

FOUR BUDGET DEFICIT THEORIES IN ONE MODEL

Jens Peter Siebel¹
Athanasios Pitsoulis²

Abstract

The analysis of many budget deficit theories is too demanding for undergraduate students. This paper illustrates governments' incentives to create budget deficits by means of a simple graphical model. It integrates four budget deficit theories: The theory of the state as Leviathan, two different strategic deficit theories, and the theory of tax competition. These theories are embedded into an illustrative example of political competition between a conservative party and a liberal party. The main pedagogical benefits of the model are its intuitive setup and its waiver of demanding analysis.

Keywords: budget deficit, public debt, teaching, macroeconomics instruction

JEL codes: H11, H63, H71

Introduction

The phenomenon of chronic, excessive budget deficits and hence rapidly growing public debt is one of the most urgent economic problems in Western democracies. Although there is a common sense that deficits have to be reduced, governments keep on leaving deficits. This hypocritical behavior has incited many explanations and interpretations in both the empirical and theoretical literature. Yet, popular political economy and public choice textbooks, such as Persson and Tabellini (2000), do not present those explanations in an integrated framework. Instead, they focus on several special motifs of deficit creation one at a time. Moreover, most budget deficit explanations rely on complex models of intertemporal optimization. These models are mathematically demanding, especially for undergraduate students. As a result, many lecturers teach the basic principles of budget deficits and public debt to graduate students only.

As an alternative approach, this article proposes a simple graphical model combining four of the most important political-economic explanations of budget deficits. The intuitive setup enables the lecturer to familiarize undergraduate students with the deficit problem. The model is suitable for blackboard and transparency presentation as well as PowerPoint presentation. Before dealing with the model, students should have acquired basic microeconomic knowledge (indifference curves, transformation curves, budgetary restrictions, deriving curves in a diagram etc.).

The model focuses on the following budget deficit theories: The first is the theory of the government as a 'Leviathan' in the sense of Brennan and Buchanan (1980): A government tries to extract an extra rent from its citizens by raising tax revenues and budget deficits in excess of what it needs to finance the provision of public goods. Both the second and third theories belong to the family of strategic deficit theories. They can be distinguished according to the social

¹ Lecturer of Economics and Business Administration, International College, University of Applied Sciences Kaiserslautern, Schoenstrasse 9, 67659 Kaiserslautern, Germany.

² Assistant Professor of Microeconomics, Institute of Economics and Business Administration, Faculty of Engineering, Brandenburg University of Technology, Konrad-Wachsmann-Allee 1, 03046 Cottbus, Germany.

groups at which the strategy is targeted. On the one hand, a government can target voters in order to secure electoral victory (the *second* theory), either in the next election (e. g. Lizzeri (1999)) or the election after the next (e. g. Lockwood et al. (1996)). On the other hand, a government can use strategic deficits in order to constrain the spending decisions of possible successors (e.g. Tabellini and Alesina (1990) or Persson and Svensson (1989), *third* theory). The latter authors present the appealing idea of a “stubborn” conservative government (Persson and Svensson 1989, p. 338) that leaves high deficits in order to constrain the liberal successor’s public spending and apply this theory to the fiscal policy of the Reagan administration in the US. Finally, the *fourth* theory holds that tax competition prevents governments from raising taxes excessively, as this could lead to capital flight, diminishing the overall welfare of an economy (Alesina and Tabellini, (1990)).

We have used the model successfully in macroeconomics lectures at the undergraduate level. Anecdotal evidence suggests that the intuitive way of approaching the deficit topic is attractive to students and reduces antipathy against economic modeling.

The Model

The core of the model is a four-quadrants diagram (see figures 3 and 4). In the following subsections we will derive the components of the four quadrants step by step.

First Step: The Welfare Functions (South-eastern and North-western Quadrant)

There are two parties, a conservative (right-wing) party and a liberal (left-wing) party, representing capitalists and workers, respectively. Capital is internationally mobile and labor is immobile.

$$x = X(c, t_i) \quad \text{with } X'_c > 0 \text{ and } X''_{cc} < 0 \quad (1)$$

is the welfare function of workers, with t_i being the tax rate on labor income and c being the degree of social security. The capitalists’ welfare function is

$$y = Y(i, t_m) \quad \text{with } Y'_i > 0 \text{ and } Y''_{ii} < 0. \quad (2)$$

Here t_m represents the tax rate on mobile capital revenues, whereas i is the amount of capital-specific infrastructure. Figure 1 shows that t_i and t_m work as shift parameters for the functions. These welfare functions will appear in the south-eastern and the north-western quadrant of figures 3 and 4.

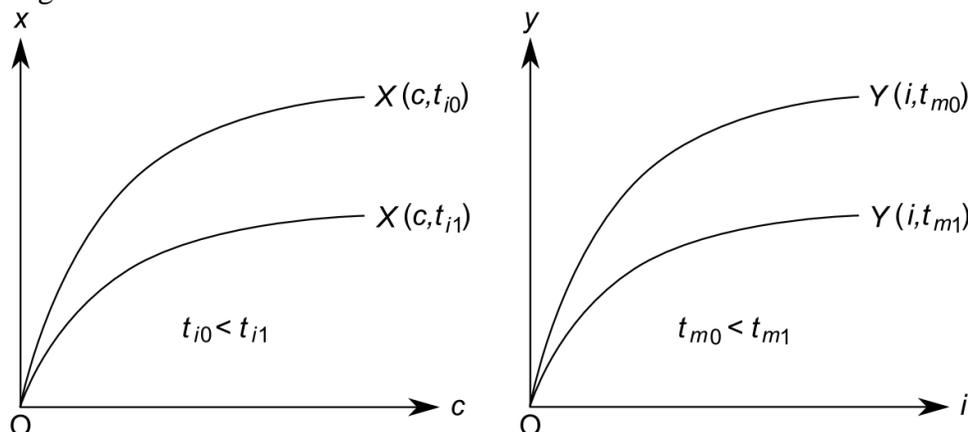


Figure 1: Welfare functions of workers and capitalists

The government decides on the tax rates on capital revenues and labor incomes. There are increasing deadweight losses of taxation, i. e. a rise in the tax rate on a production factor causes a disproportionately increasing reduction of factor-specific marginal welfare. This reflects distortionary tax-collection like progressive labor and capital income taxes³. As the government faces international tax competition, it can increase its own capital revenue taxes only up to a threshold value t_m^* . If the government exceeds this threshold value, a complete capital flight from the domestic country occurs.

Conservatives, by ideology, favor capital, liberals, by ideology, favor labor. Any government prefers to lower taxes for its ideologically favored production factor, i. e. a conservative uses an increasing budget to cut down capital taxes whereas a liberal one cuts down income taxes.

Second Step: The Budget Constraint (South-western Quadrant)

The government can finance social security and infrastructure either by tax revenues or by borrowing abroad. It starts with a balanced budget and a debt stock of zero at the beginning of the first period. At the end of the second period the budget has to be rebalanced, i. e. further deficit-spending and Ponzi games are impossible. Most US states and Canadian provinces have such strict intertemporal balanced budget rules on sub-national level⁴. Denote the first period budget balance with b . If $b > 0$, there is a first period deficit and the government has to borrow that amount on the international capital market. $b < 0$ denotes a first period surplus, the government lends to foreign countries⁵. To simplify things, the international interest rate shall be equal to zero; in order to prevent the problem of Ricardian equivalence, private savings are assumed to be absent or not to be influenced by the government's tax and deficit decisions⁶.

Third Step: The Voters (North-eastern Quadrant)

The linear-homogenous popularity function

$$u = U(x, y) \text{ with } U'_x > 0, U'_y > 0, U''_{xx} < 0 \text{ and } U''_{yy} < 0 \quad (3)$$

describes the government's popularity among voters.

The model covers two periods and there is an election at the end of each period, with the voters' preferences being time-consistent. These preferences are mapped as iso-popularity curves in the north-eastern quadrant of figures 3 and 4. Due to the properties of the popularity function, they are negatively sloped and convex. In line with the well known political business cycle model of Hibbs (1977), voters are backward looking, rewarding or punishing the government's behavior in the last period. If the government provides an x - y -allocation below the re-election ensuring iso-popularity curve, it will loose the next election. The north-eastern quadrant shows the re-election ensuring iso-popularity curves for two different cases: a) voters prefer workers'

³ One might object that capital taxes are usually proportional. In this case, one can alternatively assume that proportional capital taxation causes over-proportional marginal disutility.

⁴ Currently all US states except Vermont face some kind of balanced budget requirement. In Canada, six of ten provinces have anti-deficit laws. Even in provinces with less stringent laws, expenditures must not exceed revenues over a period of several years. On an international level, the European Stability and Growth Pact prohibits the members from running deficits in excess of three per cent of current GDP. Other examples are budgetary obligations to international organizations and donor countries like those in the Washington Consensus. Recently, Switzerland and Germany have established constitutional deficit-brakes.

⁵ We abstain from analyzing this case, as this occurs infrequently.

⁶ This is a nice example of how ad hoc assumptions help to straighten out awkward theoretical problems.

welfare over capitalists' welfare (iso-popularity curve U_{lw}) or b) voters prefer capitalists' welfare over workers' welfare (iso-popularity curve U_{rw})⁷. Throughout the following, the model will follow case a), as this case is in accordance with empirical evidence in Western democracies. Research shows that labor income is widely spread across the population, whereas capital income concentrates on a relatively small group of voters. As a result, many of these countries have higher tax rates on capital than on labor (Daveri and Tabellini, 1997)⁸.

The Government

Each government pursues a combined strategy of re-election and ideology. In line with the literature on strategic deficits, the government either tries to influence voters' behavior or the succeeding government's behavior. In line with the Leviathan-literature, the government does not use up the whole budget for social security and infrastructure and extracts the difference as additional rent. In line with the tax competition literature, the government has to take care about the fact that the country is constantly threatened by capital flight. Figure 2 gives a short overview of the governments' actions in both periods.

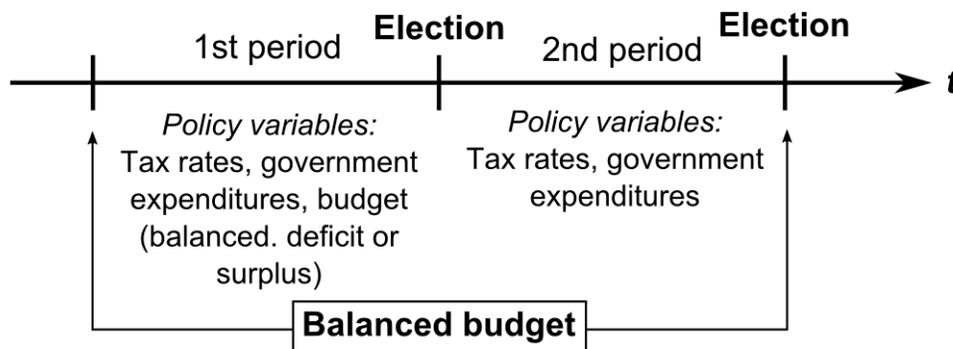


Figure 2: Time-structure of the model

Throughout the following, we focus on the case of a conservative first period government, as this is more illustrative.

The Conservative Party Holds Office

Leaving a Balanced Budget

In the reference case the first period budget is balanced $b = 0$. The budget restriction in the south-western quadrant of Figure 3 displays all feasible combinations of c and i . This determines the level of popularity the government can reach through the provision of social security and infrastructure. If the government fails in achieving re-election, it wants to ensure that it wins the second-period election at least.

Suppose that the conservative government chooses the tax rates t_{m1}, t_{i1} . The north-eastern quadrant shows the consequences of this choice: Under a balanced budget the policy

⁷ A good example is a popularity function of the Cobb-Douglas-type: $U(x, y) = x^\alpha \cdot y^{1-\alpha}$ with $\alpha \in 0.5, 1$ in case a) and $\alpha \in 0, 0.5$ in case b). As this function is linear-homogenous, all re-election ensuring allocations must have the same distance from the origin.

⁸ See also the textbook of Persson and Tabellini (2000, p. 305) for a brief survey.

t_{m1}, t_{i1} yields the transformation curve AB in x - y -space. If the transformation curve reaches the iso-popularity curve, the government will win the election, otherwise not. Figure 3 shows a case where the fiscal policy set t_{m1}, t_{i1} , $b = 0$ does not ensure re-election⁹.

Figure 4 displays the possible actions of a liberal successor if the conservative government fails in ensuring re-election. If the conservative government leaves behind a balanced budget, the liberal successor can raise capital income taxes and its worker-friendly policy will be t_m^*, t_{i0} . Then the transformation curve GH in Figure 4 would be high enough to ensure the liberal successor's re-election, as the iso-popularity curve U_{lw} is intersected¹⁰. To leave a balanced budget is thus an unfavorable policy for the conservative government.

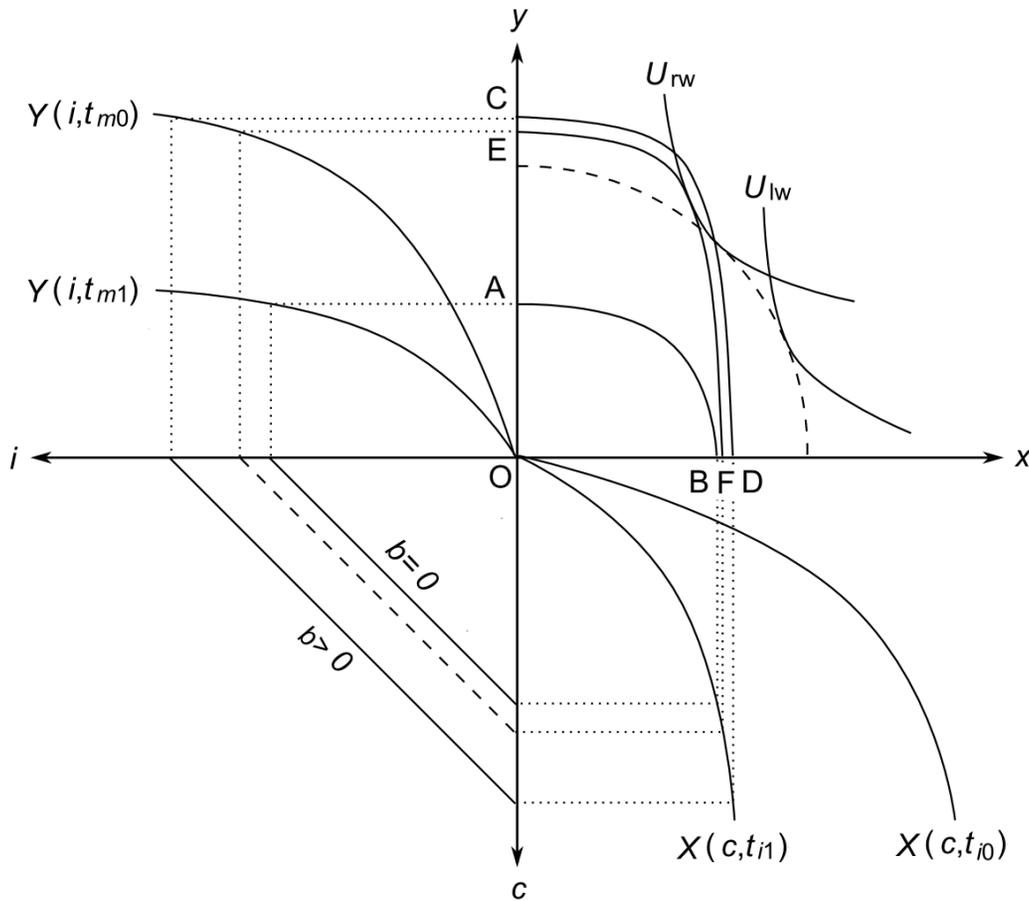


Figure 3: Behavior of the conservative government in the first period

⁹ Of course, the conservative government would be re-elected if the relevant iso-popularity curve was U_{rw} .

¹⁰ Note that in this case the government cannot extract a private rent from the budget. Thus the Leviathan strategy is ruled out for the liberal second-period government which inherited a balanced budget.

Leaving a Deficit

If the conservative government borrows on international capital markets (i. e. $b > 0$), the budget constraint in the south-western quadrant of figure 3 shifts to the left. Now the government is able to provide any amount of social security and infrastructure at a lower tax rate. Alternatively, it can provide a higher amount of social security and infrastructure at the same tax rate.

Assume that the government lowers taxes on capital, setting a fiscal policy $(t_{m0}, t_{i1}), b > 0$. The capitalists' welfare curve in the north-western quadrant of Figure 3 shifts upwards to Y_i, t_{m0} . This changes the transformation curve in the north-eastern quadrant to CD. According to the Leviathan-theory, the government will spend only a part of its budget for social security and infrastructure and keep the remainder as a rent that "represents pure profits from governing" (Sinn 1992, p. 183). In this case we get the transformation curve EF in Figure 3. However, even the debt-financed higher-spending on x cannot prevent the conservative government from being voted out of office. Waiving of the private rent would not help either. But nonetheless the government chooses the fiscal policy set $t_{m0}, t_{i1}, b > 0$.

The reason is that the government anticipates the policy of the liberal successor (figure 4). As further deficit-spending is ruled out, the liberal government must serve public debt. In figure 4 the budget constraint shifts to the right by the amount borrowed abroad. Normally, a liberal government would prefer to raise capital tax rates in excess of t_m^* in order to serve public debt and keep taxes on labor income at the level t_{i0} . But the threat of capital flight works as an additional constraint here. Capitalists would respond to a higher capital tax rate by moving their assets abroad. This cannot happen without a reduction of labor welfare, and, as a consequence, overall domestic popularity.

The liberal government cannot raise the capital tax rate beyond t_m^* . The only way to serve public debt is to demand higher taxes t_{i1} on labor, initializing a tax policy set t_m^*, t_{i1} with transformation curve II.

But in this case the liberal government lacks the popularity to ensure re-election, which means that the conservative party will regain power at the end of the second period. Hence, by choosing the strategic fiscal policy $t_{m0}, t_{i1}, b > 0$ in the first period the conservative government acts according to the deficit theories outlined in the introduction:

- 1) It extracts an additional rent for itself in the sense of Brennan and Buchanan (1980) (see Figure 2).
- 2) It ensures re-election, not immediately but at least at the end of the second period – a strategy that follows the ideas of Lockwood et al. (1996).
- 3) It commits the liberal successor to a less liberal policy. Hence, it is "stubborn" in the sense of Persson and Svensson (1989, p. 338).
- 4) It uses international tax competition as a tool to put pressure on the successor similar to the model of Alesina and Tabellini (1990).

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