Natural Budget Deficit and Natural Political Cyclicality

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Abstract

In this paper we present a framework showing how governments use debt to flaunt competency and increase their votes and the chances of reelection; however, a cognitive bias, namely, the cyclist bias, would disrupt government's computations. In this model the government's budget deficit as well as changes in debt would be evaluated in a steady state. We show that debt is a double-edged sword and the more the government relies on debt to show its competency, the more the people understand the manipulations at work behind such measures. On equilibrium, due to cognitive bias in the behavior of individuals, the government will choose budget deficit which it is increasing, leading to the fall of the current incumbent and ultimately the opposition party would take over the power. The model can provide theoretical foundations for what the empirical study of Brender & Drazen (2008) concludes: expansive fiscal policies before elections won't increase reelection probability.

Key words: Natural budget deficit, Natural political cyclicality, Cyclist bias

1. Introduction

In *political business cycles*, budget deficit is caused by the tendency of governments to apply an expansionary fiscal policy to signal their high level of competency in order to win elections (Nordhaus, 1975; Rogoff, 1990; Rogoff & Sibert, 1988). The literature on political budget cycles has faced a challenge that expansive fiscal policies before elections won't increase the reelection probability, for instance the empirical study of Brender & Drazen (2008) entitled *How Do Budget Deficits and Economic Growth Affect Reelection Prospects?*. This puzzling empirical pattern in political economy, the irrelevance between fiscal manipulations and incumbent's chances for reelection, is more investigated very recently by Bojar (2017) in the paper *Do political budget cycles work?*, in which he considers heterogeneity of individuals and with an empirical investigation attempts to shed light on the puzzle.

In this paper we are focusing on developing models in which political parties naturally seize the power cyclically and alternatively, i.e., power will not remain in the hands of a specific party forever. This paper is about developing mathematical models to show how an opportunistic government's fiscal manipulations for reelection, for showing off competency, could lead to its fall, and then the opposition party would take the power. We bring a specific cognitive bias, a type of grievance asymmetry, into a principal-agent problem and we prove that government's budget deficit policy has an increasing trend which would lead to incumbent turnover. The model can solve the mentioned puzzle in political business cycles, and also will provide theoretical foundations for empirical works in the literature of political business cycles such as Brender & Drazen (2008). This model could also somehow explain debt accumulations in countries.

In recent years interest in importing behavioral biases into political choice process has increased. For instance Diermeier & Li (2015) represent an electoral control model and they consider two behavioral biases regarding voters. Moreover Bischoff & Siemers (2013) in a game theory analysis bring cognitive biases to the model by using psychological mental models concept. Furthermore a research trend has emerged trying to provide explanations regarding the cyclicality of political environment. For instance Bove, Efthyvoulou, & Navas (2016) investigate the cyclicality of government expenditures between military and social spending to achieve its goals. Bowen, Chan, & Dube (2015) analyze the cycles of reforms and populism: how voters'

motivations influence the choice between reformist and populist policies? Their model predicts that reform fatigue has a cyclical trend. Moreover Dovis, Shourideh, Golosov, & Shourideh, (2016) present a theory of the cycles of populist and austerity policies.

Kahneman & Tversky (1979) introduce the value function in prospect theory in which losses are more highlighted than gains in human decision making process. Caplan (2011) defines pessimistic bias as "*a tendency to overestimate the severity of economic problems and underestimate the (recent) past, present, and future performance of the economy*". The implied concept of value function, loss aversion, has been explored in social psychology with the titles of negativity bias, grievance- or valence asymmetry or the preferential detection of negative stimuli; and it is investigated by the public choice economists as well and in this regard Kappe (2013) confirms the existence of negativity bias in evaluating economic performance of the British government. Furthermore Stanig (2013) and Nezi (2012) empirically test the grievance asymmetry hypothesis in retrospective economic evaluations and voting, focusing on the extent of political polarization in booms and recessions and The Greek crisis respectively. Moreover Nannestad & Paldam (1997) study the effects of grievance asymmetry on economic voting of Denmark. They conclude economic downturns have three times larger effect than recoveries on people's votes. Hansen, Olsen, & Bech (2015) also find negativity bias in voting behaviour during which individuals compare cross-national performances. Lockwood & Rockey, (2015) in an empirical and theoretical study investigate the effects of loss aversion on political competition.

We use the term *cyclist bias* for the concept we are going to develop here. It can be seen as a metaphor for convenient references. To illustrate the cyclist bias, it is necessary to assume the following fancy atmosphere: consider a cyclist on a road with downhill and uphill. Once the cyclist is in a downhill, he does not realize that pedaling has turned much more comfortable; however, when he has just started the uphill he immediately notices that pedaling has become much more difficult. Thus on the same road, in the cyclist's unconscious, the uphill part of the road is considered too long on both the way to and back from your destination; whereas in reality this conclusion cannot be correct, because if 70% of the road is uphill then on the way back 70% of the route would necessarily be downhill. In fact, when the cyclist is in the downhill part he highlights his role and abilities but in uphill, he attributes the problems to external factors. When things are improving the individual boasts his capabilities but when difficulties emerge, the

individual projects the problems to external factors blaming them as the cause of circumstances and incidents[1]. The implication of cyclist bias is similar to grievance asymmetry, negativity bias etc.

The cyclist bias is a crystallized concept of the pessimistic bias and the value function that could be understood in terms of principal-agent problem. We call the combined effects of Caplan's pessimistic bias and the value function of Kahneman and Tversky the cyclist bias. Caplan (2011) in his book *the myth of the rational voter* introduces four biased beliefs which can cause the economy not to operate at optimum levels: anti-market bias, anti-foreign bias, Make-work bias and pessimistic bias. He describes the pessimistic bias as:

> As a general rule, the public believes economic conditions are not as good as they really are. It sees a world going from bad to worse; the economy faces a long list of grim challenges, leaving little room for hope. I refer to the public's leanings as pessimistic bias, *a tendency to overestimate the severity of economic problems and underestimate the (recent) past, present, and future performance of the economy*.

Kahneman (2011) explains the specific effect of bad events on mind's cognitive mechanism. Humans put more importance on the negative aspects or losses in comparison with the positive aspects or benefits. This is rooted in the process of human evolution in which negative aspects of events and escaping have greater importance than the positive aspects and approaching. He asserts information on risk directly go to the related section of the brain through a shortcut nerve without crossing optic nerves. The humans' and animals' nervous systems and minds are designed in a way which put a higher priority and importance on bad news. This evolutionary trend has proved essential for survival and escape from dangers. In another paper Kahneman & Tversky (1979) introduce the *value function* in which losses are more highlighted than gains. The *Value Function* is depicted in the following figure:

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[1]. In *Cinema Paradiso*, Alfredo asks Father as the cyclist: Hard on the feet, eh, Father? And he replies: Going, it's all downhill and all the saints help out, But coming back, the saints just watch.
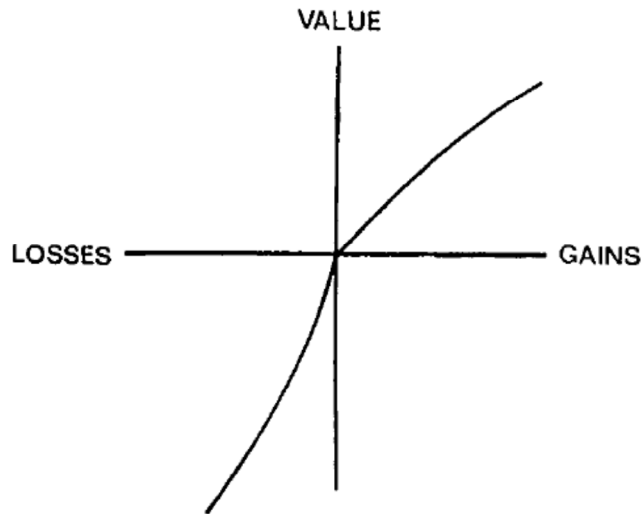
VALUE

LOSSES ——————————————— GAINS

The value function is concave for gains ($v'' < 0, for\ x > 0$) and is convex for losses ($v'' > 0, for\ x < 0$). The rationale behind this is that losses loom larger than gains. We intend to bring cognitive biases into the picture in a situation where there is a principal-agent problem; this means that the principal not only suffers from lack of sufficient knowledge but also has biased beliefs towards the performance of the agent. The situation holds true on the issue of public choice, if we perceive people as the principal and the government as an agent to provide public goods. In this case Caplan's pessimistic bias makes people have pessimistic estimates about the government's performance and the value function of Kahneman and Tversky relates these pessimistic estimates to the utility function of voters and these two effects reinforce each other. To explain this we should note: as the government provides more benefits, on the one hand these benefits will be underestimated (pessimistic bias), and on the other hand these additional benefits are valued less by the people; This is caused by the fact that the value function is concave for gains ($v'' < 0, for\ x > 0$) and the marginal value of these excess benefits for them is decreasing. In addition, if the performance of government is poor, on the one hand it would be estimated worse than what it really is on people's minds (pessimistic bias), and on the other hand because of the convexity of the value function, its negative value (or negative utility of poor performance) will be increasing ($v'' > 0, for\ x < 0$).

The Cyclist bias has the following implications for the public choice: *first*, due to higher importance of negative events on mind, people know who they *should not* vote for better than

who they *should* vote for. For example, people know the Republican Party should not win in the 2008 presidential election because George Bush has been the root cause of two wars and an economic crisis or they know that MPs opposed to JCPOA should not win in Iran's parliamentary elections in 2016 because they were responsible for sanctions and economic problems. *Second*, when the government provides more public goods, people underestimate the vitality of government performance. In fact, in times of economic growth (downhill of cycling route) people deem their own performance as important and influential and they consider the role of government as less highlighted. However in times of recession (uphill of cycling route), all the blame would be on the government.

Meanwhile we also offer an explanation for the budget deficit and as it results from natural behavior and attitude of people we call it natural budget deficit. Our inspiration for naming natural budget deficit is North, Wallis, & Weingast (2006) in which it is acknowledged that underdevelopment rather than development is the natural state of the countries. They assert societies have moved this way for centuries and it has only been in the last few centuries that some countries have been able to become a community with open access. The term natural is also used frequently in other contexts such as Darwin's natural selection, natural frequency in physics, Milton Friedman's natural unemployment. Each of these concepts implies that the investigated situation is the natural state of what is being studied. The result of the recommended model is that budget deficit is the natural state of the government's budget and that a balanced budget is imposed through external constraints by the Parliament and other such planning organizations. Another implication is that political parties naturally seize the power cyclically and alternatively which it is the natural (or intrinsic) pattern of political environment. This means that power will not remain in the hands of a specific party or thought forever.

In the following section we present a model to show the consequences of considering the cyclist bias in a principal-agent problem. The model serves as a guide for observing how the cyclist bias could enter into a model and how a reelection-seeking government's debt issuance policy could be influenced. The next section concludes.

2. The Model

The present study aims to investigate the effects of the cyclist bias on the generating of budget deficit and political cycles. How can we integrate the cyclist bias into the model? For this

purpose and to define the scope of analysis, we evaluate the economics and politics of the consumers (individuals) and the government separately. In addition, we assume economy is in a steady state of growth and the growth in consumption of private goods is equal to that of public goods ($\dot{c} = \dot{g}$).

2.1. The economy and politics of individual

The Representative individual pays a lump-sum tax to the government (T_t). Considering c_t for private consumption and y_t representing national income earned by the individual, then the private consumption would be:

$$c_t = y_t - T_t \quad (1)$$

The Representative individual also derives utility from consumption of private and public goods (Alesina, Campante, & Tabellini, 2008):

$$E \sum \beta^t [u(c_t) + h(g_t)] \quad (2)$$
$$u'(c_t) > 0$$
$$u''(c_t) < 0$$
$$h'(g_t) > 0$$
$$h''(g_t) < 0$$

Both of $u(c_t)$ and $h(g_t)$ are concave as a result of diminishing marginal utility. We assume that, in the development of the above utility function, the individual suffers from the cyclist bias which has two effects: 1. it affects the utility function 2. According to public choice theory, it affects the individual's political decisions. When macroeconomic conditions and consequently the individual's conditions are improving (downhill of cycling route), the individual only partially realizes that the general economic situation is improving attributing the improvements in his situation to his activities and intelligence and acumen. However when the macroeconomic situation and as a consequence his condition becomes difficult and his consumption gets lower (uphill of cycling route), the individual relates the unfavorable situation to the government's policies. The first consequence of the cyclist bias, at the microeconomic level, will lead to the

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fact that the utility function for the public good is just concave for the individual. Therefore the cyclist bias works toward and creates the same consequence as the diminishing marginal utility and will reinforce it. Thus in terms of the assumption of cyclist bias, reduction in the marginal utility of public good consumption is more intense than that of the private good consumption. For instance when government provides 10 units of public good, the individual just attributes two units of increased public good to the government and considers the rest of increased public good due to his efforts. So individual has a poor understanding of public good (g_t) and $h(g_t)$ has additional concavity than $u(c_t)$:

$$\left|h''(g_t)\right| > \left|u''(c_t)\right| \quad (3)$$

Which means the slope of $h(g_t)$ decreases steeper and faster than that of $u(c_t)$. On the other hand marginal utility of private consumption is higher than that of the public consumption which implies:

$$u'(c_t) > h'(g_t) \quad (4)$$

This occurs because private consumption is more tangible for the individual compared with public consumption. Imagine we have 10 families live in a neighborhood. One scenario is to give each family $200. Another scenario is for the municipality to spend $2000 for the neighborhood (to improve the condition of lighting, pavement etc.); which of the two scenarios generates more collective utility? It is very likely that the first case in which an amount of money is granted to each family is the answer. The second effect of the cyclist bias in the public choice environment is that the individual pays less attention to the government's measures and actions in times of economic prosperity, so it has a weaker impact on the government's chance of being reelected. But recessions and poor economic conditions are attributed to the weakness of government. This paper just like Alesina et al. (2008) argues that the budget deficit is generated as a result of the voters' demand. In the mentioned paper it is argued that when voters observe economic prosperity, they will demand more utility for themselves (in the form of lower taxes or better public goods). In their model it is assumed that people at the beginning of that period presuppose a level of utility for their own (x_t), based on their income and the previous period's debt. If government policies meet this utility, i.e. private and public goods' consumption provide a utility

higher than x_t, they will re-elect the government. Rogoff & Sibert (1988) and Rogoff (1990) integrate the concept of competence into their model. It is as if people, in voting, consider the government's competence in efficient use of the taxes. Tax efficiency and competence is higher when the government is able to provide more public goods using a lower amount of taxes. A government with higher competence has a higher probability to be re-elected. Inspired by Rogoff, Shi & Svensson (2006) present a moral hazard model in which the magnitude of electoral budget cycles depends on rents of holding the office and the informed voters' share in the election.

According to Alesina et al. (2008), we assume that the individual evaluates and compares his utility with the tax efficiency and then decides on his vote. Following Rogoff & Sibert (1988) and Rogoff (1990), Tax efficiency and competence is higher when the government is able to generate more public goods using a lower amount of taxes. We define tax efficiency as the ratio $\frac{g_t}{T_t}$ which implies: To what extent has the government been able to provide public goods using each incoming tax dollar. Then the individual's re-election condition is as below:

$$u(c_t) + h(g_t) \geq \alpha . \frac{g_t}{T_t} \quad (5)$$

The parameter α is the amount of importance that voters put on the government competence in the use of resources. The more competent the government and the more efficient it uses taxes, the higher the probability of its re-election would rise and the parameter α, which indicates the sensitivity of people in using taxes, is positive.

2.2. The economy and politics of government

Following Alesina et al. (2008) and by making two changes, namely, the government is not able to allocate any rent and taxes are lump sum, we consider the government budget constraint as follows:

$$g_t + b_t \leq T_t + \beta b_{t+1} \quad (6)$$

b_{t+1} is the debt that government can issue in period t at a market price β. This debt is purchased by foreigners and should be paid back in the next period. If we assume $\beta = 1$:

$$g_t \leq T_t + (b_{t+1} - b_t)$$

$$g_t \leq T_t + \Delta b \quad ; \ \Delta b = b_{t+1} - b_t \quad (7)$$

As a result of considering evolutionary and loss-aversion features in humans, which Kahneman (2011) emphasizes strongly, if people find government's actions a threat, they will not re-elect the government. One of these threats is a severe budget deficit. Moreover Dulleck & Wigger (2015) discuss fiscal restraint which is the maximum amount of money that a government can spend. Thus we assume that Δb has a maximum and if the government surpasses this ceiling it will not be re-elected:

$$Max \ \Delta b = \bar{b} \quad (8)$$

In Barro (1973) and Alesina et al. (2008) the analysis focus is on the government; the government may choose to acquire all rents and not be re-elected or decide to be re-elected. In fact, in these models, the government can do a cost-benefit analysis. This is quite different from what happens in the real world. In reality, there are parties which want to acquire power and political control, so they do not consider just a single period. There is such an approach in Rogoff & Sibert (1988) and Rogoff (1990): The parties are not seeking to maximize self-interest or rent, but seeking to maximize their chance of being re-elected. Re-election probability function can be explained based on the welfare that government provides for people and also the ego rents (like Prestige). Downs (1957) states that in democracies political parties precisely formulate their policies as a means to earn votes and win elections. Therefore the literature of information economics follows the methodology of Downs (1957) and this study applies the same approach. We define the reelection probability function as follows:

$$RP_{t+1} = \frac{h(g_t) \cdot (y_t - T_t)}{|h''(g_t)| \cdot b_t} \quad (9)$$

The party's reelection is directly related to the utility of public good but the individual's cyclist bias which is shown by $h''(g_t)$ reduces the probability of reelection. The higher the people's level of the cyclist bias, the harder it is for the party to get re-elected. The higher the individuals' incomes after tax (i.e. private consumption), the higher the probability of the

government's reelection. Finally, the more and the further the government issues debt (b_t), the lower the government's chance of being reelected.

In our model, we assume that people cannot observe the government's issued debt (b_t) in period t before the election. Moreover government does not know exactly to what level the people have the cyclist bias and then he cannot predict $h"(g_t)$. Thus the government may neglect the term from the reelection probability function (RP_{t+1}). For simplicity we do not consider the effect of private consumption on reelection probability function. Therefore the political question of the government's reelection will be to maximize the following function:

$$RP_{t+1} = h(g_t) \quad (10)$$

Proposition 1: The government's efforts for reelection lead to increased debt, and the more the people are sensitive to government's competence, the higher the debt will increase.

Proof: Given the constraints it is facing, the government aims to maximize its reelection probability:

$$RP_{t+1} = h(g_t) \quad (10)$$
$$S.t. \ g_t \leq T_t + \Delta b \quad (7)$$
$$c_t = y_t - T_t \quad (1)$$
$$u(c_t) + h(g_t) \geq \alpha. \frac{g_t}{T_t} \quad (5)$$

We form the Lagrange function and differentiate it with respect to g_t, T_t, Δb and c_t:

$$L = h(g_t) + \lambda_1[g_t - T_t - \Delta b] + \lambda_2[c_t - y_t + T_t] + \lambda_3\left[u(c_t) + h(g_t) - \alpha.\frac{g_t}{T_t}\right] \quad (11)$$

$$\frac{\partial L}{\partial g} = h'(g) + \lambda_1 + \lambda_3 h'(g) - \frac{\alpha}{T}\lambda_3 = 0 \quad (12)$$

$$\frac{\partial L}{\partial T} = -\lambda_1 + \lambda_2 + \frac{\alpha g}{T^2}\lambda_3 = 0 \quad (13)$$

$$\frac{\partial L}{\partial \Delta b} = -\lambda_1 = 0 \quad (14)$$

$$\frac{\partial L}{\partial c} = \lambda_2 + \lambda_3 u'(c) = 0 \quad (15)$$

With a little Algebraic calculation for (15) we get:

$$u'(c) = -\frac{\lambda_2}{\lambda_3}; u'(c) > 0 \xrightarrow{yields} \frac{\lambda_2}{\lambda_3} < 0 \quad (16)$$

According to *envelope theorem*, the derivative of reelection probability function to a parameter is just as the Lagrange derivative relative to the same parameter:

$$\frac{\partial h(g_t)}{\partial(\frac{g}{T})} = \frac{\partial L}{\partial(\frac{g}{T})} = -\alpha\lambda_3 \quad (17)$$

It was already stated that the more competent the government and the more efficient it uses taxes, the higher the probability of its re-election. Therefore we have:

$$\frac{\partial h(g_t)}{\partial(\frac{g}{T})} = -\alpha\lambda_3 > 0 \quad (18)$$

We already know that $\alpha > 0$, then we deduce:

$$\lambda_3 < 0 \quad (19)$$

Comparing (16) and (19) we conclude:

$$\lambda_2 > 0 \quad (20)$$

We rewrite (12) as below:

$$h'(g).(1 + \lambda_3) - \frac{\alpha}{T}\lambda_3 = 0 \Rightarrow T = \frac{\alpha\lambda_3}{h'(g).(1 + \lambda_3)} \quad (21)$$

Tax (T), α and $h'(g)$ are positive, hence $\frac{\lambda_3}{(1+\lambda_3)}$ must be positive too. This leads to $\lambda_3 > 0$ or $\lambda_3 < -1$. Combining this result with (19) gives us:

$$\lambda_3 < -1 \quad (22)$$

We paraphrase (13) to get:

$$\lambda_2 + \frac{\alpha g}{T^2}\lambda_3 = 0 \Rightarrow g = -\frac{\lambda_2}{\lambda_3}\frac{T^2}{\alpha} \quad (23)$$

We calculate Δb by using (21) and (23):

$$\Delta b = g - T = -\frac{\lambda_2}{\lambda_3}\frac{T^2}{\alpha} - T = -T\left(\frac{\lambda_2}{\lambda_3}\frac{T}{\alpha} + 1\right) = -\frac{\alpha\lambda_3}{h'(g).(1+\lambda_3)}.\left(\frac{\lambda_2}{\alpha\lambda_3}.\frac{\alpha\lambda_3}{h'(g).(1+\lambda_3)} + 1\right)$$

$$= -\frac{\alpha\lambda_3}{h'(g).(1+\lambda_3)}.\left(\frac{\lambda_2 + h'(g).(1+\lambda_3)}{h'(g).(1+\lambda_3)}\right) \quad (24)$$

We intend to determine the sign of Δb. We combine (4) and (15) to get:

$$h'(g_t) < u'(c_t) = -\frac{\lambda_2}{\lambda_3} \quad (25)$$

We multiply both sides of the above inequality in the negative parameter of λ_3 and then we do some mathematics:

$$h'(g_t).\lambda_3 > -\lambda_2 \Rightarrow \lambda_2 + h'(g_t).\lambda_3 > 0$$

$$\Rightarrow \lambda_2 + h'(g_t).\lambda_3 + h'(g_t) > h'(g_t) > 0 \Rightarrow \lambda_2 + h'(g_t).(1+\lambda_3) > 0 \quad (26)$$

The inequality (22) implies $(1 + \lambda_3) < 0$. Therefore, the sign of all statements in (24) have been determined.

$$\Delta b = -\frac{\alpha\lambda_3}{h'(g).(1+\lambda_3)}.\left(\frac{\lambda_2 + h'(g).(1+\lambda_3)}{h'(g).(1+\lambda_3)}\right) = -\frac{(+)(-)}{(+)(-)}.\left(\frac{+}{(+)(-)}\right) = -\frac{(-)}{(-)}.(-) = + \quad (27)$$

So Δb is positive. To evaluate the sensitivity of people in respect to government's competence, we differentiate from Δb in respect to α:

$$\frac{\partial\Delta b}{\partial\alpha} = -\frac{\lambda_3}{h'(g).(1+\lambda_3)}.\left(\frac{\lambda_2 + h'(g).(1+\lambda_3)}{h'(g).(1+\lambda_3)}\right) > 0 \quad (28)$$

Then the higher the people's sensitivity (α) toward the government's efficient use of tax ($\frac{g}{T}$) or its competence, the higher the amount of debt issued by the government.

Proposition 2: debt issuance by government has an increasing trend.

Proof: we use (15) to get $\lambda_2 = -\lambda_3. u'(c)$ and insert it in (24):

$$\Delta b = -\frac{\alpha\lambda_3}{h'(g).(1+\lambda_3)}.\left(\frac{\lambda_2 + h'(g).(1+\lambda_3)}{h'(g).(1+\lambda_3)}\right)$$

$$= -\frac{\alpha\lambda_3}{(1+\lambda_3)^2}.\left(\frac{-\lambda_3.u'(c) + h'(g).(1+\lambda_3)}{[h'(g)]^2}\right)$$

$$= -\frac{\alpha\lambda_3}{(1+\lambda_3)^2}.\left(\frac{h'(g) + \lambda_3.\left(h'(g) - u'(c)\right)}{[h'(g)]^2}\right) \quad (29)$$

To simplify we use $-\frac{\alpha\lambda_3}{(1+\lambda_3)^2} = k$. We already know that $k > 0$. Thus:

$$\Delta b = k.\left(\frac{h'(g)}{[h'(g)]^2} + \frac{\lambda_3.\left(h'(g) - u'(c)\right)}{[h'(g)]^2}\right) = k.\left(\frac{1}{h'(g)} + \frac{\lambda_3.\left(h'(g) - u'(c)\right)}{[h'(g)]^2}\right) \quad (30)$$

One of our assumptions was that the economy is in a steady state and the consumption growth of private good is equal to that of public good ($\dot{c} = \dot{g}$). With regard to this assumption, we differentiate (30):

$$d(\Delta b) = k.\left(\frac{0 - h''(g).\dot{g}}{[h'(g)]^2} + \frac{\lambda_3.\left(h''(g).\dot{g} - u''(c).\dot{c}\right).[h'(g)]^2 - 2h''(g).\dot{g}.h'(g).\lambda_3.\left(h'(g) - u'(c)\right)}{[h'(g)]^4}\right)$$

$$= k.\dot{g}.\left(\frac{-h''(g)}{[h'(g)]^2} + \frac{\lambda_3.\left(h''(g) - u''(c)\right).[h'(g)]^2 - 2h''(g).h'(g).\lambda_3.\left(h'(g) - u'(c)\right)}{[h'(g)]^4}\right) \quad (31)$$

Using (2), (3) and (4) we conclude:

$$h'(g) - u'(c) < 0 \quad (32)$$

$$h''(g) - u''(c) < 0 \qquad (33)$$

Therefore we can find the sign of $d(\Delta b)$:

$$d(\Delta b) = (+). \left(\frac{-(-)}{+} + \frac{(-).(-).(+) - 2(-).(+).(-).(-)}{+} \right) = (+). \left(\frac{+}{+} + \frac{(+) + (+)}{+} \right) = + \qquad (34)$$

Thus we proved debt has an increasing trend. Referring to (8), this proposition implies that after *n* periods, the government debt reaches its maximum and at this point people will no longer re-elect the government. Then we conclude that parties naturally win elections alternatively and cyclically and we name this process: *Natural Political Cyclicality*.

3. Conclusion

In this paper we introduced a framework based on which governments use some pre-electoral manipulations to raise the number of their votes and chances of reelection; however, the cyclist bias obscures government's mathematics. In fact considering the cyclist bias can provide the theoretical foundations for what the empirical paper of Brender & Drazen (2008) concludes. They correctly state that expansive fiscal policies before elections won't increase the reelection probability; however, they misinterpret the reason. The reason of not being reelected, as Brender and Drazen say, is not that the people punish the government for running deficits, but it is that people have cyclist bias; i.e. people think if something goes right, it's because of their intelligence and hardworking and if something goes wrong the government is fully responsible. In fact our model can provide a rationale for both results of their empirical paper: 1. deterioration of the government's fiscal balance as well as 2. Decrease in probability of reelection. Brender and Drazen have an underlying implicit assumption that voters have rational behavior and complete information. However if we look at the issue from the perspective of behavioral economics and consider the people as lacking in rationality and having information incomplete, we can prepare reasons about what is happening. For the first result of Brender and Drazen, deterioration of the government's fiscal balance, the cyclist bias indicates that in times of economic growth (downhill of cyclist route) people underestimate the government's role and consider the government's performance less than what it actually is (pessimistic bias). Moreover the additional benefits that government provides for people, are less valued by them because the

value function is concave for gains. Therefore, the government is constantly forced to offer more services to get re-elected and the costs of these further services lead to deficit in the election year. For the second result of Brender and Drazen, decrease in probability of reelection, the cyclist bias indicates that level of additional services that the government should constantly offer to compensate for the pessimistic bias and the concavity of the value function is increasing. Therefore budget deficit has an increasing trend. However due to the evolutionary and loss-aversion features of the human beings, there is a maximum for budget deficit. If the government surpasses this ceiling it will not be re-elected. So after some time government debt reaches its maximum and at this point people will no longer re-elect the government. Then we conclude parties naturally win the election alternatively and cyclically.

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