and are more easily disappointed than positively surprised by the government performance; the second (Abelson and Levy, 1985) states that the electorate has a strong risk aversion for potential costs of re-electing a politician who has demonstrated his bad performance. In the light of the negativity effect, Aragones (1997) obtains a result of systematic alternation of the two parties implementing different policies. In our analysis, there is no uncertainty and electorate decisions are not based on past performance, but as usually in political models, for their preferred party at each election. Finally, the negativity and incumbency effects affect the election outcome in opposing directions. The first one leads to the defeat of the incumbent , whereas the second one leads to the re-election of the incumbent. Both theories focus on individual politicians. Differently, our study does not deal with politicians but with parties.

In our model, political cycles emerge as a consequence of the opposition effect. There exists very few models considering this determinant of political cycles. Kramer (1977) and Bendor, Mookherjee and Ray (2005), study dynamic models of electoral competition between two parties with myopic behavior. Kramer (1977) suppose that the incumbent cannot change his policy whereas the challenger can locate anywhere in the policy space. He shows that candidates systematically alternate in power. Bendor, Mookherjee and

[3]Cox and Katz (2002) state that redistricting caused the rise of legislators incumbency advantage after the 60s.

[4]McKelvey and Riezman (1992) argue that seniority tends to create a disencentive to vote for challengers.

[5]See Persson and Tabellini (2000, chapter 4) for a survey of the incumbents accountability literrature.

[6]See Goertzel (2005) for a review of the american voters mood changes literrature. Schlesinger (1949, 1986, 1992) consider that the electorate is inevitably disappointed by the party or the ideology that is in power. Klinberg (1952) suggests that American mood in public opinion balances between introversion and extroversion. This could expalin why domestic and foreign concerns alternate through time and parties turnover in power.

[7]See Aragones (1997) for a survey.

Ray (2005) propose a model based on a satisfycing behavior of the incumbent and a search behavior of the challenger. If the winning candidate is satisfied, then he does not change his policy until he loses the election, whereas the challenger is not satisfied, then he searches a policy that can defeat the incumbent. In our study, parties, once elected, are not constrained to keep their policy the next election. Parties behave strategically, they try to win the present election in selecting their platforms and their behavior do not change whether they are in power or not.

Another topic related to our analysis are policy cycles. Many scholars argue that policy cycles are generated by economic cycles[8]. We propose a different explanation;.in our model, policy cycles are not generated by economic shocks but by the political structure. Since parties implement different policies[9], political turnover and policy changes are clearly related. In a very different framework, Roemer (1995) shows that policy cycles arise because of stochastic changes in voters preferences in a model with policy motivated candidates with uncertainty. Our approach is different in many aspects. We suppose that parties are only office motivated and the non-convergence of platforms does not result from uncertainty but from parties multidimensional heterogeneity. Furthermore, we show that perpetual cycles (but not necessarily periodic) appear in a context with no uncertainty.

In considering an infinite number of successive elections and a dynamic link coming from public policies long-term effects, our work contributes to the literature of infinite horizon models of repeated elections. This literature is mainly focused on the dynamic inefficiency of government [10]. Battaglini and Coate (2005) consider an infinite horizon model of collective spending and taxation. Public decisions are determined through a legislative bargaining process. Agents are forward looking, they take decisions in anticipating the

[8]A huge litterature studies political business cycles. See Berry (1991) for a survey.

[9]Hibbs (1977), Beck (1982), and Chappel and Keech (1986) show that Democrat and Republican governments have different influences on the unemployment rate. Alesina and Sachs (1988) and Tabellini and La Via (1989) show that parties are associated with different monetary policies.

[10]Baron (1996) studies a dynamic model of pork barrel policies. Gomes and Jehiel (2004) analyze the persistence of innefficiencies in a general framework of social and economic interactions that can be applied to legislative bargaining, coalition formation or exchange economies. Hassler, Storesletten and Zilibotti (2003) study public good provision in an OLG model, where an age-dependant taxation creates distorsions in human capital investment. Azzimonti, Sarte and Soares (2003) focus on the role of commitment in a dynamic public spending and taxation model.

outcomes of futures elections. The authors objective is very different from ours, because they concentrate on long-term government inefficiencies[11]. We do not analyze taxation and debt problems, then we suppose that the tax rate is fixed and that there is no saving and no debt.

Finally, in considering parties with different competences, our work contributes to the literature on valence in politics. A growing literature deals with models where policy and quality are orthogonal dimensions[12]. Here, we suppose that parties' competences are different according to the different policies[13]. Other authors analyze agency problems[14], where politicians are associated to a policy-dependent competence level and voters have incomplete information on politicians type and/or actions[15]. We extend the assumption of heterogeneous competences to the case of two dimensions, but we suppose that they are common knowledge.

The paper is organized as follows. In section 1, we present voters behavior and parties constraints. In section 2, we derive the multiple possible outcomes of the electoral competition. In section 3, we show that the opposition party is advantaged. In section 4, we present our main results: the probability of winning cannot converge; when the median voter is extremist, a party can stay in power for ever, whereas when he is moderate, no party can keep power for ever; and we show that cycles are more likely to occur when the depreciation rate is low and when parties are strongly specialized. In section

[11] In a close study, Azzimonti-Renzo (2005) analyzes government long-term innefficiences when the decision maker is atomistic.

[12] This literrature, initiated by Stokes (1992) focus on the problem of equilibrium existence and platforms location in spatial models when candidates have different "scores" on the quality dimension. Ansolabehere and Snyder (2000) study the unidimensional model in a world of certainty; Aragones and Palfrey (2002) analyze the case where candidates maximize their share of votes and overcome the pure strategy equilibrium non-existence problem in studying mixed strategy equilibrium for small advantage levels. Groseclose (1999) and Aragones and Palfrey (2004) add candidates policy concerns.

[13] As noticed by Prat (2002): "One may doubt that [voters] utility is separable in policy and valence. A left wing voter may prefer an inept right-wing politician to an effective right-wing politician because the latter is more likely to live up to his or promises and pass right-wing legislation. Still, an inept politician creates pure inefficiencies which are costly to all citizens."

[14] See again Persson and Tabellini (2000, chapter 4, section 4.7) for a review of this literature.

[15] Rogoff and Siebert (1988) propose a model of adverse selection and Rogoff and Sundaram (1993, 1996) study politician accountability in models with moral hazard and adverse selection.

6, we discuss two candidates objectives (re-election concerns and rent-seeker candidates). Finally, we conclude in section 7.

1 The model

We consider an infinite horizon model of repeated elections with two opportunistic parties A and B. Each period, voters elect a party and the new government implements his platform. Then, another election takes place, and so on. The government provides two durable public goods, a and b, that depreciate each period with a constant rate δ in $[0,1]$, and the government 's budget is normalized to 1 at any period. A new government can either keep the existing stocks or transform one of the public good into the other. Specifically, if the level of public good g ($g=a,b$) after election t is g_t and $I_{g,t+1}$ new units are produced by the government in period $t+1$, then the level in period $t+1$ is[16]:

$$g_{t+1} = (1-\delta)\, g_t + I_{g,t+1},$$

where $g=a,b$. The level g_{t+1} can be either greater or smaller than g_t. When $g_{t+1} \geq g_t$, this means that the government at time $t+1$ chooses to keep the stock of public good g. If $g_{t+1} < g_t$, the government either undoes or does not invest enough in good g to maintain its level. A policy z_t is a couple of public goods quantities (a_t, b_t).

Voters:

Voters differ in the weight they place on the two public goods. Voter i's weight for the first public good is denoted by α_i, belonging to the unit interval $[0,1]$. The preferences of voter i are represented by:

$$W_i\,(a_t, b_t) = \alpha_i \ln(a_t) + (1-\alpha_i)\ln(b_t)\,,$$

where a_t and b_t are the public goods stocks after date t. The policy after election t is noticed $z_t = (a_t, b_t)$.

This kind of preferences, introduced by Tabellini and Alesina (1990), allows voters to disagree about which quantities of public goods to consume.

[16] Azzimonti-Renzo (2005) and Battaglini and Coate (2005) make the same assumption on the long-term effect of public spending.

Furthermore, these preferences belong to the class of "intermediate preferences" defined by Grandmont (1978), and verify the single crossing property (Grandmont, 1978). The median voter theorem applies, i.e. the median voter's preferred policy is the unique Condorcet winner. The preferred policy of the median voter, characterized by α_m, is thus the Condorcet winner in our context.

It is important to notice that the identity of the median voter α_m, does not depend on the date, i.e, is independent of the dynamics of the model.

Parties:

At each period, both parties propose credible platforms in order to win the election. The government's

budget constraint is:

$$I_{a,t} + I_{b,t} \leq 1,$$

We define a party as a stable organization, which can provide the two public goods. We suppose that the two parties are specialized: party A has a comparative advantage in providing good a and party B a comparative advantage in providing good b. This advantage will be captured by two constants, $\eta^A \in]1, \overline{\eta}]$ and $\eta^B \in]1, \overline{\eta}]$ which are inversely related to the marginal cost of providing the public goods. Finally, we suppose that the technology for providing both public goods has constant returns to scale, with marginal costs of $1/\eta^A$ and 1 for party A and 1 and $1/\eta^B$ for party B. With these specifications in mind, we write the budget constraints of the two parties at an election at date t as:

Party A:

$$\frac{a_t - (1-\delta)\, a_{t-1}}{\eta^A} + b_t - (1-\delta)\, b_{t-1} \leq 1, \tag{A}$$

Party B:

$$a_t - (1-\delta)\, a_{t-1} + \frac{b_t - (1-\delta)\, b_{t-1}}{\eta^B} \leq 1, \tag{B}$$

where stocks of the two public goods must be positive, i.e., $a_t, b_t \geq 0$. Inequality (A) defines party A's set of policy $\mathbf{A}(t)$ and inequality (B) define party B's set of policy $\mathbf{B}(t)$.

2 Political Equilibria

2.1 The median voter choice

The median voter selects the winning party, and her choice drives the dynamics of successive elections. We start the analysis by deriving her preferred platform over the set of credible platforms. The median voter's preferred policy over $\mathbf{A}(t)$, denoted m_t^A is the solution to:

$$\underset{(a_t,b_t)}{Max} \ [W_i(a_t,b_t)] \qquad \text{(MA)}$$
$$s.t. : (a_t,b_t) \in \mathbf{A}(t)$$

and her preferred platform over $\mathbf{B}(t)$, denoted m_t^B is the solution to:

$$\underset{(a_t,b_t)}{Max} \ [W_i(a_t,b_t)] \qquad \text{(MB)}$$
$$s.t. : (a_t,b_t) \in \mathbf{B}(t)$$

Straightforward calculations allow us to characterize the median voters' preferred policies:

$$m_t^A = \left(\eta^A \alpha_m s_{t-1}^A, (1-\alpha_m) s_{t-1}^A\right),$$
$$m_t^B = \left(\alpha_m s_{t-1}^B, \eta^B (1-\alpha_m) s_{t-1}^B\right),$$

where $s_{t-1}^A = 1 + (1-\delta)\left(b_{t-1} + \frac{a_{t-1}}{\eta^A}\right)$ and $s_{t-1}^B = 1 + (1-\delta)\left(a_{t-1} + \frac{b_{t-1}}{\eta^B}\right)$.

Hence, the derivation of the median voter's preferred platform depends on the public goods stocks a_{t-1} and b_{t-1}. She has to compare m_t^A and m_t^B. Let $\Lambda_t(.)$ be such that:

$$\Lambda_t(\alpha_m) = \frac{s_{t-1}^A}{s_{t-1}^B} \frac{\left(\eta^A\right)^{\alpha_m}}{\left(\eta^B\right)^{1-\alpha_m}},$$

The median voter weakly prefers m_t^A to m_t^B if and only if $W_i\left(m_t^A\right) \geq W_i\left(m_t^B\right)$. With simple computations, one can show that the median voter weakly prefers m_t^A to m_t^B if and only if $\Lambda_t(\alpha_m) \geq 1$. Not surprisingly, the more A is competent, the less B is competent, and the more α_m is high, the higher the likelihood that the median voter chooses a policy in A's policy set.

2.2 Equilibria

Parties select their platforms in order to win the election. Party A (respectively party B) maximizes is probability of victory π_t^A (respectively π_t^B). In the case where the median voter is indifferent between the two programs, we suppose that each party is equally likely to win the election. We denote by z_t^A party A's platform and by z_t^B party B's platform in the election at date t. Let $\mathbf{M}^A(t)$ (respectively $\mathbf{M}^B(t)$) be the set of party A platforms strictly preferred to m_t^B (respectively to m_t^A). Formally:

$$\mathbf{M}^A(t) = \left\{ z_t \in \mathbf{A}\left(t\right) : W_m\left(z_t\right) > W_m\left(m_t^B\right)\right\},$$

$$\mathbf{M}^B(t) = \left\{ z_t \in \mathbf{B}\left(t\right) : W_m\left(z_t\right) > W_m\left(m_t^A\right)\right\},$$

Since parties are only interested in winning the election, a platform that the rival cannot defeat is an equilibrium strategy. This leads to a multiplicity of Nash equilibria, summarized in the following proposition:

Proposition 1 *The set of Nash equilibrium is always non empty and is:*
(i) $\mathbf{M}^A(t) \times \mathbf{B}\left(t\right)$ *if* $\Lambda_t > 1$, *and* A *is elected,*
(ii) $\mathbf{A}\left(t\right) \times \mathbf{M}^B(t)$ *if* $\Lambda_t < 1$, *and* B *is elected,*
(iii) $\left(m_t^A, m_t^B\right)$ *if* $\Lambda_t = 1$, *and* A *and* B *are elected with probability* $\frac{1}{2}$.

(Proofs are reported in the appendix.)

These results lead to several observations. First, because parties only want to win the election and the information is complete, one party is in general certain to be elected (in cases (i) and (ii)). This party can propose many winning platforms, whereas the loser locates anywhere in his policy set. Figure 2 illustrates this kind of equilibrium:

Second, in very specific circumstances (in case (iii)), the median voter is indifferent between the two parties (see Figure 3). If this event occurs, it will dramatically change the dynamics of elections, as we discuss section 4.1.

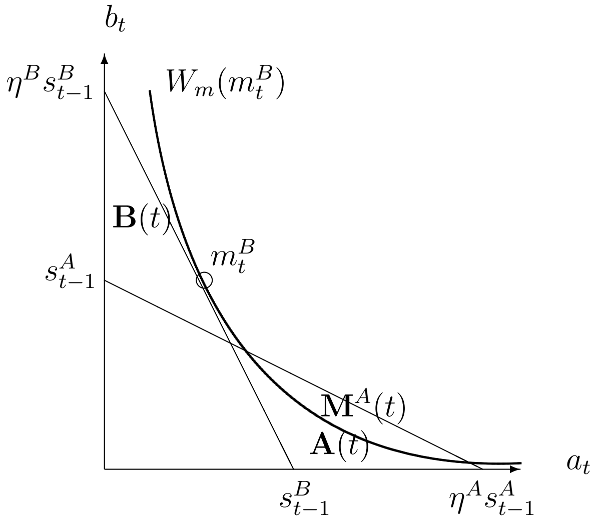

Figure 1: Candidate A winning strategies when $\Lambda_t > 1$

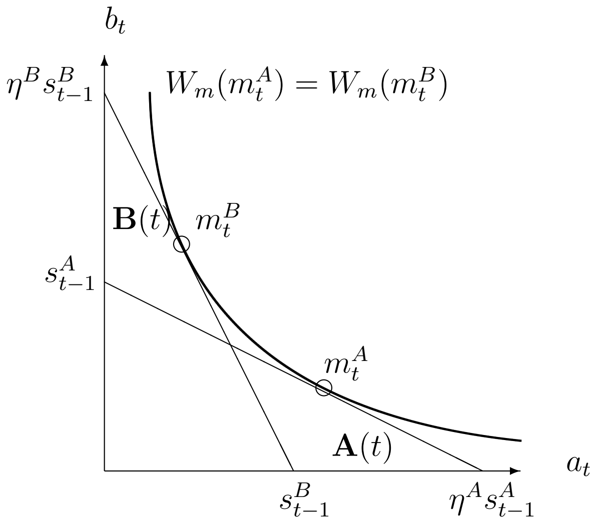

Figure 2: Equilibrium strategies when $\Lambda_t = 1$

3 The opposition advantage

In this section, we discuss about the advantage conferred to the party in the opposition. Consider two elections at dates t and $t+1$, and suppose that B wins the election at date t. Then B implements his policy $z^B_t = \left(a^B_t, b^B_t\right) \in$

$\mathbf{M}^B(t)$, one of his equilibrium platform for election t. Since B is the winner, it is necessarily true that $\Lambda_t \leq 1$. First remark that $z_t^B \notin \mathbf{A}(t)$ because of the definitions of $\mathbf{M}^B(t)$ and m_t^A, so that z_t^B must satisfy

$$\frac{a_t^B - (1-\delta)\, a_{t-1}}{\eta^A} + b_t^B - (1-\delta)\, b_{t-1} > 1,$$

This simply means that if A would try to imitate B at election t, then he would violate his budget constraint. Furthermore, since B wins at t, then $(a_t, b_t) = \left(a_t^B, b_t^B\right)$. This last equation can be then rewritten as follows:

$$s_t^A - 1 > (1-\delta)\, s_{t-1}^A. \tag{1}$$

By definition, $z_t^B \in \mathbf{B}(t)$, so that:

$$a_t^B - (1-\delta)\, a_{t-1} + \frac{b_t^B - (1-\delta)\, b_{t-1}}{\eta^B} \leq 1,$$

or, equivalently,

$$s_t^B - 1 \leq (1-\delta)\, s_{t-1}^B. \tag{2}$$

Using equations 1 and 2, we obtain:

$$\frac{s_{t-1}^A}{s_t^B} < \frac{s_t^A - 1}{s_t^B - 1},$$

Furthermore, it is easy to check that $\frac{s_t^A}{s_t^B} \geq \frac{s_t^A - 1}{s_t^B - 1}$, only because s_t^A and s_t^B are strictly greater than 1. Finally, the relative advantage of party A is strictly greater at election $t+1$ than at election t. This result is summarized in the next proposition:

Proposition 2 *At each election, the relative advantage of the opposition party increases: for all t where A is the opposition party, $\Lambda_{t+1} > \Lambda_t$.*

(Proof: see the reasoning above.)

This result states that the share of votes of the opposition party generally increases from one election to the next. The intuition of this result is that when a party is elected, since he must implement his promises, he gives the opposition party the opportunity to propose a more satisfactory platform on both dimensions. This effect drives the dynamics of elections and, when it is sufficiently large, can lead to a switch in power between the majority and the minority.

4 Political Cycles

In this section, we study the dynamics of elections and public good provision. The questions arising at this point are: What is the long run behavior of the dynamics of elections ? Does the parties' probability of winning converge to one half ? How do cycles depends on the median voter preferences ? On the parties competences ? On the durability of public goods?

4.1 Do parties' winning probabilities converge?

We focus on the special case (iii), where each candidate has one half chance of winning election k. We have shown that the sequence $(\Lambda_t)_t$ is decreasing when A is not in power, and, by symmetry, is increasing when A is in power. Then, the sequence is either always increasing and then for all t, $\Lambda_t \leq 1$, always decreasing and for all t, $\Lambda_t \geq 1$, or follows a cycle.

This sequence can not converge to 1. Indeed, suppose that there exists an election k such that $\Lambda_k = 1$. Then each party has one half chance of being elected in k. Without loss of generality, suppose that A is elected, then $\Lambda_{k+1} < \Lambda_k = 1$, and party B is elected for sure in $k+1$. The following corollary of proposition 2 summarizes this result:

Corollary 1 *If $\Lambda_k = 1$, the elected party in k is defeated in $k+1$.*

(The proof relies on the simple argument above.)

The intuition of this result is that, when the median voter is indifferent between both platforms ($\Lambda_k = 1$), he would indeed like both platforms to be implemented in turn[17]. But only one party is elected, and provides a polarized platform. At the next election, the opposition party will provide a policy which uses the stock of public goods implemented by the majority, but is closer to the median voter's preferences.

4.2 Stable power

The following proposition provides sufficient conditions for a party to constantly remain in power.

[17] The intuition is close to Alesina and Rosenthal (1996) at the difference that, in our model, voters cannot mix policies during a unique mandate, but they get mixed policies through successive mandates with parties turnover.

Proposition 3 *There exists* $0 < \underline{\alpha} < \overline{\alpha} < 1$ *such that, for all* $\left(\alpha_m, \delta, \eta^A, \eta^B, a_0, b_0\right) \in [0,1]^2 \times]1, \overline{\eta}]^2 \times R_+^2$*:*
(i) If $\alpha_m \in [0, \underline{\alpha}]$ *, then party B wins all elections,*
(ii) If $\alpha_m \in [\overline{\alpha}, 1]$ *, then party A wins all elections.*

(Proof: see the appendix)

The intuition of this result is straightforward. If the median voter has extreme tastes, then one of the two parties is abbe to keep power forever by exploiting its comparative advantage in providing one of the two policies.

4.3 Cycles

We now analyze cycles where parties alternate in power. We wish to know when these cycles are not conjunctural, namely, when they are independent of the initial stocks of public good, a_0 and b_0.We define political cycles in the following way:

Definition 1 *A set of parameters* $\left(\alpha_m, \delta, \eta^A, \eta^B, a_0, b_0\right) \in [0,1]^2 \times]1, \overline{\eta}]^2 \times R_+^2$*, exhibits* ***political cycles*** *if and only if no party wins an infinite number of consecutive elections.*

Formally, we study the case where the sequence $(\Lambda_t)_t$ does not converge and does not diverge. Unfortunately, because there exist many equilibria at each election, we cannot give necessary and sufficient conditions on the set of parameters such that it exhibits political cycles. However, we propose a sufficient condition for the existence of political cycles:

Proposition 4 *For all* $\left(\delta, \eta^A, \eta^B, a_0, b_0\right) \in]0,1[\times]1, \overline{\eta}]^2 \times R_+^2$*, there exist* $\alpha_1 < \alpha_2$ *both in* $[0,1]$*, such that: if* $\alpha_m \in [\alpha_1, \alpha_2]$ *no party can maintain itself indefinitely in power.*

4.4 Comparative statics

Since there exist many equilibria, it seems complicated to provide general comparative statics. To give an insight into the influence of the depreciation rate and the candidates competences on political cycles we suppose, for simplicity, that the winning candidate always implements the median voter preferred platform[18], that is m_t^A (respectively m_t^B) when candidate A (respectively candidate B) wins the election t. Furthermore, we consider the simple case where $\eta^A = \eta^B = \eta$, i.e. when candidates are equally competent in their respective specialities. Under these assumptions, we obtain the following comparative statics results:

Proposition 5 *The interval* $[\alpha_1, \alpha_2]$ *defined in Proposition 4 is unique and,*

$$\frac{\partial(\alpha_2 - \alpha_1)}{\partial \eta} > 0,$$

and,

$$\frac{\partial(\alpha_2 - \alpha_1)}{\partial \delta} < 0.$$

The higher the specialization of parties, the larger the parameter range for which political cycles occur. When parties become more specialized, they implement more extreme policies and the median voter is more willing to switch in order to see the other good provided. When the depreciation rate increases, goods have shorter effects and voters need less power turnover.

5 Extensions: parties' lexicographic preferences

The results presented in the precedent sections hold without specifying the choice of an elected party among the generally large set of winning policies. We now allow parties to select one policy in order to maximize a sub-objective function. In other words, parties of lexicographic preferences: they first want to be elected, and select among the winning platforms that platform which maximizes their subobjective. Formally, party A's program becomes:

$$\begin{aligned} &\underset{z_t^{A*} \in \mathbf{A}(t)}{Max} \; \Pi_t^A \left(z_t^{A*}, z_t^B\right), \\ s.t. \quad : \quad &\forall z_t^A \in \mathbf{A}(t), \; \pi_t^A \left(z_t^{A*}, z_t^{B*}\right) \geq \pi_t^A \left(z_t^A, z_t^{B*}\right), \end{aligned}$$

[18] The median voter preferred platform is always an equilibrium platform for the winning candidate.

and candidate B's program is:

$$\underset{z_t^{B*}\in\mathbf{B}(t)}{Max}\ \Pi_t^B\left(z_t^A, z_t^{B*}\right),$$
$$s.t.\ :\ \forall z_t^B \in \mathbf{B}(t),\ \pi_t^B\left(z_t^{A*}, z_t^{B*}\right) \geq \pi_t^B\left(z_t^{A*}, z_t^B\right),$$

5.1 Re-election concerns

Suppose that parties want to be re-elected, and consider the following reduced form for a long-run, non myopic behavior of political parties. At the election at date t, the winning party's subobjective is to maximize his relative advantage in the next election, that is Λ_{t+1} for party A, and $\frac{1}{\Lambda_{t+1}}$ for party B. A party first wishes to be elected, and then to create the most favorable conditions for its re-election. If $\Lambda_t = 1$, then equilibrium programs are derived from their first objective of victory and they play $\left(m_t^A, m_t^B\right)$. But, if $\Lambda_t \neq 1$, for example $\Lambda_t > 1$, then party A can choose many winning programs. In this case, it chooses a platform $z_t^A = \left(a_t^A, b_t^A\right) \in \mathbf{M}^A(t)$. Hence, its relative advantage for the next election is $\Lambda_{t+1} = \frac{1+(1-\delta)\left(b_t+\frac{a_t}{\eta^A}\right)}{1+(1-\delta)\left(a_t+\frac{b_t}{\eta^B}\right)}\frac{\left(\eta^A\right)^{\alpha m}}{\left(\eta^B\right)^{1-\alpha m}}$. Intuitively, since Λ_{t+1} is decreasing in a_t and increasing in b_t, party A will choose a program with a minimum of good a and a maximum of good b. Unfortunately, Λ_{t+1} has no maximum in $\mathbf{M}^A(t)$, but it has a supremum value:

Proposition 6 Λ_{t+1} *admits a supremum over* $\mathbf{M}^A(t)$ *and there exists a unique corresponding program with a minimum quantity of* a *and a maximum quantity of* b.

(The Proof is in the appendix)

This result suggests that parties seeking re-election choose very inefficient platforms, because they do not fully exploit their comparative advantage. The intuition is that a party has to provide some of the public good that he is not competent at producing, in order to induce voters to reelect him next period. Figure 4 illustrates this inefficient platform, denoted $\overline{z}_t^A$, when A wins the election:

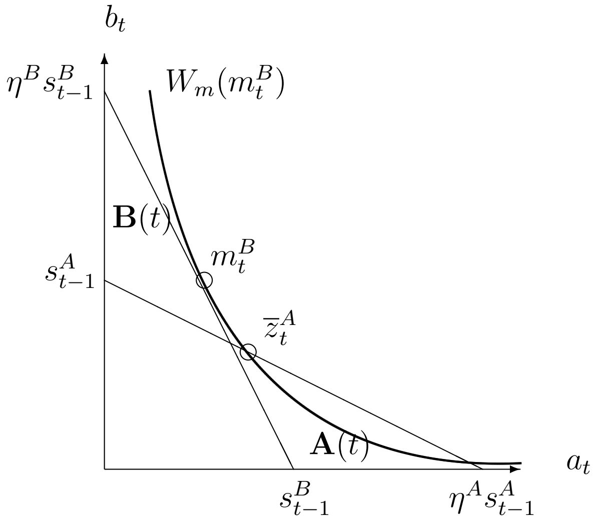

Figure 3: When candidate A has re-election concerns and $\Lambda_t > 1$

5.2 Rent-seeker candidates

The results of previous sections also hold when the candidates' sub-objective is to extract rents from power. Formally, if A wins the election, he chooses to maximize his rent from power:

$$\begin{aligned} & \underset{r^A_t}{Max}\left[r^A_t\right] \\ s.t. \quad : \quad & \frac{a^A_t}{\eta^A} + b^A_t + r^A_t \leq s^A_{t-1} \\ \text{and, } \left(a^A_t, b^A_t\right) \quad \in \quad & \mathbf{M}^A(t) \end{aligned}$$

As in the case of reelection concerns, the problem has no maximum in $\mathbf{M}^A(t)$, but a supremum exists:

Proposition 7 *(i) If* $\Lambda_t \geq 1$, $r^{A*}_t = \left(1 - \frac{1}{\Lambda_t}\right) s^A_{t-1}$ *is the supremum of* r^A_t *over* $\mathbf{M}^A(t)$*,*
(ii) If $\Lambda_t \leq 1$, $r^{B*}_t = (1 - \Lambda_t)\, s^B_{t-1}$ *is the supremum of* r^B_t *over* $\mathbf{M}^B(t)$.

One can approximate the maximization program in supposing that the winning candidate P chooses to extract $r^{P*}_t - \varepsilon$, with ε being an infinitesimal positive real number. Then, the higher the relative advantage of candidate

A (Λ_t), the higher the rents he can extract. Figure 5 illustrates this result, where candidate A's equilibrium platform is denoted $\overline{z}_t^A$:

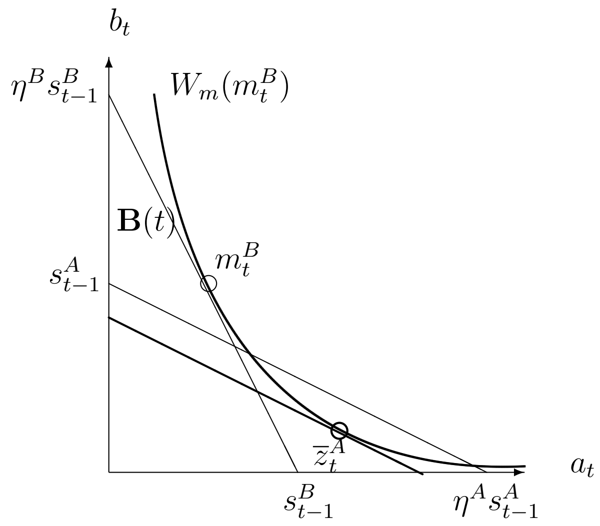

Figure 4: When candidate A has re-election concerns and $\Lambda_t > 1$

Furthermore, notice that we know from Proposition 2, that $\Lambda_{t+1} > \Lambda_t$. Hence, if A wins the election at t and $t+1$, we obtain that $r_{t+1}^{A*} < r_t^{A*}$. This would suggest that the longer a party is in power, the smaller the rents he can extract.. We have to be cautious with this observation because of problems of enforceability. Indeed, if parties cannot be forced to implement their promises, an incumbent who is certain to lose the next election will extract all the rents from power. Persson and Tabellini (2000, chapter 4).discusses this issue and provides a survey of the relevant literature.

6 Conclusion

We have considered an infinite horizon dynamic model of public consumption with durable public goods. We have shown that the longer a party keeps power, the more the opposition is likely to come back to power. Therefore, we have been able to show that policy and political cycles can occur, when the median voter preferences are balanced enough between the public goods provided by the two parties. This result holds when the parties' main objective is to win the election and is compatible with a large range of candidates sub-objectives, that may change from one election to the next. In particular, we have shown that a candidate seeking re-election will choose a very inefficient platform, providing the minimal quantity of the public good in which he has a comparative advantage.

7 Appendix

Proof of Proposition 1:
(i) If $\Lambda_t > 1$, by definition, the median voter strictly prefers m_t^A than m_t^B. Hence, $m_t^A \in \mathbf{M}^A(t) \neq \emptyset$. Let $z_t^A \in \mathbf{M}^A(t)$ and $z_t^B \in \mathbf{B}(t)$, then $W_m\left(z_t^A\right) > W_m\left(m_t^B\right) \geq W_m\left(z_t^B\right)$. Then $\left(\pi_t^A, \pi_t^B\right) = (1,0)$ and no party has an incentive to deviate. This implies that $\mathbf{M}^A(t) \times \mathbf{B}(t) \subset \mathbf{E}(t)$. Now, choose $z_t^A \notin \mathbf{M}^A(t)$, then $W_m\left(m_t^B\right) \geq W_m\left(z_t^A\right)$. In this case $\pi_t^A < 1$, then party A has an incentive to move and play, for example, m_t^A.
(ii) The proof is the symmetric reasoning of case (i).
(iii) If $\Lambda_t = 1$, by definition, $W_m\left(m_t^A\right) = W_m\left(m_t^B\right)$. Suppose that party A plays m_t^A and party B chooses $z_t^B \neq m_t^B$. Since m_t^B is the unique preferred program of the median voter in $\mathbf{B}(t)$, we have that $W_m\left(m_t^B\right) > W_m\left(z_t^B\right)$, and $\pi_t^B\left(m_t^A, z_t^B\right) = 0 < \pi_t^B\left(m_t^A, m_t^B\right) = \frac{1}{2}$. The same is true concerning party A, then $\left(m_t^A, m_t^B\right)$ is the unique equilibrium.

Proof of Proposition 3:
Let us consider an election at date t. Public goods stocks are $\left((1-\delta)\, a_{t-1}, (1-\delta)\, b_{t-1}\right)$, and:

$$\Lambda_t(\alpha_m) = \frac{1 + (1-\delta)\left(b_{t-1} + \frac{a_{t-1}}{\eta^A}\right)}{1 + (1-\delta)\left(a_{t-1} + \frac{b_{t-1}}{\eta^B}\right)} \frac{\left(\eta^A\right)^{\alpha_m}}{\left(\eta^B\right)^{1-\alpha_m}},$$

This is a continuous and strictly increasing function of α_m. Its value is $\frac{1+(1-\delta)\left(b_{t-1}+\frac{a_{t-1}}{\eta^A}\right)}{\eta^B+(1-\delta)\left(\eta^B a_{t-1}+b_{t-1}\right)} < 1$, and $\frac{\eta^A+(1-\delta)\left(\eta^A b_{t-1}+a_{t-1}\right)}{1+(1-\delta)\left(a_{t-1}+\frac{b_{t-1}}{\eta^B}\right)} > 1$ when $\alpha_m = 1$. Then, there exists a unique value of α_m, denoted $\widehat{\alpha}_t$, such that $\Lambda_t = 1$:

$$0 < \widehat{\alpha}_t = \frac{\ln\left(\eta^B \frac{s_{t-1}^B}{s_{t-1}^A}\right)}{\ln\left(\eta^A \eta^B\right)} < 1,$$

Since this is true for all t, there exist $0 < \underline{\alpha} < \overline{\alpha} < 1$, such that for all t :

$$\underline{\alpha} < \widehat{\alpha}_t < \overline{\alpha},$$

Finally, if $0 \leq \alpha_m \leq \underline{\alpha}$, then, for all t, $\Lambda_t < 1$, and B wins. If $\overline{\alpha} \leq \alpha_m \leq 1$, then, for all t, $\Lambda_t > 1$, then A wins.

Proof of Proposition 4:
In section 3, we have shown that, when B wins the election t, the two following inequalities hold:

$$s_t^A > (1-\delta)\, s_{t-1}^A + 1, \tag{3}$$

and,

$$s_t^B \leq (1-\delta)\, s_{t-1}^B + 1. \tag{4}$$

Claim 1: We claim that there exists k such that for all $t \geq k$, B wins the election t. Then the two precedent inequalities hold for all $t \geq k$, then, for all $t > k$:

$$s_t^A > (1-\delta)^{t-k}\, s_k^A + t - k, \tag{5}$$

$$s_t^B \leq (1-\delta)^{t-k}\, s_k^B + t - k. \tag{6}$$

Combining Inequalities 5 and 6 leads to the following inequality:

$$\frac{s_t^A}{s_t^B} > \frac{(1-\delta)^{t-k}\, s_k^A + t - k}{(1-\delta)^{t-k}\, s_k^B + t - k},$$

Since B wins forever after k, then for all $t > k$, $\Lambda_t \leq 1$. Furthermore $(\Lambda_t)_t$ is increasing, then it converges to a value $\widetilde{\Lambda}$. Remember that $\Lambda_{t+1} = \frac{s_t^A}{s_t^B} \frac{\left(\eta^A\right)^{\alpha_m}}{\left(\eta^B\right)^{1-\alpha_m}}$. Hence, since $(1-\delta) < 1$,

$$\widetilde{\Lambda} > \frac{\left(\eta^A\right)^{\alpha_m}}{\left(\eta^B\right)^{1-\alpha_m}},$$

Then, there exists a real number $0 < \varepsilon_1 < 1$, such that a necessary condition for Claim 1 is:

$$\widetilde{\Lambda} > \frac{\left(\eta^A\right)^{\alpha_m}}{\left(\eta^B\right)^{1-\alpha_m}} + \varepsilon_1 > \frac{\left(\eta^A\right)^{\alpha_m}}{\left(\eta^B\right)^{1-\alpha_m}}.$$

Claim 2: We claim that there exists k such that for all $t \geq k$, A wins the election t. Then for all $t > k$, $\Lambda_t \geq 1$. By an argument symmetric to that of Claim 1, $(\Lambda_t)_t$ converges to $\widehat{\Lambda}$, and there exists a real number $0 < \varepsilon_2 < 1$, such that a necessary condition for Claim 2 is:

$$\widehat{\Lambda} < \frac{\left(\eta^A\right)^{\alpha_m}}{\left(\eta^B\right)^{1-\alpha_m}} - \varepsilon_2 < \frac{\left(\eta^A\right)^{\alpha_m}}{\left(\eta^B\right)^{1-\alpha_m}}.$$

Finally, if,

$$\frac{\ln\left(\eta^{B}\right)+\ln\left(1-\varepsilon_{1}\right)}{\ln\left(\eta^{A}\eta^{B}\right)}\leq\alpha_{m}\leq\frac{\ln\left(\eta^{B}\right)+\ln\left(1+\varepsilon_{2}\right)}{\ln\left(\eta^{A}\eta^{B}\right)},$$

then $\widehat{\Lambda}<1<\widetilde{\Lambda}$, and Claim 1 and 2 are contradictory, so that no party can win an infinite number of consecutive elections. Then there exist $\alpha_1<\alpha_2$ such that no party can win an infinite number of consecutive elections.

Proof of Proposition 6:

First we prove that $\overline{a}_t=\underset{a_t\in\left[0,\eta^A s^A_{t-1}\right]}{\arg\min}\left(W_m\left(a_t,s^A_{t-1}-\frac{a_t}{\eta^A}\right)=W_m\left(m^B_t\right)\right)$ exists and is unique. This equation is equivalent to:

$$\left(\frac{\mu}{\alpha_{m}}\right)^{\alpha_{m}}\left(\frac{1-\mu}{1-\alpha_{m}}\right)^{1-\alpha_{m}}=\frac{1}{\Lambda_{t}\left(\alpha_{m}\right)},\tag{7}$$

where $\mu=\frac{a_t}{\eta^A s^A_{t-1}}\in[0,1]$. Here $\Lambda_t>1$, and, by proposition 3, $\alpha_m>0$. The right-hand side of (7) is null when $\mu=0$ and equal to 1 when $\mu=\alpha_m$. Thus 7 admits a solution. If $\alpha_m=1$, then the right-hand side is strictly decreasing in μ, and the solution is unique. If $\alpha_m<1$, then the right-hand side is concave in μ, is null when $\mu=0$ or 1, and maximal when $\mu=\alpha_m$. Thus 7 has two different solutions. Hence, the set of solutions is finite, then the argmin exists and is unique. Now, consider the following maximization program:

$$\begin{aligned}&\underset{z^A_t\in\mathbf{A}(t)}{Max}\ \Lambda_{t+1},\\ s.t.\ :\ &W_m\left(z^A_t\right)\geq W_m\left(m^B_t\right).\end{aligned}$$

Since Λ_{t+1} is strictly decreasing in a_t and strictly increasing in b_t, $\overline{z}_t=\left(\overline{a}_t,s^A_{t-1}-\frac{\overline{a}_t}{\eta^A}\right)$ is the unique solution to this maximization problem, and the optimal value of Λ_{t+1} is a supremum of Λ_{t+1} over $\mathbf{M}^A\left(t\right)$.

Proof of Proposition 7: (i) It is simple to verify that the median voter's preferred program in $\mathbf{A}\left(t\right)$ when candidate A extracts a rent r^A_t is $\widetilde{z}^A_t=\left(\eta^A\alpha_m\left(s^A_{t-1}-r^A_t\right),\left(1-\alpha_m\right)\left(s^A_{t-1}-r^A_t\right)\right)$. Then, the median voter weakly prefers $\widetilde{z}^A_t$ to m^B_t if and only if:

$$r^A_t\leq\left(1-\frac{1}{\Lambda_t}\right)s^A_{t-1}.$$

(ii) Symmetrically, the median voter preferred platform in $\mathbf{B}(t)$, when candidate B extracts a rent r_t^B, is $\widetilde{z}_t^B = \left(\alpha_m \left(s_{t-1}^B - r_t^B\right), \eta^B \left(1-\alpha_m\right)\left(s_{t-1}^B - r_t^B\right)\right)$. Then, the median voter weakly prefers $\widetilde{z}_t^B$ to m_t^A if and only if:

$$r_t^B \leq \left(1-\Lambda_t\right) s_{t-1}^B.$$

Proof of Proposition 5:
Claim 1: There exists k such that for all $t \geq k$, B wins the election t. Then at $t+1$, he implements $m_{t+1}^B = \left(\alpha_m s_t^B, \eta\left(1-\alpha_m\right) s_t^B\right)$ and:

$$s_{t+1}^A = 1 + (1-\delta)\left(\eta\left(1-\alpha_m\right) + \frac{\alpha_m}{\eta}\right) s_t^B,$$

and,

$$s_{t+1}^B = 1 + (1-\delta)\, s_t^B.$$

Since $\delta > 0$, then s_t^B converges to $\frac{1}{\delta}$, and s_t^A to $1 + \frac{1-\delta}{\delta}\left(\eta\left(1-\alpha_m\right) + \frac{\alpha_m}{\eta}\right)$. Hence, Λ_t converges to:

$$\widetilde{\Lambda}\left(\alpha_m\right) = \left(\delta + (1-\delta)\left(\eta\left(1-\alpha_m\right) + \frac{\alpha_m}{\eta}\right)\right)(\eta)^{2\alpha_m - 1},$$

By Proposition 2, $\left(\Lambda_t\right)_t$ increases and we obtain that *Claim 1* is equivalent to $\widetilde{\Lambda}\left(\alpha_m\right) \leq 1$. The inequality is weak, because by Corollary 2 Λ_t cannot attain its limit when $\widetilde{\Lambda}\left(\alpha_m\right) = 1$. Let $f^B\left(\alpha_m\right) = \widetilde{\Lambda}\left(\alpha_m\right) - 1$, then *Claim* 1 is equivalent to $f^B\left(\alpha_m\right) \leq 0$. Now we turn to the symmetric Claim for party A:

Claim 2: There exists k such that for all $t \geq k$, A wins the election t. With the same arguments as those of *Claim* 1, we obtain that $\left(\Lambda_t\right)_t$, which is now decreasing, converges to:

$$\widehat{\Lambda}\left(\alpha_m\right) = \frac{1}{\delta + (1-\delta)\left(\frac{1-\alpha_m}{\eta} + \eta\alpha_m\right)}(\eta)^{2\alpha_m - 1},$$

And *Claim* 2 is equivalent to $\widehat{\Lambda}\left(\alpha_m\right) \geq 1$. Let $f^A\left(\alpha_m\right) = \frac{1}{\widehat{\Lambda}\left(\alpha_m\right)} - 1$, then *Claim* 2 is equivalent to $f^A\left(\alpha_m\right) \leq 0$. Furthermore,

$$f^A\left(\alpha_m\right) \propto \delta + (1-\delta)\left(\frac{1-\alpha_m}{\eta} + \eta\alpha_m\right) - (\eta)^{2\alpha_m - 1},$$

The right-hand term is clearly strictly concave in α_m and is equal to $\delta\left(1-\frac{1}{\eta}\right) > 0$ when $\alpha_m = 0$ and $\delta(1-\eta) < 0$ when $\alpha_m = 1$. Hence, $f^A(\alpha_m)$ as a unique root in $]0,1[$, denoted α_2. Furthermore, $f^A\left(\frac{1}{2}\right) = \delta + \frac{(1-\delta)}{2}\left(\frac{1}{\eta}+\eta\right) > 0$, then $\alpha_2 > \frac{1}{2}$. Observe that $f^A(1-\alpha_m) = f^B(\alpha_m)$, then $f^B(\alpha_m)$ has a unique root $\alpha_1 < \alpha_2$. Finally, *Claim* 1 and *Claim* 2 are both contradicted if and only if $\alpha_m \in [\alpha_1, \alpha_2]$.

Now we can turn to the comparative statics. α_2 is implicitly defined as a function of δ and η by:

$$\delta\eta + (1-\delta)\left(1-\alpha_2+\eta^2\alpha_2\right) - (\eta)^{2\alpha_2} = 0, \tag{8}$$

Then, differentiating this equation with respect to η leads to $\frac{\partial\alpha_2}{\partial\eta} = \frac{N(\delta,.)}{D(\delta,.)}$ with,

$$N = 2\alpha_2(\eta)^{2\alpha_2-1} - \delta - 2\alpha_2(1-\delta)\eta,$$

and,

$$D = (1-\delta)\left(\eta^2-1\right) - 2(\eta)^{2\alpha_2}\ln\eta,$$

It is easy to verify that $\frac{\partial N}{\partial\delta} = 2\alpha_2\eta - 1 > 0$ because $\alpha_2 > \frac{1}{2}$. Since $\eta > 1$, we obtain:

$$N \leq 2\alpha_2\left((\eta)^{2\alpha_2-1} - \eta\right) < 0,$$

Furthermore,

$$\frac{\partial D}{\partial\eta} \propto (1-\delta)(\eta)^{2(1-\alpha_2)} - (1+2\alpha_2\ln\eta),$$

Let $g(\alpha_2) = (1-\delta)(\eta)^{2(1-\alpha_2)} - (1+2\alpha_2\ln\eta)$, then $g'(\alpha_2) < 0$. Since $g(1) = -\delta - 2\alpha_2\ln\eta$, then $\frac{\partial D}{\partial\eta} < 0$. Furthermore, when $\eta = 1$, $D = 0$, then,

$$D < 0,$$

Finally,

$$\frac{\partial\alpha_2}{\partial\eta} > 0.$$

Concerning the depreciation rate, differentiating 8 with respect to δ leads to:

$$\frac{\partial\alpha_2}{\partial\delta} = \frac{1+(\eta^2-1)\alpha_2-\eta}{D},$$

Here, the numerator of the right-hand side is increasing in α_2 and is equal to $(\eta - 1)^2$ when $\alpha_2 = \frac{1}{2}$, then it is always positive, hence:

$$\frac{\partial \alpha_2}{\partial \delta} < 0.$$

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