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Conference Paper

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44th Congress of the European Regional Science Association: "Regions and Fiscal Federalism", 25th - 29th August 2004, Porto, Portugal

Provided in Cooperation with:
European Regional Science Association (ERSA)

Suggested Citation: Barreira, Ana; Baleiras, Rui Nuno (2004) : Elections and the public expenditure mix, 44th Congress of the European Regional Science Association: "Regions and Fiscal Federalism", 25th - 29th August 2004, Porto, Portugal, European Regional Science Association (ERSA), Louvain-la-Neuve

This Version is available at:
https://hdl.handle.net/10419/117096

Elections and the public expenditure mix

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May 2004

Abstract

The paper presents an intertemporal utility model that determines the effects of elections on the public expenditure composition.

Conventional political budget cycle models describe incumbents as concerned only with the conditions that guarantee re-appointment. Aiming at achieving re-election, incumbents behave opportunistically in order to seduce voters about their political performance. The paper introduces another motivation for the manipulation of the public expenditure mix near elections: the incumbent's concern with her future utility in the case of defeat.

We provide data to suggest that both central and local governments in the European Union do mqanipulate the budget composition around election moments. In order to rationalise this observation, the paper proposes a model where voters and incumbent are rational, have complete information and no bias towards any category of public expenditure, namely consumption expenditure or investment expenditure. The paper shows that even under these extreme conditions, an electorally induced cycle on public expenditure mix is still expected, one where consumption expenditure raises relative to investment expenditure in pre-election periods. This opportunistic budget manipulation follows from two facts. First, any decision an incumbent makes on consumption expenditure pays back political dividends during the same period the expenditure is incurred, while any investment expenditure only becomes visible to voters with a one-period delay. Second, re-election is an uncertain event, which makes the second state of nature valuable. Outside politics, the incumbents' pay back is a direct function of the voters' assessment of the incumbents' job while in office.

The model is then extended to accommodate the scenario where voters and society at large do not share preferences. When voters or society evidence a preference prone to one of the public expenditure categories, a bias towards such category emerges in post-election periods. In pre-election periods two cases are found. Consumption expenditures exceed investment expenditures if either voters or society prefer the former category at the margin. The cycle's nature is ambiguous if the marginal preferences of voters or society are biased towards investment expenditures.

JEL classification: H50, E62.
Keywords: Political Budget Cycles, Public Expenditure, Elections.

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1. Introduction

Casual observation easily detects current expenditure rising faster than capital expenditure in the run to the forthcoming election and the reverse pattern soon afterwards, or transfer payments increased in pre-electoral periods and taxes lifted right afterwards. The press is keen to recognise these policy cycles as a reflection of politics and the economics literature has studied them for a long time—the political business cycle (PBC) literature. The dominant perspective regards policy-makers as opportunist agents that use the (fiscal) policy tools they control to maximise their re-election chances—Nordhaus (1989), Shachar (1993), Gärtner (1994), Frey (1997), and Persson and Tabellini (2000, Ch. 16; 1990, Ch. 5).

Recently, Baleiras (1997) and Baleiras and Santos (2000, 2003) have looked for politico-economic determinants of *stop-and-go* patterns on government expenditure. These patterns are characterised by expansionary moves in pre-electoral periods followed by more or less serious contractions in post-electoral periods. Their explanation diverges from the dominant view in the sense that incumbent politicians do not maximise their re-election chances: they rather maximise their future utility over the *two* states of nature associated with any democratic election: victory and defeat. This standpoint is particularly relevant for local incumbents because their chances of finding a suitable political appointment following an electoral defeat are definitely weaker than for central government leaders. Policy-makers have a self-interest to induce stop-and-go cycles because their concern for the upcoming electoral uncertainty entails a probabilistic discount of the future (in the sense of post-electoral) public expenditure. Thus, one euro of expenditure today, while in office, renders more utility than one euro of expenditure tomorrow, when they can either be in office again or not.

Those authors addressed government expenditure as a homogeneous variable. We extend their framework to try to rationalise cycles on public expenditure *mix*. We are therefore interested to study the underlying causes for changes over time in the shares of current and capital outlays. Like them, we give away of policy errors and myopic expectations as possible justifications for such cycles and focus on inherently rational and forward-looking behaviour on the part of all players: the incumbent politician, voters and society at large. Our reasoning follows from the perception that current and capital expenditure in a given year pay political dividends back with different time frames. Typically, most current expenditure items (civil servant wages,

welfare compensations, etc.) give the electorate immediate benefits, which translate into ego-returns for the incumbent leader in the short run, that is, before the upcoming electoral contest for sure. By contrast, capital outlays today help to produce durable public goods that become politically visible only much later, with their full payback arriving very likely only after the forthcoming election.

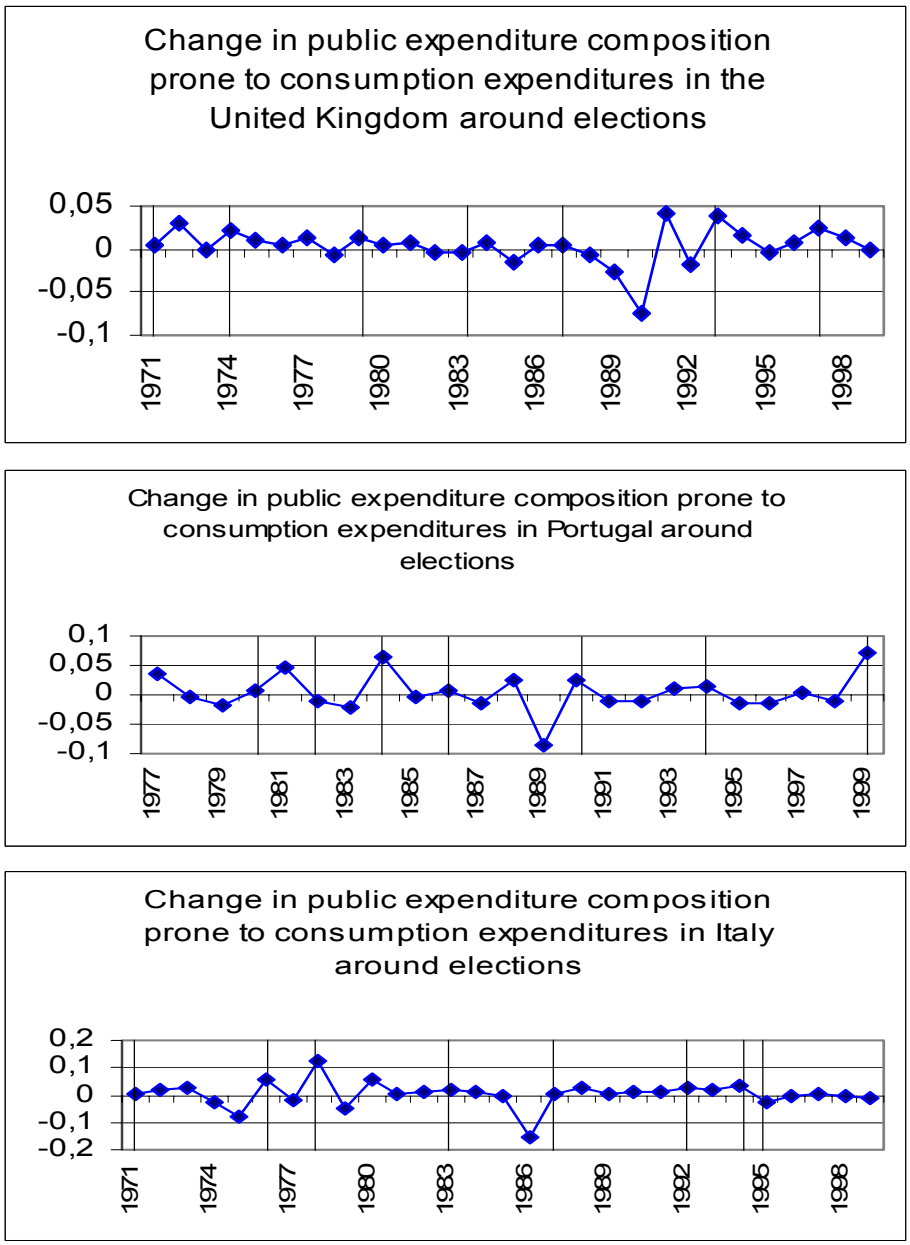
The material is organised as follows. Section 2 displays international data on expenditure mix at different government layers aiming at motivating the reader for the empirical relevance of the subject. The model is designed in Section 3. The basic result, emergence of a political business cycle in expenditure mix, is derived in Section 4. Section 5 gives the electorate and society at large an active role and explores the implications for mix cycling that stem from possible differences among them on time preferences. Finally, Section 6 concludes.

2. Motivation

Most PBC literature has focused on the level of public spending or the deficit. Surprisingly, little relevance has been given to the expenditure composition, namely to the budget shares of consumption and investment outlays.

However, international data reveal frequent biases towards consumption on pre-electoral periods. As examples, the cases of the United Kingdom, Portugal, and Italy are reported in Graph I. It displays the difference between the share of consumption expenditure and the share of investment expenditure for each central government. The vertical lines identify the general election moments. Broadly speaking, it seems that most peaks of that difference occur in the last two or three quarters before the poll.

Graph I – Public expenditure budget cycles electorally induced by central governments



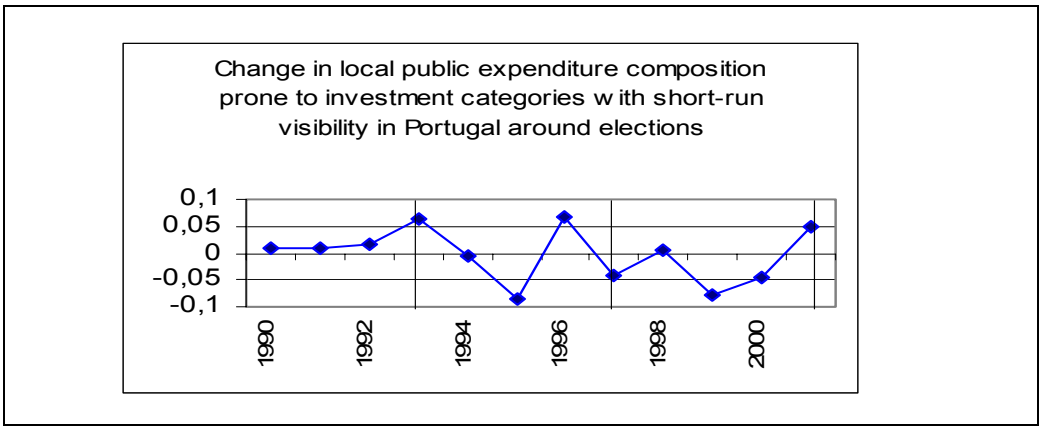
Sources: IMF – *Government Finance Statistics Yearbook*

Note: *Vertical lines represent the periods when a bias towards consumption expenditures is expected and correspond to the election year when it occurs in the last six months and to the year before election when it occurs in the first six months.*

A similar pattern can be found among subnational governments, provided that we interpret the expenditure items carefully. It is well known that subnational authorities control fewer fiscal instruments capable of intra-tenure cycling (Baleiras and Costa, 2004), yet there are some. For example, Portuguese municipalities are responsible for a

whole array of investment goods where some (viaducts and road works) are likely to pay back within a relative short notice and others pay back later (social housing, school buildings, and sewerage infrastructures). It is shown in Graph II that the share of the former tends to exceed the latter's on pre-electoral years.

Graph II – Public expenditure budget cycles electorally induced by local governments



Source: Portuguese Local Government Bureau – *Annual Local Finance Statistics*

Note: *Vertical lines correspond to election years in which a manipulation is expected towards those investment expenditure categories that become visible to voters in a shorter period of time. Local elections were always held in December.*

The following question emerges when both Graphs are analysed: Is the incumbent's search for voters' assessment the single drive beyond the political budget cycle on public expenditure mix? Or are there any other reasons, besides the re-election quest, that motivate incumbents to manipulate the public budget beyond re-election concerns?

The theoretical model proposed in Sections 3 and through 5 addresses these issues and, interestingly, will show that such cycles may occur even when the incumbents have no self-interest to induce them.

3. The model

Each electoral tenure is made of two periods (1 and 2)[1] and the incumbent must decide, in each period, the budgetary shares of consumption (g_A) and investment expenditures (g_B), with $g_A + g_B = 1$, for simplicity.

Any decision an incumbent makes on consumption expenditure pays back political dividends immediately, i.e., during the same period the expenditure is incurred.

In contrast, any investment expenditure, decided in one period, becomes visible to voters only in the following period. Putting it another way, investment expenditures only give utility to the incumbent with a one-period delay.

Consider the budgetary choices of period 2 (the pre-electoral period). Any euro spent in consumption gives the incumbent for sure some utility in the very same period. However, any euro spent on investment during period 2 will only give the incumbent some utility in the following period if she is re-elected—an uncertain event. This delay phenomenon occurs also in period 1. However, as the investment expenditure decided in period 1 will become visible in period 2, the incumbent's utility from that expenditure is certain.

The incumbent decides expenditure composition at the beginning of each period and her utility is represented by $v(g_i)$ which is twice continuously differentiable, with $v' > 0,\ v'' < 0$ for $i = A, B$. This satisfaction can only be enjoyed while the incumbent is in office.

Voters' utility is explained by the following expression: $s = a\left[w\left(g_A^1\right) + w\left(g_A^2\right)\right] + (1-a)\left[w\left(g_B^1\right) + w\left(g_B^2\right)\right]$, with $w' > 0,\ w'' < 0$. Parameter a ($a \in [0,1]$) captures the voters' preferences for budget composition between consumption and investment expenditures. When $a > 0.5$ $(a < 0.5)$ it represents a bias for consumption (investment) expenditures.

Re-election probability, π, is a function of voters' satisfaction level: $\pi = \pi(s)$, $\pi \in [0,1]$ and $\pi' > 0$.

[1] Several PBC models, essentially those where asymmetric information prevails, include a positive discount rate. Since the model of this paper relies on full information assumption and seeking for simplicity, the insertion of a positive discount rate was set aside. However, it could be also considered in the model without changing results qualitatively.

If it is assumed that voters prefer no budget distortion or, equivalently, that no cycle occurs during the two-tenure period, the wider the cycle (i.e. the difference between g_A and g_B choices) in each period, the smaller is s and thus the lower will be the incumbent's re-election chances. In contrast, the more likely the defeat scenario [probability $1-\pi(s)$], the wider the cycle becomes.

In this context, the best income an incumbent may achieve in case of electoral defeat (outside income) becomes increasingly important.

Outside income is denoted by y in which $y = y(s)$, with $y' > 0$. This income is endogenous and depends on the entrepreneurial community's evaluation of the incumbent's performance while in office. The entrepreneurial community reward the incumbent's performance by ensuring her an outside office job. That community is part of the electorate, thus sharing voters' preferences. The greater the utility prospective employers (that is to say voters) retrieve from the incumbent's budgetary decisions, the higher will be the reward an incumbent could expect in case of election defeat through outside income. In synthesis, outside income is an increasing function of the voters' satisfaction level.

As s decreases, π and y decrease as well. These are the two disciplinary pressures against the incumbent's self-interest to overspend in public consumption $(g_A > 0.5)$.

While in office, the incumbent chooses twice the budget composition, one in period 1 and another in period 2. Given the visibility lag of investment expenditure, the utility from these choices spans for three periods: periods 1 and 2 of the current tenure and the post-electoral future (period 3). Naturally, the latter utility is contingent upon the electoral outcome.

Formally, the fiscal choice of period 1 generates an ego-return $v(g_A^1)$ in period 1 and an ego-return $v(g_B^1)$ in period 2; the fiscal choice of period 2 induces ego-return $v(g_A^2)$ in period 2 and an expected ego-return $\pi v(g_B^2)$ in period 3. Moreover, period 3 utility in case of electoral defeat is given by $(1-\pi)x(y)$. So, the incumbent's inter-temporal utility function is:

$$U = v(g_A^1) + v(g_B^1) + v(g_A^2) + \pi v(g_B^2) + (1-\pi)x(y).$$

Knowing that $g_B = 1 - g_A$, in each period, the above expression can be rewritten as:

$$U = v\left(g_A^1\right) + v\left(1 - g_A^1\right) + v\left(g_A^2\right) + \pi v\left(1 - g_A^2\right) + \left(1 - \pi\right)x\left(y\right)$$

The incumbent's problem becomes an optimisation problem with just two choice variables, g_A^1 and g_A^2. In this sense, the incumbent will have to find the utility maximising levels of consumption expenditures in each period.

Equivalently,

$$\begin{aligned} &\underset{g_A^1, g_A^2}{Max} U = v\left(g_A^1\right) + v\left(1 - g_A^1\right) + v\left(g_A^2\right) + \pi(s)v\left(1 - g_A^2\right) + \left(1 - \pi(s)\right)x\left(y(s)\right) \\ &s.t. \qquad s = a\left[w\left(g_A^1\right) + w\left(g_A^2\right)\right] + \left(1 - a\right)\left[w\left(1 - g_A^1\right) + w\left(1 - g_A^2\right)\right] \end{aligned} \tag{3.1}$$

It is further assumed that $v\left(1 - g_A^2\right) > x\left(y\right)$ which means the incumbent prefers the ego-rent from investment expenditure to the outside income. Although a technical necessity, this assumption squares well with the informal perception that most politicians prefer re-election runs to retreats if allowed to do so.

4. Political budget cycle

Given the incumbent's budgetary decision and the manner how it gives her utility, in each period, as described above, it is reasonable to ask if under these conditions there is an incentive for the incumbent to engage into budget composition manipulation and how.

The intuition tells that, given the voters' full information and unbiased preferences, the incumbent gains nothing from budget manipulation in period 1. This is so since the incumbent neither improves her reputation near voters nor faces any uncertainty on investment expenditure utility in period 2.

However, in period 2, the incumbent has an incentive to incur into a *political budget cycle*. This results from the fact that investment expenditures, in period 2, flow probabilistically into the next period utility. In this framework, the incumbent has thus an incentive to spend on consumption expenditures rather than on investment expenditures. Despite the loss on re-election chances that this behaviour generates, the incumbent still has a motive to prefer to spend more on consumption goods.

The following Proposition shows formally these results:

Proposition 1—the inter-temporal political expenditure cycle: Even when the electorate shows no preference for a cycle $(a = 0.5)$,

i) a political budget cycle is found in the pre-election period, given by $g_A^2 > 0.5$, and

ii) there is no cycle in the post-election period, $g_A^1 = 0.5$.

Proof:

See appendix 1.

Interpreting the result, it can be said that the incumbent has a total opportunistic behaviour, which means that she has no ideological bias for g_A or g_B. Any eventual composition cycle follows only from the differences in political visibility of g_A and g_B during her legislature period. Moreover, this visibility differential matters in period 2 only, since she is uncertain about being re-elected and thus cannot guarantee a satisfaction from her investment expenditures choices in this period. In other words, one unit of consumption expenditure in period 2 generates higher utility than one unit attached to investment expenditure in the same period, because the latter is probabilistically discounted to the ensuing period 3.

The voters, in contrast, have an ideology in the model represented by parameter a, as already stated, which reveals a definite preference between consumption expenditure and investment expenditure. The higher is a, the more biased are voters' preferences towards consumption expenditures.

The incumbent, given her ideological neutrality, does not have an idiosyncratic incentive to increase investment expenditures in period 1 when voters evidence no bias on preferences regarding expenditure composition. However, given the investment expenditure delay on utility, the incumbent cannot retrieve satisfaction from investment expenditure decided in period 2 (pre-election period), unless she gets re-elected. This induces the incumbent to spend more of her last period budget on consumption expenditures, thus leading to a budget cycle— $g_A^2 > g_B^2$.

In this framework a cycle is only observed in the second half of legislature, since voters prefer no cycle, which gives the incumbent no reason to distort budget composition at the first period in office. In fact, any deviation away from a half

budgetary partition, in period 1, reduces voters' satisfaction, thus decreasing the incumbent's re-election probability as well as her outside income.

5. Preference differences between the electorate and society at large

Now the following question is introduced: Is it reasonable that the entrepreneurs' willingness to pay for the (ex-) incumbent still reflects the electorate's assessment of her performance when non-voters show a significant weight in population? Probably not, because voters are not representative of society's welfare, under these circumstances.

This analysis becomes more interesting if it were taken in consideration that the preferences of voters and non-voters are usually misaligned in the sense that they do not evidence the same priorities.

Following this perspective, the polar cases will be in contrast where:

i) society at large prefer no cycle at all and voters prefer a cycle and

ii) society prefer a cycle and voters prefer no cycle at all.

It is plausible to ask what circumstances may lead the electorate to prefer one type of expenditure and society to prefer an equal partition between the two types of expenditures or vice-versa.

In fact some kind of expenditure satisfies more directly voters and other types of expenditure give more direct satisfaction to non-voters. For the first type of expenditures it can be referred the defence expenditures or economic services like transportation and communication expenditures. Examples of the second type contain expenditures on health, education and social housing construction, where beneficiary groups include much larger fractions of youth and migrant population who typically do not vote.

In this sense, g_B and g_A are re-interpreted respectively, as the first and second type of these expenditures.

Under the existence of preference misalignment between voters and non-voters, an incumbent wishing to please the former exclusively will bring a negative spillover effect on non-voters, since the last ones will find a budget composition different from their most desired partition.[2]

[2] O'Toole and Strobl (1994) argued that "government expenditure, both in size and composition, will more accurately reflect the tastes of the entire eligible-to-vote population under compulsory voting rules.

This gives some insights that those countries where a great number of voters do not actually exercise their right to vote, it is expected that incumbents distort budget composition in order to favour effective electors.[3]

In this sense, it is introduced in the model, at this point, a contra-incentive reproduced by an outside income related to incumbent's social welfare performance.

The outside income will appear here as a recognition measure of the incumbent's merit or reputation by society. The prospective employers' evaluation of the incumbent's performance is now more enlarged. Instead of focusing exclusively on strict economic results, the entrepreneurial community will correlate outside income to the incumbent's social goals achievement.

In this perspective, the two following propositions discuss how the political expenditure cycle evolves when society and voters exhibit different preferences. It is shown in Proposition 2 and in Corollary 1 that when either voters or society evidence a marginal preference for consumption expenditures, the incumbent distorts the budget composition, increasing the later share in both post-election and pre-election periods.

An alternative case is also discussed here where either voters or society prefer a budget mix biased towards investment expenditure. Proposition 3 and Corollary 2 show that in this particular case, investment expenditure exceeds current expenditure in the post-election period.

5.1. Model redefinition

The society's welfare is evaluated by the following expression: $W = c\left[w\left(g_A^1\right) + w\left(g_A^2\right)\right] + (1-c)\left[w\left(g_B^1\right) + w\left(g_B^2\right)\right]$, with $w' > 0, w'' < 0$. Parameter c ($c \in [0,1]$) indicates the budget composition between g_A and g_B expenditures as desired by society. When $c > 0.5$ $(c < 0.5)$ it represents a bias in favour of the first type (second type) expenditures.

In contrast, under voluntary voting rules the composition of government spending is biased towards the preferences of the voting population".

[3] As O'Toole and Strobl (1994) referred, it is the voters with lower income as well as reduced instruction level who, usually, having less information about politics, do not vote.

As referred, outside income is a measure of the incumbent's social reputation. In this sense, $y(W)$ is a result of social welfare and not a strictly outcome of voters' satisfaction. By now it is assumed that the entrepreneurial community is willing to pay the incumbent at least the same or an higher income than the one she would achieve if outside income was related to economic performance alone. If it is not the case, then the incumbent will have no incentive to care about society's preferences. In fact, if outside income is higher when it is just a function of voters' satisfaction, then there is a return to the basic model presented in (4.1).

In this framework, the incumbent's problem becomes:

$$\begin{aligned} &\underset{g_A^1, g_A^2}{Max}\, \tilde{U} = v\left(g_A^1\right) + v\left(1 - g_A^1\right) + v\left(g_A^2\right) + \pi(s)v\left(1 - g_A^2\right) + \left(1 - \pi(s)\right)x\left(y(W)\right) \\ &s.t.\;\; s = a\left[w\left(g_A^1\right) + w\left(g_A^2\right)\right] + (1-a)\left[w\left(1 - g_A^1\right) + w\left(1 - g_A^2\right)\right] \\ &\qquad W = c\left[w\left(g_A^1\right) + w\left(g_A^2\right)\right] + (1-c)\left[w\left(1 - g_A^1\right) + w\left(1 - g_A^2\right)\right] \end{aligned} \tag{4.1}$$

5.2. Further results

As a first case, assume voters and society have different preferences, such that the former prefer no cycle ($a = 0.5$) and the latter have a bias towards consumption expenditures ($c > 0.5$).

Proposition 2—the inter-temporal political expenditure cycle when society prefers a cycle in favour of consumption expenditure and voters prefer the absence of a cycle: When outside income is an outcome of total population satisfaction, voters prefer no cycle ($a = 0.5$) and society favours consumption expenditure ($c > 0.5$), then a political budget cycle emerges in both periods, such that current expenditure exceeds capital expenditure in the optimum $\left[\tilde{g}_A^t > 0.5,\; t = 1,2\right]$.

Proof:

See appendix 2.

A similar result to Proposition 2 is found if voters rather than society evidence a preference bias towards g_A expenditure type ($a > 0.5$) and society prefer an absence of a cycle ($c = 0.5$).

Corollary 1—the inter-temporal political expenditure cycle when voters prefer a cycle in favour of consumption expenditure and society prefers the absence of a cycle: When outside income is an outcome of total population satisfaction, society prefers no cycle ($c = 0.5$) and voters favour consumption expenditure ($a > 0.5$), then a political budget cycle emerges in both periods, such that current expenditure exceeds capital expenditure in the optimum $\left[\tilde{g}_A^t > 0.5,\ t = 1,2 \right]$.

Proof:

Mutatis mutandis, the same kind of cycle emerges. ■

The other case in which voters prefer a concentration on g_B expenditures ($a < 0.5$) and society prefer no cycle ($c = 0.5$) is presented now.

Proposition 3—the inter-temporal political expenditure cycle when voters prefer a cycle in favour of investment expenditure and society prefers the absence of a cycle: When outside income is an outcome of total population satisfaction, society prefers no cycle ($c = 0.5$) and voters favour investment expenditure ($a < 0.5$), then

i) the political budget cycle emerges in period 1 and,

ii) the cycle type in period 2 is ambiguous.

Proof:

See appendix 3.

The cycle type in period 2, under the conditions described in Proposition 3, remains an empirical question. Putting it another way, it will be possible to evaluate empirically if in a country with a representative weight of non-voters, the cycle type has the same

nature as common preferences $\left(g_A^2 > 0.5\right)$ or, in opposition, if it occurs either an absence of a cycle or a bias to g_B expenditures.

The nature of the cycle described in Proposition 3 stands if society rather than voters prefer g_B expenditures ($c < 0.5$) and voters prefer no cycle ($a = 0.5$).

Corollary 2—the inter-temporal political expenditure cycle when society prefers a cycle in favour of investment expenditure and voters prefer the absence of a cycle: When outside income is an outcome of total population satisfaction, voters prefer no cycle ($a = 0.5$) and society favours investment expenditure ($c < 0.5$), then

i) the political budget cycle emerges in period 1 and,

ii) the cycle type in period 2 is ambiguous.

Proof:

Mutatis mutandis, the same kind of cycle emerges. ■

5.3. Interpretation of the results

The intuition of the two last results can be explained as follows. If society's preferences differ from voters' ones, the incumbent will face a trade-off effect: pleasing voters improves her re-election chances but decreases her outside income, since incumbent has made options that are far away from the ones most preferred by society. Ii is useful to recall here that, in this case, incumbent's reputation is evaluated according to her social welfare performance.

This means that when incumbent pegs social welfare to her utility function (Proposition 2 and 3), the political expenditure cycles are no longer as predicted when she looks only into the voters' interest and her own (Proposition 1).

Under the case in Proposition 2 ($c > a = 0.5$), given the incumbent's ideology absence, in period 1 she will follow society's preferences. In this case, the budget composition is distorted in favour of g_A expenditures, thus improving the incumbent's outside reward. In period 2, both society and the incumbent's self-interest on g_A expenditures push for a $g_A > 0.5$ cycle. In this case, the incumbent supports some cost

on votes but increases its outside income in case of defeat. Besides, a bias is expected to g_A expenditures in period 1 and period 2.

The previous argument is also valid for the case in which voters' preferences are biased to g_B expenditures ($a < c = 0.5$), presented in Proposition 3. Given the incumbent's preference absence for any type of expenditure, in period 1 a PBC is found, which increases g_B expenditures, thus favouring voters and improving the incumbent's re-election probability. Given the incumbent's re-appointment concern, she has an incentive to spend more on g_B expenditures also in period 2, compared to common preferences. However, the incumbent's self-interest is opposite to voters'. Thus, these two effects can lead to an absence of a cycle (the two-effect balance) or a bias in favour of any type of expenditure. A budget composition option where g_B expenditures are privileged seems also very plausible to the incumbent. Although imposing some dissatisfaction on all society, it pleases voters, first constituencies that give an immediate reward to the incumbent: the vote.

This analysis converges to other authors' results mentioned above in which the incumbents tend to satisfy particular constituencies, specifically those who vote.

The conclusion is that, in both cases, when outside income depends on society's preferences, which are not aligned with voters ones, a cycle will emerge in period 1.

The larger the number of non-voters in total population, the higher the impact of a given preference differential between society and voters. The society's behaviour is more differentiated from the voters' one as the weight of non-voters in society increases. Only in this case, different preferences are expected since non-voters influence society's welfare evaluation. If non-voters are not a significant fraction of population, an incumbent who chooses a budget composition that satisfies voters' preferences guarantees re-election and outside income is not penalised, since voters reflect society's preferences. However, when voters and non-voters are not aligned in preferences, and simultaneously non-voters have weight in the total population, this is an incentive for the incumbent to change budget composition in order to accommodate the preferences of both types of population.

6. Concluding remarks

Is it merely the re-election concern that mobilises incumbents to manipulate public expenditure composition?

The paper has proved that even when

1) voters know the budget availability after the pre-electoral decision for investment expenditures as well as
2) the incumbent foresees perfectly her re-election chances,

an intertemporal political budget expenditure cycle emerges with implications on expenditure mix. In this case, an expenditure cycle prone to consumption expenditures is expected in the pre-election period. Central governments increase the share of consumption expenditure whenever they come close to electoral contests and local governments increase the share of those expenditure categories that bring political dividends immediately.

When the incumbent's performance as perceived by society is brought into question, the incumbent faces two opposing incentives in the pre-election period. In fact, under this scenario, the incumbent finds herself into a dilemma whenever voters' or society's preferences favour investment expenditures. If she favours consumption expenditures, she displeases either voters or society, thus decreasing her re-election chances, in the former case, or her outside income if defeated in the next election contest, in the latter case. Given this opposing incentives faced by the incumbent in the pre-election period, it is not possible to know *a priori* the budget mix in that period.

If either voters' or society's preferences are biased towards consumption expenditures, then the political budget cycle prone to such expenditure category emerges in both post-election periods and pre-election periods.

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Appendix 1:

The incumbent's problem is given by expression (3.1):

$$\underset{g_A^1, g_A^2}{Max} U = v\left(g_A^1\right) + v\left(1 - g_A^1\right) + v\left(g_A^2\right) + \pi(s)v\left(1 - g_A^2\right) + \left(1 - \pi(s)\right)x\left(y(s)\right)$$

$$s.t. \qquad s = a\left[w\left(g_A^1\right) + w\left(g_A^2\right)\right] + (1-a)\left[w\left(1 - g_A^1\right) + w\left(1 - g_A^2\right)\right]$$

The objective function is twice differentiable and assumed to be strictly concave in order to ensure the existence of a unique and global maximum. Under this condition the first-order conditions are necessary and sufficient to characterise the global extreme value, thus obviating the need for checking the second-order condition.

The first order-conditions are:

$$\frac{\partial U}{\partial g_A^1} = v'\left(g_A^1\right) + \pi'(s)\left(aw'\left(g_A^1\right) - (1-a)w'\left(1-g_A^1\right)\right)v\left(1-g_A^2\right) -$$
$$- v'\left(1-g_A^1\right) +$$
$$+ x'y'(s)\left(aw'\left(g_A^1\right) - (1-a)w'\left(1-g_A^1\right)\right) - \pi'(s)\left(aw'\left(g_A^1\right) - (1-a)w'\left(1-g_A^1\right)\right)x\left(y(s)\right) -$$
$$- \pi(s)x'y'(s)\left(aw'\left(g_A^1\right) - (1-a)w'\left(1-g_A^1\right)\right) = 0$$

$$\frac{\partial U}{\partial g_A^2} = v'\left(g_A^2\right) + \pi'(s)\left(aw'\left(g_A^2\right) - (1-a)w'\left(1-g_A^2\right)\right)v\left(1-g_A^2\right) -$$
$$- \pi(s)v'\left(1-g_A^2\right) +$$
$$+ x'y'(s)\left(aw'\left(g_A^2\right) - (1-a)w'\left(1-g_A^2\right)\right) - \pi'(s)\left(aw'\left(g_A^2\right) - (1-a)w'\left(1-g_A^2\right)\right)x\left(y(s)\right) -$$
$$- \pi(s)x'y'(s)\left(aw'\left(g_A^2\right) - (1-a)w'\left(1-g_A^2\right)\right) = 0$$

The two equations can be simplified to expressions (A.1.1) and (A.1.2) below, respectively:

$$v'\left(g_A^1\right) - v'\left(1-g_A^1\right) =$$
$$= \left\{\pi'(s)\left[x\left(y(s)\right) - v\left(1-g_A^2\right)\right] - \left(1-\pi(s)\right)x'y'(s)\right\}\left(aw'\left(g_A^1\right) - (1-a)w'\left(1-g_A^1\right)\right) \quad \text{(A.1.1)}$$

$$v'\left(g_A^2\right) - \pi(s)v'\left(1-g_A^2\right) =$$
$$= \left\{\pi'(s)\left[x\left(y(s)\right) - v\left(1-g_A^2\right)\right] - \left(1-\pi(s)\right)x'y'(s)\right\}\left(aw'\left(g_A^2\right) - (1-a)w'\left(1-g_A^2\right)\right) \quad \text{(A.1.2)}$$

Let $g_A^{1^*}$ and $g_A^{2^*}$ denote the optimal solution to problem (3.1).

Step i— Firstly, the focus is on period 1 expenditure composition, given by (A.1.1) above.

As previously referred, it is expected that $g_A^1 - g_B^1 = 0$. The following proof is made by contradiction. In this sense, suppose not. Under this scenario it could be found that $g_A^1 - g_B^1 > 0$ or $g_A^1 - g_B^1 < 0$.

Define $\Omega \equiv \pi'(s)\left(x\left(y(s)\right) - v\left(1-g_A^2\right)\right)$ as well as $\hat{\Omega} \equiv \left(1-\pi(s)\right)x'y'(s)$. Given the assumption $x(y) - v\left(g_B^2\right) < 0$ and the signs of the primitive functions, then it implies $\Omega < 0$ and $\hat{\Omega} > 0$.

This allows to rewrite expression (A.1.1) as:

$$v'\left(g_A^1\right) - v'\left(1-g_A^1\right) = \left(\Omega - \hat{\Omega}\right)\left(aw'\left(g_A^1\right) - (1-a)w'\left(1-g_A^1\right)\right).$$

Assuming that it could be $g_A^1 - g_B^1 > 0$, this means that $g_A^1 > 0.5$, given budget constraint.

Thus, under this scenario it will be found a left-hand side strictly negative or equivalently $v'\left(g_A^1\right) < v'\left(1-g_A^1\right)$. By the same token, $w'\left(g_A^1\right) < w'\left(1-g_A^1\right)$, which leads to $\left(aw'\left(g_A^1\right) - (1-a)w'\left(1-g_A^1\right)\right) < 0$, given the basic assumption that $a = 0.5$.

Jointly with $\left(\Omega - \hat{\Omega}\right) < 0$, this gives a right-hand side strictly positive, which is a contradiction.

Thus, the conclusion is that g_A^1 cannot be strictly larger than g_B^1.

The other scenario is $g_A^1 - g_B^1 < 0$ or, equivalently, $g_A^1 < 0.5$. In this situation it will be found $v'\left(g_A^1\right) > v'\left(1-g_A^1\right)$ as well as $w'\left(g_A^1\right) > w'\left(1-g_A^1\right)$. Here the left-hand side is strictly positive. Knowing that $\left(\Omega - \hat{\Omega}\right) < 0$ as well that $\left(aw'\left(g_A^1\right) - (1-a)w'\left(1-g_A^1\right)\right) > 0$, in this case a right-hand side strictly negative is found. Thus, a contradiction is found again, which means that g_A^1 cannot also be strictly smaller than g_B^1.

Summarizing, if g_A^1 is neither strictly bigger nor strictly smaller than g_B^1, well then this means that the equilibrium solution in period 1 can only be $g_A^1 = g_B^1$.

Step ii— At this point there is a turn into the period 2 expenditure shares, given by expression (A.1.2):

$$v'\left(g_A^2\right) - \pi(s)v'\left(1-g_A^2\right) =$$
$$= \left\{\pi'(s)\left[x\left(y(s)\right) - v\left(1-g_A^2\right)\right] - \left(1-\pi(s)\right)x'y'(s)\right\}\left(aw'\left(g_A^2\right) - (1-a)w'\left(1-g_A^2\right)\right)$$

The rest of this proof replicates Baleiras and Vasco (2000). The following exposition proceeds by contradiction. Suppose, therefore, that the inequality $g_A^2 - g_B^2 > 0$ is not fulfilled. Then, $g_A^2 - g_B^2 \leq 0$ or $g_A^2 \leq 0.5$, given the budget constraint in period 2.

The left-hand side of the expression is strictly positive, because $g_A^2 \leq 0.5$, which implies that $v'\left(g_A^2\right) \geq v'\left(1-g_A^2\right) > \pi(s)v'\left(1-g_A^2\right)$.

Let return to the definition of $\Omega \equiv \pi'(s)\left(x(y(s)) - v\left(1-g_A^2\right)\right)$ as well as $\hat{\Omega} \equiv \left(1-\pi(s)\right)x'y'(s)$, which are common in the two period first-order conditions. Given also the assumption $x(y) - v\left(g_B^2\right) < 0$ and the signs of the primitive functions, then it is found $\Omega < 0$ and $\hat{\Omega} > 0$, as previously stated.

In this case, the right-hand side can now be written as $\left(\Omega - \hat{\Omega}\right)\left(aw'\left(g_A^2\right) - (1-a)w'\left(1-g_A^2\right)\right)$

From $g_A^2 \le 0.5$, $w'\left(g_A^2\right) \ge w'\left(1-g_A^2\right)$, implying for $a = 0.5$ that $\left(aw'\left(g_A^2\right) - (1-a)w'\left(1-g_A^2\right)\right) \ge 0$. Therefore, the right-hand side of the expression becomes non-positive, which establishes a contradiction.

Concluding, it can be said that g_A^2 is strictly larger than g_B^2 in the optimum. ■

Appendix 2:

Step i—First-order conditions of problem (4.1)

$$\begin{aligned}\frac{\partial \tilde{U}}{\partial g_A^1} = {} & v'\left(g_A^1\right) + \pi'(s)\left(aw'\left(g_A^1\right) - (1-a)w'\left(1-g_A^1\right)\right)v\left(1-g_A^2\right) - \\ & - v'\left(1-g_A^1\right) + \\ & + x'y'(W)\left(cw'\left(g_A^1\right) - (1-c)w'\left(1-g_A^1\right)\right) - \pi'(s)\left(aw'\left(g_A^1\right) - (1-a)w'\left(1-g_A^1\right)\right)x\left(y(W)\right) - \\ & - \pi(s)x'y'(W)\left(cw'\left(g_A^1\right) - (1-c)w'\left(1-g_A^1\right)\right) = 0\end{aligned}$$

$$\begin{aligned}\frac{\partial \tilde{U}}{\partial g_A^2} = {} & v'\left(g_A^2\right) + \pi'(s)\left(aw'\left(g_A^2\right) - (1-a)w'\left(1-g_A^2\right)\right)v\left(1-g_A^2\right) - \\ & - \pi(s)v'\left(1-g_A^2\right) + \\ & + x'y'(W)\left(cw'\left(g_A^2\right) - (1-c)w'\left(1-g_A^2\right)\right) - \pi'(s)\left(aw'\left(g_A^2\right) - (1-a)w'\left(1-g_A^2\right)\right)x\left(y(W)\right) - \\ & - \pi(s)x'y'(W)\left(cw'\left(g_A^2\right) - (1-c)w'\left(1-g_A^2\right)\right) = 0\end{aligned}$$

Rearranging, it becomes:

$$\begin{aligned}v'\left(g_A^1\right) - v'\left(1-g_A^1\right) = {} & \left[\pi'(s)\left(x\left(y(W)\right) - v\left(1-g_A^2\right)\right)\right]\left(aw'\left(g_A^1\right) - (1-a)w'\left(1-g_A^1\right)\right) - \\ & - \left(1-\pi(s)\right)x'y'(W)\left(cw'\left(g_A^1\right) - (1-c)w'\left(1-g_A^1\right)\right)\end{aligned} \qquad \text{(A.2.1)}$$

$$v'\left(g_A^2\right)-\pi(s)v'\left(1-g_A^2\right)=\left[\pi'(s)\left(x\left(y(W)\right)-v\left(1-g_A^2\right)\right)\right]\left(aw'\left(g_A^2\right)-(1-a)w'\left(1-g_A^2\right)\right)- \\ -\left(1-\pi(s)\right)x'y'(W)\left(cw'\left(g_A^2\right)-(1-c)w'\left(1-g_A^2\right)\right) \quad \text{(A.2.2)}$$

Denote the optimal quantities springing out of the first-order conditions (A.2.1) and (A.2.2) as $\tilde{g}_A^1$ and $\tilde{g}_A^2$, respectively.

Step ii—Cycle in period 1

At first it is paid attention to period 1's budget composition or equivalently to equation (A.2.1).

Evaluating the $\tilde{g}_A^1$ solution, it could be $\tilde{g}_A^1=\tilde{g}_B^1$, or $\tilde{g}_A^1<\tilde{g}_B^1$ as well as $\tilde{g}_A^1>\tilde{g}_B^1$.

If the solution were $\tilde{g}_A^1\le 0.5$, given the signs of the primitive functions, $v'\left(\tilde{g}_A^1\right)\ge v'\left(1-\tilde{g}_A^1\right)$, then the left-hand side is non-negative. Knowing that with $a=0.5$ and $\tilde{g}_A^1\le 0.5$, the following inequality holds $\left(aw'\left(\tilde{g}_A^1\right)-(1-a)w'\left(1-\tilde{g}_A^1\right)\right)\ge 0$, this leads to a non-positive right-hand first term, given $\pi'>0$ as well as $\left(x\left(y(W)\right)-v\left(1-\tilde{g}_A^2\right)\right)<0$, by assumption. With $c>0.5$ and $\tilde{g}_A^1\le 0.5$, the inequality is given as $\left(cw'\left(\tilde{g}_A^1\right)-(1-c)w'\left(1-\tilde{g}_A^1\right)\right)>0$, jointly with $w'>0$, $x'>0$ and $y'>0$, a negative right-hand second term will be found.

Consequently, a negative right-hand side is found when $\tilde{g}_A^1\le 0.5$, which establishes a contradiction.

Therefore, if $\tilde{g}_A^1$ is neither equal nor strictly smaller than $\tilde{g}_B^1$, this means that, in this case, it will be found $\tilde{g}_A^{1*}>0.5$, thus leading to a *political expenditure cycle* in period 1.

Step iii—Cycle in period 2: $\tilde{g}_A^2>0.5$

Analysing now the period 2, with $y=y(W)$ and returning to expression (A.2.2), here recalled for the reader's convenience:

$$v'\left(g_A^2\right)-\pi(s)v'\left(1-g_A^2\right)=\left[\pi'(s)\left(x\left(y(W)\right)-v\left(1-g_A^2\right)\right)\right]\left(aw'\left(g_A^2\right)-(1-a)w'\left(1-g_A^2\right)\right)-$$
$$-\left(1-\pi(s)\right)x'\,y'(W)\left(cw'\left(g_A^2\right)-(1-c)w'\left(1-g_A^2\right)\right)$$

The subsequent exposition follows by contradiction once again. Suppose not, then $\tilde{g}_A^2 \le 0.5$. More precisely, under $\tilde{g}_A^2 \le 0.5$, the expression (A.2.2) has a strictly positive left-hand side, given $v'>0$ and $\pi<1$. When $\tilde{g}_A^2 \le 0.5$ as well as $a=0.5$, then $\left(aw'\left(\tilde{g}_A^2\right)-(1-a)w'\left(1-\tilde{g}_A^2\right)\right)\ge 0$. Thus, a non-positive first term of right-hand side of expression (A.2.2) is found. Given $c>0.5$ and $\tilde{g}_A^2 \le 0.5$, a right-hand side second term strictly negative is found, since $\left(cw'\left(\tilde{g}_A^2\right)-(1-c)w'\left(1-\tilde{g}_A^2\right)\right)>0$.

This leads to a contradiction. Thus, $\tilde{g}_A^2 \le 0.5$ is not a solution for problem (4.1). ■

Appendix 3:

Step i—Cycle nature in period 1

For period 1 the expression is again given by (A.2.1):

$$v'\left(g_A^1\right)-v'\left(1-g_A^1\right)=\left[\pi'(s)\left(x\left(y(W)\right)-v\left(1-g_A^2\right)\right)\right]\left(aw'\left(g_A^1\right)-(1-a)w'\left(1-g_A^1\right)\right)-$$
$$-\left(1-\pi(s)\right)x'\,y'(W)\left(cw'\left(g_A^1\right)-(1-c)w'\left(1-g_A^1\right)\right)$$

As previously, it is followed an exposition by contradiction. It is denoted $\Phi=\left(1-\pi(s)\right)x'\,y'(W)\left(cw'\left(\tilde{g}_A^1\right)-(1-c)w'\left(1-\tilde{g}_A^1\right)\right)$.

Seeing now the hypothesis that $\tilde{g}_A^1 \ge 0.5$, then, given the signs of the primitive functions, $v'\left(\tilde{g}_A^1\right)\le v'\left(1-\tilde{g}_A^1\right)$ and $\Phi \le 0$. Given $\pi'>0$ and $\left(x\left(y(W)\right)-v\left(1-g_A^2\right)\right)<0$, by assumption, as well as $\left(aw'\left(\tilde{g}_A^1\right)-(1-a)w'\left(1-\tilde{g}_A^1\right)\right)<0$, this leads to a positive first term. Thus a right-hand side with a positive sign is found, which establishes a contradiction.

Therefore, if $\tilde{g}_A^1$ is neither equal nor larger than $\tilde{g}_B^1$, this means that in this case it will be found $\tilde{g}_A^{1*} < 0.5$, thus leading to a political expenditure cycle in period 1 as in Proposition 2.

Step ii—Cycle nature in period 2

The first-order conditions (A.2.1) and (A.2.2) still apply.

Returning to expression (A.2.2) in order to evaluate if there is a political budget cycle in period 2 when there are voters' bias in preferences towards g_B expenditures.

At this point it is tested if when $a < 0.5$ as well as $c = 0.5$, the equilibrium solution continues to be $\tilde{g}_A^{2*} > 0.5$, or equivalently, if it must be inquired whether $\tilde{g}_A^{2*} > 0.5$ can solve problem (4.1).

When $\tilde{g}_A^2 > 0.5$ as well as $a < 0.5$, then $\left(aw'\left(\tilde{g}_A^2 \right) - (1-a)w'\left(1-\tilde{g}_A^2 \right) \right) < 0$. Thus a first term of right-hand side of expression (A.2.2) strictly positive is found. Given $c = 0.5$ and $\tilde{g}_A^2 > 0.5$, a second term also strictly positive is found, since $\left(cw'\left(\tilde{g}_A^2 \right) - (1-c)w'\left(1-\tilde{g}_A^2 \right) \right) < 0$. This implies a right-hand side strictly positive.

For $\tilde{g}_A^2 > 0.5$ to be a solution to problem (4.1), it must also have a left-hand side strictly positive, i.e., $v'\left(\tilde{g}_A^2 \right) - \pi(s)v'\left(1-\tilde{g}_A^2 \right) > 0$. However, it cannot be ensured, given $v' > 0$, $v'' < 0$ and $\pi < 1$. Thus, the left-hand side has an ambiguous sign. Hence, $\tilde{g}_A^2 > \tilde{g}_B^2$ is (is not) a possible solution in case π is enough low (high) to make the left-hand side strictly positive (non-negative).

Using $\tilde{g}_A^2 < 0.5$, a strictly positive left-hand side of expression (A.2.2) is found. The first term on the right-hand side has an ambiguous sign, which depends on $\left(aw'\left(\tilde{g}_A^2 \right) - (1-a)w'\left(1-\tilde{g}_A^2 \right) \right)$ being positive or negative, given $a < 0.5$, $w' > 0$, $w'' < 0$, $\pi' > 0$ and $x\left(y(W) \right) - v\left(1-\tilde{g}_A^2 \right) < 0$. Given $c = 0.5$ and $\tilde{g}_A^2 < 0.5$, a right-hand

second term strictly negative is found, since $\left(cw'\left(\tilde{g}_A^2\right)-(1-c)w'\left(1-\tilde{g}_A^2\right)\right)>0$. This leads to a right-hand side taking any value, which leads to an ambiguous result. Once again it cannot be ensured that $\tilde{g}_A^2$ is strictly smaller than $\tilde{g}_B^2$.

If it is considered $\tilde{g}_A^2=0.5$, then the left-hand side of expression (A.2.2) is strictly positive. On the right-hand side there is a first term strictly positive, given $a<0.5$, $w'>0$, $\pi'>0$ and $x\left(y(W)\right)-v\left(1-\tilde{g}_A^2\right)<0$. The second term is null given $c=0.5$ and $\tilde{g}_A^2=0.5$. Thus, it can be said that $\tilde{g}_A^2=0.5$ is definitively a solution to problem (A.2.2) when voters have a preference bias to g_B expenditures. However, it cannot be guaranteed that this will be the only solution.

Given the results it can be said that $\tilde{g}_A^2$ can take any value, i.e. $\tilde{g}_A^2$ can be equal, strictly bigger or strictly smaller than $\tilde{g}_B^2$. ■