

# An Empirical Investigation of the Strategic Use of Debt\*

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## Abstract

In this paper I test whether there are strategic considerations in the making of fiscal policy. The general idea is that if a government anticipates the possibility of defeat in the next election it will try to use the debt strategically in order to influence the policy of its successor. Previous empirical studies have either rejected the strategic explanation of debt or have not been able to isolate this effect. I argue that these findings might be due to potential difficulties with the data sets used. To come to grips with these problems I make use of a data set from Swedish local governments. The main advantages of this panel data set are the institutional and constitutional homogeneity of the sample and the large number of observations from elections, nearly 2000. The main findings of this paper strongly suggest that there are strategic considerations in the making of fiscal policy. A right-wing government accumulates more debt during its term of office if it thinks that it will be defeated as compared to when it expects to remain in office. On the other hand, a left-wing government decreases the level of debt the higher the possibility of its defeat. Moreover, the larger the inherited debt the more a newly elected government has to reduce spending. These results are consistent with the predictions from a model developed by Persson and Svensson (1989).

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## I. INTRODUCTION

This paper is going to test whether there are strategic considerations in the making of fiscal policy. The idea is that the stock of debt links past policies to future policies. The current policymaker can affect the state of the world inherited by his successors through his choice of fiscal policy. If the government anticipates the possibility of defeat in the next election it can use the debt strategically in order to influence the policy of its successor. In other words, one can look upon debt as a commitment device in a political game between current and future governments, where future tax revenues are committed to debt service.

In this paper, I will examine this hypothesis empirically. As guidance for my empirical investigation I rely on two theoretical models of strategic use of debt; Alesina and Tabellini (1990), and Persson and Svensson (1989). The predictions from the two models differ from each other. Alesina and Tabellini (1990) predict that both left and right wing governments should issue debt if they think they will be thrown out of office in the pending election. On the other hand, Persson and Svensson (1989) predict that only right-wing governments should issue debt. Instead, left-wing governments should decrease their level of debt.

To the best of my knowledge, there are only four empirical studies of the strategic use of debt, Grilli, Masciandaro, and Tabellini (1991), Crain and Tollison (1993), Lambertini (1996), and Franzese (1998). Grilli et al. (1991) using data from a sample of the OECD countries find that short government durability plays a crucial role in explaining public borrowing. However, this study cannot discriminate if this is due to strategic reason or to government weakness, meaning that public debt is a residual source of finance, which simply reflects a government's inability to cut expenditures or raise taxes. Moreover, they just test the implications from Alesina and Tabellini's model. Crain and Tollison (1993) conduct their empirical analysis on U.S. States and their results indicate that government stability is correlated with less volatility of budget deficits or surpluses. They interpret this finding as consistent with strategic debt behavior, but it is not obvious that this is the right conclusion to draw since there are two strategic debt

models and only one of them necessarily predict less volatility.<sup>1</sup> Nevertheless, Crain and Tollison's (1993) study is at best an indirect test of strategic debt behavior. The third study by Lambertini with OECD and U.S. data finds no evidence of strategic use of debt. Instead, she argues that debt accumulation is due to capital market imperfections. She shows that a deficit could arise if a majority of individuals are prevented from borrowing. Finally, the fourth study by Franzese (1998) is also unable to find any effects of strategic debt behavior on a panel of OECD countries.

These findings are perhaps less surprising since there are several potential difficulties using U.S. or OECD data to test the strategic explanation. U.S. data (the Federal level) contains very few observations from elections, so there is a serious lack of degrees of freedom.<sup>2</sup> However, with OECD panel data there could be a problem with the pooling assumption, that is, that the OECD countries are too heterogeneous with respect to institutional and constitutional matters to be pooled together.<sup>3</sup>

Two examples of the problems with too much heterogeneity might help to clarify this last point. A test of strategic debt behavior requires data on the incumbent's expectation of electoral defeat. Since we cannot observe expectations, we have to rely on proxy variables. Thus, one problem concerns how to get comparable measures of these proxies. This is not an easy task since the OECD countries differ, among other things, with respect to electoral system, i.e., presidential or parliamentary, and type of election, i.e.; election occurrence is fixed or flexible.<sup>4</sup>

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<sup>1</sup> It is only from Persson and Svensson's (1989) model that this statement follows. In Alesina and Tabellini's (1990) model, however, this is not necessarily true.

<sup>2</sup> There is another problem with U.S. data to infer if there is a strategic debt behavior. The problem concerns who control the budget process. Lambertini assumes that the president has the power to control the budget, and not the Congress. This assumption might be questionable. See Kiewiet and McCubbins (1991).

<sup>3</sup> In the context of this paper, to use a panel data set from the U.S. States could also be problematic, since they differ with respect to balanced budget requirements, borrowing rules etc.

<sup>4</sup> Both theories that are tested in this paper have the explicit assumption of fixed election calendar. For member OECD nations, only in Sweden, Norway, Switzerland and U.S. are the calendar fixed. If the calendar is flexible and one tries to investigate strategic debt behavior, one has the additional incentive of opportunistic election timing to take care of.

The second example concerns the classification of parties as Left or Right. Since one of the main assumptions of the strategic debt models is that there are two parties with conflicting preferences and they pursue different platforms once in office, we should conduct our empirical tests on those countries with a clear Left and Right scale.

To come to grips with these problems this paper makes use of a panel data set from Swedish local governments. The main advantages of this panel data set are the homogeneity of the sample, i.e., same political system, elections held at fixed intervals of time, highly comparable measures of debt, clear Left and Right scale etc., and the large number of observations from elections, nearly 2000. Though, this article utilizes data from local Swedish governments to test the strategic debt hypothesis its main concern is evaluative: does the strategic debt hypothesis tell us something about the real world?

Furthermore, this paper discriminates between the two theories of strategic debt behavior, Alesina and Tabellini (1990), and Persson and Svensson (1989), by nesting there respective hypotheses into a single regression equation.

Moreover, this article also use an instrumental variable method to possibly correct for measurement errors and endogeneity problems associated with the construction of the proxy for the expectation of electoral defeat.

After controlling for other possible economic and demographic determinants of debt behavior, the main findings of this paper strongly suggest that a right-wing government accumulate more debt during its term of office if it thinks that it will be defeated as compared to when it expects to remain in office. On the other hand, a left-wing government decreases the level of debt the higher the possibility of its defeat.

These results are consistent with the strategic debt model developed by Persson and Svensson (1989). According to their model, the inherited debt should affect a newly elected government's decision on spending. The evidence from this paper shows that this is indeed the case. A high debt forces a newly elected government to decrease spending.

A reader with little or no prior knowledge of the general Swedish governing system, and the relationship between the state and local governments in particular, might raise the valid question as to whether local governments have any freedom of action of their own. The answer to this question is of great importance, since the models that are to be tested

in this paper are developed for sovereign countries, and it would be futile to use Swedish local governments as a testing ground if this question is not answered in the affirmative. Therefore, I will make a short description of local governments and their relationship to the state to show that they actually have a large degree of autonomy.

Moreover, local governments play an important role in the Swedish economy, both in terms of the allocation of functions among different levels of government and in terms of economic significance.<sup>5</sup> They are, for example responsible for the provision of day care, education, care of the elderly, and social welfare services. In trying to quantify their economic importance, one can note that (i) during the 1980s and the 1990s, the total consumption of the local governments constituted approximately 20 percent of GDP, (ii) during the same period, the total expenditures of local governments amounted to roughly 25 percent of GDP, (iii) the local governments are the single biggest employer in the economy (approximately 25 percent of all employed are employed by the local governments), (iv) the local governments have a large stock of debt (roughly 30 percent of GDP).

Another issue that might be raised using this type of data set is that competition among local jurisdiction restricts policymaker's ability to pursue policies that do not reflect the residents' desires (Tiebout 1956).<sup>6</sup> Thus, this argument appears to imply that political explanations of local fiscal policies are unnecessary and would make my explanation void. However, Epple and Zelenitz (1981) show that competition among jurisdictions is not sufficient to prevent individual governments from pursuing policies, which are not in the interests of their residents. Thus, from this we can conclude that the political choice process can matter for policy choices.

The remainder of the paper is organized as follows: in the next section, there is a short description of the autonomy of Swedish local governments. In section III, I give a

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<sup>5</sup> In this paper, all the numbers and facts are for Swedish municipalities. I am using the word municipality and local government interchangeably.

<sup>6</sup> There are few Swedish studies examining the effects on interjurisdictional migration of fiscal policy variables. For example, Nelson and Wyzan (1989) conclude that local government tax and spending choices has inconclusive effects on migratory decisions.

short and non-technical presentation of two theories of strategic debt behavior.<sup>7</sup> Section IV outlines the empirical procedure and a discussion of the data to which it is applied. Section V and VI presents the empirical results. I conclude with a discussion of my findings.

## II. FISCAL AUTONOMY OF SWEDISH LOCAL GOVERNMENTS<sup>8</sup>

There is in Sweden a very long tradition cherishing local self-government. This principle of local-self government is written into the Swedish Constitution. The decision making power of local governments is exercised by elected assemblies, municipality councils. The members of the councils are elected for three-year terms. The elected representatives are responsible for the administration, implementing and the drafting of decisions. In principle, politicians thus control Swedish local government at all stages.

Local authorities have the constitutional right to set their own personal income tax. In 1994, the average personal income tax was about 19 percent but the range was between 13 percent and 22 percent. On average, 57 percent of their revenues come from the income tax. Fees, loans and other sources constitute 21 percent of total revenues, while intergovernmental grants make up 22 percent. Thus, roughly 80 percent of local government revenues are in principle at their own discretion.

Swedish municipalities have the statutory rights to borrow money. The domestic and international credit markets decide the limits and terms of such loans. For example, some local governments have been borrowing money from abroad and they have therefore been credit rated at rating firms such as Standard & Poor. A consequence of their right to borrow is that there is large cross-sectional variation of the level of debt. For example, in 1994 the average level of debt was 14900 SEK per capita and the standard deviation was 6200.<sup>9</sup> The minimum level of debt was 4000 and the maximum 49400 SEK per capita

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<sup>7</sup> There is an appendix where the theories are formally stated and the empirical predictions are derived.

<sup>8</sup> See Murray (1985) for an evaluation of the autonomy.

<sup>9</sup> 100 SEK is about \$12 dollars.

Local government operations could be divided into mandatory and voluntary areas. Examples of mandatory tasks are education and social services. Examples of voluntary tasks are cultural affairs, recreational programs and technical operations such as energy distribution. Murray (1985) estimated that about 40 percent of the expenditures are to be considered obligatory. However, there are large differences in the freedom of action in running a mandatory operation due to variations in the constraints imposed by legislation. Thus, Local governments could decide on least 60 percent of their own expenditures. To put this statement in perspective we can look at the cross-sectional variation in expenditures. During the period 1974 to 1994, the average expenditures was about 28 000 SEK per capita in real terms and the standard deviation roughly 5600. Thus, there is quite a bit of cross-sectional variation.

Finally, the State plays no part in either monitoring or approving local government accounts. However, there has existed a balanced budget requirement, but this requirement was only a prospective or beginning of year balance and there are several studies that show that this is not an effective constraint on deficit behavior.<sup>10</sup>

To conclude, I find that Swedish local governments meet the required autonomy so that it is justifiable to use this data set as a testing ground for strategic debt behavior.

## II. MODELS OF STRATEGIC USE OF DEBT

In this paper, I will test two models, Alesina and Tabellini (1990), and Persson and Svensson (1989), both of which emphasize strategic considerations in the making of debt policy. In these models, governments with different preferences alternate in office.

Alesina and Tabellini (1990) assume that the governments differ with respect to their preferences about the composition of government spending. For example, consider a government who wants to spend a lot on defense and little on welfare, and assume that it knows that it is going to be replaced by another government who has the opposite

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<sup>10</sup> For an evaluation of the effect of balanced budget requirements on Swedish local governments, see Murray (1985) and Lane and Back (1991). The conclusion from their studies is similar to the evidence from the U.S. Bohn and Inman (1996) conclude that beginning of year balanced budget requirement is not an effective constraint on state deficits behavior.

preference. The current government then realizes that defense spending will be cut in the future anyway so it borrows a lot now because the marginal cost of repaying the extra dollar of debt will fall on welfare which it cares little about. In other words, a deficit bias will emerge because the government who borrows faces an asymmetry. When the policymaker borrows he can spend the extra sources in the way he wants but uncertainty about who will be appointed in the future prevents the current policymaker from fully internalizing the future costs of the spending cuts.

In Persson and Svensson (1989), however, the level of government spending is questionable. They consider a conservative government and a liberal or a left-wing government. The conservative government wants a lower amount of spending than the liberal. Suppose that the conservative government is certain to be replaced by its opponent in the next election. Then the conservative government faces a trade off between distortionary taxes and debt.<sup>11</sup> By lowering taxes and issuing debt, the conservative government constrains future spending. However this creates a suboptimal distribution of tax distortions since the taxes today are too low, which implies that future taxes are going to be too high when the debt becomes due. If the conservative government puts more weight on reaching its preferred level of spending than on the welfare cost of a distorted tax profile over time,<sup>12</sup> it will issue more debt than the successor would prefer. On the other hand, the left wing government has exactly the opposite incentive. By raising taxes and reducing debt it creates surpluses to encourage increases in future spending decisions.

To sum up, these two models have different empirical implications concerning debt. <sup>13</sup> Alesina and Tabellini (1990) predict that there is a deficit bias irrespective of the incumbent's political ideology, while Persson and Svensson (1989) predict that only right-wing governments should issue debt. Instead, left-wing governments should leave a surplus. Nevertheless, both models predict that the strategic use of deficits or surpluses

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<sup>11</sup> Persson and Svensson (1989) assume that the only way to raise money for government spending is through a distortionary tax.

<sup>12</sup> Persson and Svensson (1989) refer to this as stubbornness.

<sup>13</sup> See the appendix for the formal derivations of the empirical predictions.



are larger, the greater the disagreement between different policymakers and the more likely that the current government will be replaced. Accordingly, we should expect an incumbent with a high probability of defeat in the next election to create facts for its successor by issuing or reducing debt. Thus, debt policy should among other things be a function of the incumbent's probability of defeat. More formally,

$$(1) \quad DEBT = \alpha + \beta P + X\gamma + u$$

where  $P$  is the probability of defeat and  $X$  is a vector of variables affecting the level of debt and  $u$  is an error term. Since the predictions differ between the two strategic debt models, I need to discriminate between them. Thus, equation (1) is separated in two cases, depending on the ideological preferences of the incumbent. Hence I rewrite (1) as

$$(2) \quad DEBT = \alpha_L + \beta_L P + X\gamma_L + u$$

$$(3) \quad DEBT = \alpha_R + \beta_R P + X\gamma_R + u$$

where the subscripts  $L$  and  $R$  stand for left-wing and right-wing incumbents respectively. One way of comparing these two equations is to use a dummy variable approach. Let  $D_L = 1$  if there is a left wing incumbent and  $D_L = 0$  otherwise. Merge (2) and (3) as

$$(4) \quad DEBT = \alpha_I + \alpha_2 D_L + \beta_1 P + \beta_2 D_L P + X\psi + D_L X\mu + u$$

The introduction of the dummy variable enables us to nest the predictions from the two models. Alesina and Tabellini (1990) predict that the incumbent should issue debt irrespective of its political ideology when there is a high probability of defeat. Thus, their hypothesis is that  $\beta_R > 0$  and  $\beta_L > 0$  and  $\beta_R = \beta_L$ . This is equivalent to  $\beta_1 > 0$  and  $\beta_2 = 0$  in equation (4).<sup>14</sup> On the other hand, Persson and Svensson (1989) predict that a right-wing government has a larger incentive to borrow than a left-wing government. Thus, their hypothesis is that  $\beta_R > 0$  and  $\beta_R > \beta_L$ . The sign of  $\beta_L$  could be positive or negative

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<sup>14</sup> This is because  $\beta_R = \beta_1$  and  $\beta_L = \beta_1 + \beta_2$ .

depending on the stubbornness of the left-wing government.<sup>15</sup> A negative sign of the coefficient  $\beta_L$  would implicate a stubborn left-wing government. This translates to  $\beta_1 > 0$ ,  $\beta_2 < 0$ , and possibly  $\beta_1 + \beta_2 < 0$  (if the left-wing government is stubborn) in equation (4).

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<sup>15</sup> Stubbornness refers to the weight the government attaches to reaching its preferred level of government consumption relatively to the welfare cost of a distorted tax profile over time. For further details see Persson and Svensson (1989).

#### IV. ECONOMETRIC PROCEDURE AND DATA

##### *A. Previous studies*

An empirical test of strategic use of debt requires data on the incumbent's expectation to be defeated. But since we cannot observe the incumbent's expectation we have to rely on proxy variables.

Lambertini (1996) uses two different proxies of expectations. One proxy is constructed from opinion polls in the U.S. More precisely, the percentages reported in the Presidential Trial and Heats published in the Gallop's Polls are used as a proxy of expectation. The other one is based on a postulated relationship between a set of economic variables and individuals' voting decision for the OECD countries. Here it is assumed that the voting decision is based on the change in real GDP per capita, real GDP growth rate, and the change in the unemployment rate.

Grilli et al. (1991) construct a proxy from the total number of government changes, those that results in transfer of power from one party to another. Their hypothesis is that the higher the frequency of government changes, the higher is the accumulation of debt. However, by using the frequency of government changes they implicitly assume that the incumbent's respond in same way, i.e., the incumbent is issuing debt irrespective of its political inclination. This assumption might be wrong since Persson and Svensson's model predicts that left-wing governments could reduce the level of debt.

Crain and Tollison (1993) construct their proxy as a z-statistic, i.e., the absolute value of the mean share of seats held by Democrats minus 50 percent, divided by the standard deviation in Democrat's share. The probability of no regime change is then obtained from the cumulative normal distribution.

Franzese (1998) constructs his proxy as the inverse of the actual duration of the incumbent government times a measure of the expected ideological distance between the incumbent government and a future opponent.

*B. An instrumental variable approach*

There has been several ways of measuring the probability of electoral defeat. In this paper I am going to use an approach that deals with the unobservable variable problem from the econometricians point of view. The basic idea is to specify an auxiliary equation that links the unobservable variable, the expectation of defeat in our case, to a set of explanatory variables. More formally,

$$(5) \quad P^* = P + \eta = \mathbf{W}\boldsymbol{\omega} + \eta$$

where  $P$  is the true expectation of defeat,  $\mathbf{W}$  is some variables describing the formation of expectations,  $P^*$  is the actual election outcome (which is a zero-one variable) and  $\eta$  is an error term.

Equation (4) and (5) now forms the basis of our statistical approach. The first step is to estimate equation (5). The second step is to use the fitted values from equation (5) as instruments for  $P^*$  in the estimation of equation (4). Thus, this is an instrumental variable (IV) procedure.<sup>16</sup> This approach has at least two clear advantages to the previous studies mentioned above. First it deals with a measurement error problem since one has to use a proxy variable instead of the true expectation of defeat  $P$ . Pagan (1984) shows that this IV-method will give a consistent estimator. The second advantage of this method is that deals with a potential endogeneity problem. One could argue Aghion and Bolton (1990), and Persson and Tabellini (1997), that the level of debt could be used strategically to influence the election outcome. One solution to this problem is to use an instrumental variable approach.

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<sup>16</sup> Wickens (1982) calls this procedure "the error in variables method" (EVM).

### C. Data and econometric issues

A large pooled time-series cross-section data set is used. The sample period is from 1974 to 1994 and 277 municipalities have been included in the sample.<sup>17</sup> The dependent variable is public debt measured in per capita terms and at constant prices.<sup>18</sup> There are several measures of debt in the official financial position of municipalities but I have chosen to work with short and long-term debt not including social security liabilities.<sup>19</sup> I made this choice so as to have a comparable measure of debt during the sample period. To capture any possible effect of strategic use of debt, I control for the inherited debt from the previous election. The rationale for this is that the inherited debt can constrain the incumbent policymaker from pursuing his preferred debt policy during his term of office. Thus, I can reformulate the basic regression equation (4) as

$$(6) DEBT_{it} = \alpha_1 + \alpha_2 D_L + \beta_1 P_{it} + \beta_2 D_L P_{it} + \delta_1 DEBT_{it-3} + \delta_2 D_L DEBT_{it-3} + X_{it} \psi + D_L X_{it} \mu + u_{it}$$

$$i = 1, \dots, 277$$

$$t = 76, 79, 82, 85, 88, 91 \text{ and } 94$$

with  $i$  denoting municipalities and  $t$  denoting election years.

An ideal testing ground for the strategic debt models would be a country with a two-party system where the parties only have unidimensional preferences along some issue space (i.e., the composition or the level of government spending). Since some countries are closer to this ideal than others we would like to perform our test on those which more or less meet this ideal. Despite the fact that the Swedish electoral system is based on proportional representation, I find it reasonable to make the approximation as if it were a

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<sup>17</sup> For a full description of the data used in the analysis, see Appendix 1. Due to amalgamations of municipalities, it is not possible to go further back than 1974. At the beginning of 1974 there existed 278 municipalities.

<sup>18</sup> I have used the implicit GDP deflator, expressed in 1991 values. The deflator is constructed by taking the ratio of GDP at current market prices to GDP at fixed market prices. I have also used two other deflators, CPI and a municipality-specific price index, but the results are very similar.

<sup>19</sup> Long-term debts are defined as debts with a maturity of 1 year or longer, while short-term debts have a maturity of up to 1 year. Data on social security liabilities are only available from 1988.

two-party system since there has traditionally been two main opposing party blocs,<sup>20</sup> the socialist and the non-socialist bloc.<sup>21</sup> Unfortunately, at the local level, there are several small parties not included in these two blocs and sometimes these parties hold the balance of power. I call these kinds of constellations undefined blocs.<sup>22</sup> These undefined blocs create a problem because there is no general information about the constellation of parties this bloc is constituted of. This makes it impossible to use the predictions of the strategic debt theories, since these are based on assumptions about the incumbent's preferences (the level or the composition of spending). Due to this fact, I delete those observations from the analysis.<sup>23</sup>

This leaves us with two different incumbents, left or right wing governments, and since either of these incumbents could have been defeated or not, there are four distinct cases. Table 1 shows the different cases for Swedish local governments during the sample period 1974 to 1994.

TABLE I  
INCUMBENT GOVERNMENTS

	Left-wing incumbent	Right-wing incumbent
Incumbent defeated, $P^*=1$	107	194
Incumbent not defeated, $P^*=0$	710	619
Total sum	$\Sigma$ 817	$\Sigma$ 813

<sup>20</sup> Alesina et al. (1997) treat Sweden as a bipartisan system.

<sup>21</sup> The socialist bloc includes the Leftist Party and the Social Democratic Party. The non-socialist bloc includes three parties: the Conservative Party, the Centrist Party and the Liberal Party, from 1974 until 1988. Since 1988 it includes a fourth party: the Christian Democratic Party. In 1991 there was a fifth part included in the non-socialist bloc: the New Democratic Party, but it was excluded in the 1994 election.

<sup>22</sup> This classification is compiled from the distribution of seats in local councils. If either of the blocs receive more than 50 percent of the seats it is defined accordingly, otherwise it is an undefined bloc.

<sup>23</sup> I had to delete 309 observations.

From Table I, we can see that the total numbers of government changes are 301.<sup>24</sup> In 107 cases a left-wing incumbent and in 194 cases a right-wing incumbent lost its power. Thus the relative frequency of government changes for each group is 13 percent and 24 percent respectively.

Table II shows the frequency of government changes in each of 277 local governments included in the sample.<sup>25</sup> During the sample period, there was no change of power in 117 municipalities. Of these, 69 had left-wing governments and 45 had right-wing governments.

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<sup>24</sup> At parliamentary and municipal council elections, voters in Sweden vote for a political party every third year. These elections are held at the same point in time.

<sup>25</sup> Since there are seven elections during this period, the maximum number of changes of power is 7.

TABLE II  
THE FREQUENCY OF GOVERNMENT CHANGES AND THE AVERAGE  
PERCENTAGE SEATS WON BY THE INCUMBENT GOVERNMENT  
1974-1994

Frequency	0	1	2	3	4	5	6	7
Number of municipalities	117	28	42	40	29	13	8	0
Average percentage seats won by the incumbent	62.2	57.0	55.9	53.5	52.9	52.8	52.0	0

After the description of the political data, we are now ready to implement the IV-method. To begin with, we need to find the variables  $W$  describing the formation of expectations of electoral defeat in order to estimate equation (5). A prerequisite is that these variables are predetermined since we are using an instrumental variable approach. One predetermined variable that could be used is the share of seats that the incumbent government (or the legislative majority) received in the previous election. The rationale for using this variable is that the closer the majority is to having only 50 percent of the seats the higher should the perceived probability of defeat be. Table II shows the average percentage seats won by the incumbent in the 8 groups of municipalities classified according to number of changes of power. This shows clearly that the more number of changes of power the closer the average seat is to 50 percent. Apart from the share of seats I also include fixed effects, both municipal and time specific effects.<sup>26</sup> Individual effects are introduced to control for the heterogeneity in the degree of government stability. We can see from Table II that the frequency of government changes is unequally dispersed among the different municipalities. Time effects are included to control for variables that may have common effect on the municipalities in a given year, such as the effect from the business cycle, changes in preferences of the electorate, etc. Equation (5) is estimated with a Probit model, i.e.  $\Pr(P^* = 1) = \Phi(W\omega)$ , where  $\Phi(\cdot)$  is the standard cumulative function.

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<sup>26</sup> Potentially, information from opinion polls could also be used as an explanatory variable, but in Sweden there are only opinion polls at the national level.



Table III provides the results from the estimation of the probability of defeat based on the Probit model. The coefficient of the share of seats in the last election is highly significant. To interpret the quantitative effect from the share of seats, we make a transformation of the coefficient from the Z metric to its impact on the probability of defeat (calculated at the mean). Thus, for a one-percent increase in the share of seats the probability of defeat will decrease with 8.5 percent. The model predicts 93 percent of the observations correctly. The correlation between the actual outcome from election  $P^*$  and the predicted values from the Probit model is 0.81. Thus, we have a very high correlation between the instrument and the actual election result.

TABLE III  
ESTIMATION OF THE PROBABILITY OF DEFEAT

(z-STATISTICS IN PARENTHESES)	
Explanatory variables	Probit model
Share of seats in the last election	-28 (-7.03)
Individual effects	Yes
Time effects	Yes
Percent correct predictions	93
Pseudo $R^2$ (Likelihood ratio index)	0.47

There are, of course, other variables affecting the level of debt apart from the probability of defeat and the inherited debt. To take this into account and avoid omitted variable bias I have to control for those variables. The strategic debt theories do not provide much guidance of which variables to include and there is still no consensus concerning the process that generates government fiscal decisions.<sup>27</sup> However, there are usually some economic and demographic factors included in the estimation of a jurisdiction fiscal decision and therefore I will also try to control for similar factors.

The main expenditures of Swedish municipalities are education, childcare and the care of the elderly. Therefore, these expenditures fall more heavily on municipalities with a large fraction of young or elderly people. Thus, I control for the share of young people (0-16) and the share of people older than 65. The main parts of revenues come from a

<sup>27</sup> See Inman (1988) for a survey of various model of government expenditure determination.

proportional local income tax and since there are differences in the tax base, which could have an impact on the ability to raise tax revenues, I include it as a control.<sup>28</sup> The tax base could also be seen as a control for business cycle variations since it possibly picks up business cycle fluctuations. I also include population size as a control variable. Population size captures the possibility that there are potentially congestion effects or scale economies in the provision of local government services.

Finally, I include “time effects”. Time effects are primarily used to control for variables that may have common effect on the municipalities in a given year, such as the effect from the business cycle, changes in the preferences of the voters, etc. Including time effects is particularly important in the context of my problem, because I do not want to attribute behavioral significance to any across-municipalities correlation in debts that are really due to common national influences. Table IV provides mean and standard deviations of the variables in my analysis.

TABLE IV  
ECONOMIC AND DEMOGRAPHIC VARIABLES 1974-1994<sup>a</sup>

Variable	Number of observations <sup>b</sup>	Mean	Std. Deviation
Debt	1629	11152	5378
Income tax base	1630	75911	12660
Population	1630	28562	46763
Proportion of elderly (65+)	1630	0.18	0.045
Proportion of young (0-16)	1630	0.21	0.028

a. Debt and income tax base is per capita in 1991 SEK.

b. The full sample consists of 1939 observations, but observations where there has been an undefined bloc in power prior to an election has been deleted.

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<sup>28</sup> The tax base at time  $t$  is measured as the total taxable income from individuals living in the municipality according to the tax assessment in  $t-1$ .

#### IV. RESULTS

In this section I present empirical evidence of the strategic use of debt and check the robustness of these results.<sup>29</sup>

##### *A. Basic Results*

Table V and VI shows the results of the effect of the probability of defeat on the level of debt. Table V presents the results when I only control for the inherited debt from the last election and time effects, while table VI shows the results when I use all the control variables. Each column in the two tables is a regression. Coefficient estimates for the time effects are not presented.

In table V, column (1) and (2) show the results when the actual election result is used as a proxy for the probability of defeat. Column (3) and (4) present the results from the IV-method. Furthermore, column (1) and (3) shows the results when left and right wing governments are constrained to have the same slope coefficients regarding the control variables; in this case the inherited debt.

Before I focus on the strategic debt variables some comments can be made about the regressions and the controls. First, the regression accounts for about 65 percent of the variation in the level of debt. Second, the main determinant of the level of debt is the inherited debt. About 75 percent of the debt are transferred from one election period to the next. This indicates that the level of debt is a mean reverting process.<sup>30</sup> Third, the two different incumbents do not seem to have different slope coefficients regarding the inherited debt since the interaction term is insignificant. Fourth, the coefficient of  $D_t$  is positive in all regressions and statistically significant in two regressions, column (1) and (3). This indicates that the socialist bloc has on average a higher level of debt when there is zero probability of defeat. The difference is the range of 400 to 800 SEK per capita.

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<sup>29</sup> There have been several changes in the number of municipalities during this period. In 1974 there existed 278 municipalities and in 1994 there were a total of 286. For this reason, I repeated the analysis excluding those municipalities, which have not existed, unchanged during the period. I find virtually identical results. Hence, I focus throughout on results for the full sample.

<sup>30</sup> I have not checked this statistically since the time series dimension only includes 7 observations.

A test of the strategic debt models is easily carried out.<sup>31</sup> The coefficient of the probability of defeat  $P$  is positive and highly significant with t-values in the range of 2.4 to 4.0.<sup>32</sup> This strongly suggests that a right-wing government accumulate more debt the higher the possibility of its defeat. The difference in the accumulation of debt between an electoral secure right-wing government with no probability of defeat and a right-wing government that is certain to be defeated is quite substantial. The largest difference is in the IV-estimation, column (3) and (4). On average, the level of debt is roughly 1500 SEK/capita higher (which is about 13 percent of the total debt) when it is certain to be defeated compared to when it is certain to remain in power.

The coefficient of  $PD_L$  is negative and highly significant in all regressions.<sup>33</sup> Hence this result strongly suggests that the two blocs have different slope coefficients. The left-wing government even have a negative slope coefficient since  $\beta_L = \beta_1 + \beta_2 < 0$ .<sup>34</sup> Thus, the left-wing government is stubborn because it decreases its level of debt the higher its possibility of defeat. For example, in the IV-cases, a socialist incumbent decreases, on average, the level of debt with about 1000 SEK per capita when it is certain to be defeated compared to when it is certain to remain in power.

Figure I gives a schematic picture of the relationship between the level of debt and the probability of defeat for the two types of incumbent governments. This figure shows, in addition to that they have different slope coefficients, that a socialist bloc who is certain to be defeated has about the same level of debt compared to a non-socialist bloc which is certain to remain in power. Figure I also shows that a non-socialist bloc which is

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<sup>31</sup> Reminder: Alesina and Tabellini's hypothesis:  $\beta_1 > 0$  and  $\beta_2 = 0$ , Persson and Svensson's hypothesis  $\beta_1 > 0$ ,  $\beta_2 < 0$ , and possibly  $\beta_1 + \beta_2 < 0$  if the left-wing government is stubborn.

<sup>32</sup> I am using a one-sided test, i.e.,  $\beta_1 > 0$  (null hypothesis  $\beta_1 = 0$ ) because this is the prediction from both theories. For this test, the critical value at the 5 percent level is 1.65, and the critical value at the 1 percent level is 2.33.

<sup>33</sup> Since I am trying to discriminate between the two theories, the alternative hypothesis is that  $\beta_1 > \beta_2$  (with the null hypothesis  $\beta_1 = \beta_2$ ). Hence, I am using a one-sided t-test and the critical value at the 5 is 1.65, and the critical value at the 1 percent level is 2.33.

<sup>34</sup> I have conducted a formal test of  $\beta_L = 0$  with the alternative hypothesis  $\beta_L < 0$  and I can reject the null at the 1-percent level in all regressions in table V and VI.

replaced with certainty has even a higher level of debt compared to a socialist bloc which is certain to stay in power.

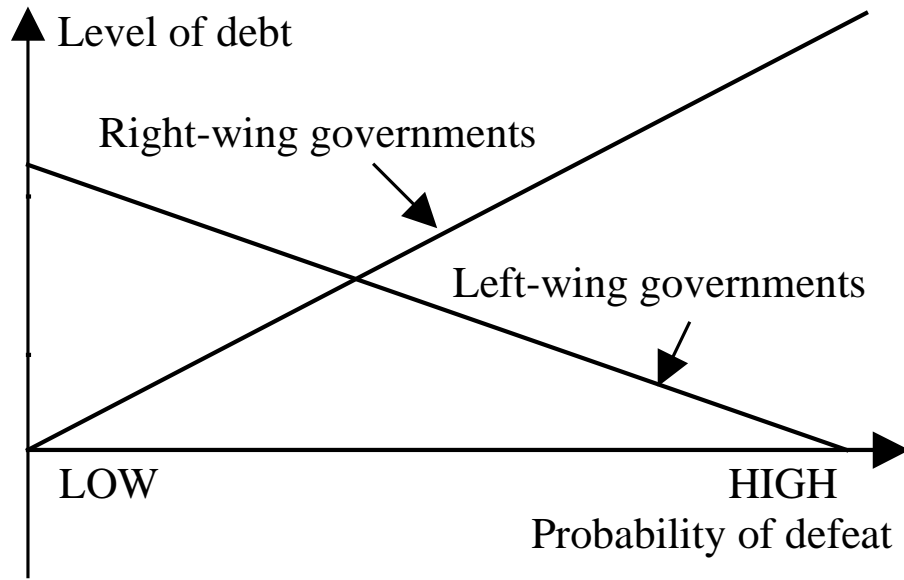


FIGURE I  
The effect of the probability of defeat on the level of debt

TABLE V  
THE IMPACT OF P ON THE LEVEL OF DEBT,<sup>a</sup>  
1974-1994

(*t*-STATISTICS IN PARENTHESES)

Explanatory variable	Proxy variable: Actual election result <sup>b</sup>	Proxy variable: Actual election result <sup>b</sup>	Instrumental variable method <sup>c</sup>	Instrumental variable method <sup>c</sup>
	(1)	(2)	(3)	(4)
Socialist incumbent $D_L=1$	795 (5.06)	502 (1.25)	923 (4.91)	445 (1.19)
Probability of defeat $P$	820 (2.41)	890 (2.72)	1422 (3.77)	1583 (3.96)
$D_L P$	-1773 (-3.35)	-1856 (-3.59)	-2398 (-4.07)	-2607 (-4.27)
Inherited debt	0.77 (39.51)	0.76 (25.04)	0.76 (45.19)	0.74 (29.04)
$D_L$ Inherited debt		0.03 (0.75)		0.05 (1.47)
R <sup>2</sup>	0.653	0.653	0.652	0.652
Number of observations	1628	1628	1628	1628
Time effects	Yes	Yes	Yes	Yes

\*Statistically significant at the 5 percent level (the critical value for a one-sided hypothesis is 1.65)

\*\* Statistically significant at the 1 percent level (the critical value for a one-sided hypothesis is 2.33)

a. See notes to table I for sample information.

All regressions are restricted to those municipalities, which have had a socialist or a non-socialist bloc before an election.

All income tax bases and debt are per capita in 1991 SEK.

b. White standard errors were used in calculating *t*-statistics.

c. The probability of defeat is estimated from a panel probit regression with fixed effects, i.e.,  $election\ result_{it} = \mu + \gamma_i + \lambda_t + share\ of\ seats_{it} + \varepsilon_{it}$ , with *i* and *t* denoting municipalities and election years respectively. The fitted probabilities are used as instruments for the actual election outcome. These predicted probabilities have a correlation coefficient of 0.81 with actual changes of governments.

TABLE VI  
THE IMPACT OF P ON THE LEVEL OF DEBT,<sup>a</sup>  
1974-1994

(*t*-STATISTICS IN PARENTHESES)

Explanatory variable	Proxy variable: Actual election result <sup>b</sup>	Proxy variable: Actual election result <sup>b</sup>	Instrumental variable method <sup>c</sup>	Instrumental variable method <sup>c</sup>
	(1)	(2)	(3)	(4)
Socialist incumbent $D_L=1$	865 (5.28)	4131 (0.91)	1002 (5.10)	4605 (1.12)
Probability of defeat $P$	584 (1.91)	562 (1.82)	1014 (2.67)	1082 (2.65)
$D_L P$	-1965 (-3.65)	-1744 (-3.39)	-2719 (-4.67)	-2607 (-4.27)
Inherited debt	0.74 (31.82)	0.71 (23.01)	0.74 (41.57)	0.70 (26.59)
Population size	0.02 (2.66)	0.03 (2.64)	0.02 (8.27)	0.03 (9.39)
Tax base	-0.004 (-0.42)	-0.01 (-1.05)	-0.004 (-0.36)	-0.01 (-0.92)
Proportion young	10446 (1.56)	19907 (1.92)	11615 (1.99)	22108 (2.75)
Proportion elderly	7928 (1.79)	11517 (1.67)	8498 (2.28)	12621 (2.42)
$D_L$ Inherited debt		0.06 (1.44)		0.07 (2.05)
$D_L$ Population size		-0.02 (-1.94)		-0.02 (-5.04)
$D_L$ Tax base		0.03 (1.86)		0.03 (1.71)
$D_L$ Proportion young		-19156 (-1.60)		-20826 (-1.91)
$D_L$ Proportion elderly		-7924 (-1.00)		-8597 (-1.27)
R <sup>2</sup>	0.668	0.675	0.667	0.674
Number of observations	1628	1628	1628	1628
Time effects	Yes	Yes	Yes	Yes

\*Statistically significant at the 5 percent level (the critical value for a one-sided hypothesis is 1.65)

\*\* Statistically significant at the 1 percent level (the critical value for a one-sided hypothesis is 2.33)

a. See notes to table I for sample information.

All regressions are restricted to those municipalities, which have had a socialist or a non-socialist bloc before an election.

All income tax bases and debt are per capita in 1991 SEK.

b. White standard errors were used in calculating *t*-statistics.

c. The probability of defeat is estimated from a panel probit regression with fixed effects, i.e.,  $election\ result_{it} = \mu + \gamma_i + \lambda_t + share\ of\ seats_{it} + \varepsilon_{it}$ , with *i* and *t* denoting municipalities and election years respectively. The fitted probabilities are used as instruments for the actual election outcome. These predicted probabilities have a correlation coefficient of 0.81 with actual changes of governments.

Table VI reports the results when I use all control variables. Column (1) and (2) show the results when the actual election result is used as a proxy for the probability of defeat. Column (3) and (4) present the results from the IV-method. Furthermore, column (1) and (3) shows the results when left and right wing governments are constrained to have the same slope coefficients regarding the control variables. The results are very similar to the results in table V. The coefficients of strategic variables  $P$  and  $PD_L$  are still statistically significant, although the  $t$ -values for the coefficients of the right-wing incumbent are lower. In other words, all regressions in table V and VI are illustrating the same principle, that is to say a socialist bloc, on average, reduces the level of debt while a non-socialist bloc does the opposite the higher the probability of defeat.

The coefficients of the other variables in Table VI also need some comments. The inherited debt, the population size, the proportion young and the proportion of elderly all seem to have a positive and significant effect on the level of debt, while the tax base seem to have none. Furthermore, the value of the coefficient on inherited debt, 0.70, indicates that the level of debt is a mean reverting process.<sup>35</sup> There is also some support for that the two incumbents have different slope coefficients regarding some of the control variables, in particular the tax base and the population size, since the interactions terms are significantly different from zero.

To sum up, my results strongly supports that the two incumbents behave differently when the probability of defeat increases. On average, right-wing governments increase their level of debt, while left-wing governments do the opposite. Thus, this finding give strong supports to Persson and Svensson's model.

### *B. Econometric Issues*

There are some econometric issues when estimating equation (6). First, I have not included any individual specific effects in my regressions. I have done this for two reasons. The first reason is that I am only interested in the cross-section variation so I could make the comparison between local governments with a low and a high probability of defeat. In the sample there are many local governments that have not had any change of

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<sup>35</sup> I have not checked this statistically since the time series dimension only includes 7 observations.



power and therefore these have the same estimated probability of defeat during the whole sample period. Thus, it is well known that it is impossible to identify a coefficient of any variable that does not vary over time by including fixed individual effects. The second reason of not including fixed effects is statistical, I have conducted the LM-test,<sup>36</sup> i.e., the null hypothesis that individual specific effects do not exist. I cannot reject this hypothesis at the 5 percent significance level for any of the regression models in Table V and Table IV. However, I have also estimated the models in Table V and VI via a random effect specification (not presented) and I find virtually the same results as presented in those tables.<sup>37</sup>

Another econometric issue concerns measurement error. Since we can not observe the probability of defeat we must use a proxy variable. Thus our proxy variable contains measurement error. I have tried to deal with this problem through the instrumental variable method. We can make a formal test of no measurement error, or equivalently exogeneity of the regressor, with a Hausman test.<sup>38</sup> I cannot reject that there is no measurement error or that our proxy variable is endogenous in any of the regressions in Table V or VI.

### *C. Sensitivity analysis*

My results are robust to a number of checks. First, if I exclude one electoral period at a time, the results are quantitative and qualitatively similar to the ones presented. Second, I have also excluded one municipality at a time at it does not alter my results. Third, I have run separate regressions on short and long-term debt and this does not change my results substantially. However, the effects from P are relative stronger on short-term than on long-term debt.

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<sup>36</sup> Breusch and Pagan (1980)

<sup>37</sup> I am aware of that by including random effects and having a specification with a lagged dependent variable will bias my estimates, but the bias for the independent variables, in particular for the strategic ones, is toward zero (Trognon 1978). Thus, the bias goes in the direction of not finding any effects of the strategic variables.

<sup>38</sup> Hausman (1978)

Furthermore, I have used an alternative proxy of the probability of defeat. Following Grilli et al. (1991), I have used the number of changes of power as a proxy of electoral uncertainty. However, by using this particular proxy variable there is no behavioral distinction between left and right wing governments. Thus, the implicit assumption is that both types of governments issue debt when they expect to be defeated. During my sample period, 1974 to 1994 there has been a total number of seven elections, thus the highest value of this proxy variable is seven and the lowest is zero. Table II provides information about the proxy, frequency of government changes.

To evaluate this type of proxy variable, I estimate a cross-section regression where the dependent variable is the level of debt 1994. The control variables are the level of debt 1974, and the mean value over time during the period 1974 to 1994 of the other control variables; the tax base, the population size, the proportion young, and the proportion elderly. More formally,

$$(7) \quad DEBT_{i1994} = \alpha + \beta FREQ_i + \gamma_1 DEBT_{i1974} + \underline{X}_i \gamma + u_i$$

where  $i$  stands for municipalities and the underbar denotes average values for the other explanatory variables during 1974-1994.

Table VII provides the result from the regression. The result implies that the frequency of government changes have no significant impact on the accumulation of debt (the sign of the coefficient is also opposite from what would be expected). Thus, I interpret this result as a confirmation of my previous finding. Right-wing governments issue debt and left-wing governments reduce the level of debt and these opposite behavioral responses seem to cancel out when there is a recurrent alternations between these two types of governments. Furthermore, it shows that it can be very misleading to use this type of proxy as a test of strategic debt behavior.

TABLE VII  
 THE ACCUMULATION OF DEBT DUE TO FREQUENT GOVERNMENT  
 CHANGES,<sup>a</sup>  
 1974-1994  
 (*t*-STATISTICS IN PARENTHESES)

Explanatory variables	Dependent variable: Level of debt 1994
Frequency of government changes	-8 (-0.04)
Level of debt 1974	0.20 (2.94)
Tax base	-0.18 (-3.38)
Population size	0.05 (4.83)
Proportion young (0-16)	-61310 (-2.60)
Proportion elderly (65+)	-46850 (-2.37)
R <sup>2</sup>	0.29
Number of observations	277

a. See notes to table I for sample information.

All income, tax base and debt are per capita in 1991 SEK.

White standard errors were used in calculating *t*-statistics.

## V. EXTENSIONS

My results seem to give strong support to Persson and Svensson's model. However, this section makes some additional checks on the assumption and implications of their model. I make two extensions. The first one tests whether the left-wing governments have larger expenditures than right-wing governments. One key assumption of Persson and Svensson's model is that the two types of incumbents have different preferences regarding the level of spending. To find that left-wing governments spend more than right-wing governments would strengthen the strategic explanation of debt. The second extension tests whether the inherited debt influences a newly elected government's decision on spending or not. The basic mechanism of Persson and Svensson's model rests on the assumption that the inherited debt has an impact on this decision.<sup>39</sup>

### A. *Spending levels*

Perhaps the most convincing evidence that the left and right wing governments have different levels of spending would be long-run evidence: evidence not dependent on variation in politics, economic setting or other short-run behavior.

To explore this possibility, I will compare the behavior between left and right wing governments where there has not been any change of power during the sample period. Table II shows the frequency of government changes in each of 277 local governments included in the sample. During the sample period, there was no change of power in 117 municipalities. Of these, 69 had left and 45 had right-wing governments.

I use a specification in which each variable is expressed as the mean value over time for each local government. Thus, the data for each local government reflects typical behavior over a long time period. In this case, the parameters are estimated using only cross-section variation in the data. Thus, I estimate the following specification

$$(8) \quad EXP_i = \alpha + \beta_1 LEFT_i + \underline{X}_i \gamma + u_i$$

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<sup>39</sup> See appendix 2 for this claim.

Where LEFT=1 if there has been a left-wing government in power during the whole sample period and otherwise LEFT=0 (which means that a right-wing government is in power). We would expect that  $\beta_l > 0$  if the assumption of Persson and Svensson's model is valid.

Table VIII presents the results. The coefficient of LEFT is highly significant and positive. The interpretation of its magnitude is that left-wing governments have on average 12 percent higher expenditures than right-wing governments. Thus, this finding supports the basic assumption that the two types of government pursue different expenditure policies.

TABLE VIII  
SPENDING DIFFERENCE BETWEEN LEFT AND RIGHT-WING  
GOVERNMENTS  
(*t*-STATISTICS IN PARENTHESES)

Explanatory variables	
LEFT	3259 (5.11)
Tax base	0.04 (1.64)
Population size	0.03 (1.39)
Proportion young (0-16)	-62879 (-2.14)
Proportion elderly (65+)	-12367 (-0.80)
R <sup>2</sup>	0.49
Number of observations	114

All income, tax base and debt are per capita in 1991 SEK.

White standard errors were used in calculating *t*-statistics.

#### *B. Influences of the inherited debt on expenditures*<sup>40</sup>

The model by Persson and Svensson rests, among other things, on the argument that the inherited debt should influence a newly elected government's decision on spending. To investigate if this is the case I use an empirical specification where the dependent variable is the change in the level of expenditures between the election year and the first

<sup>40</sup> I am grateful to Eva Johansson for providing me with data on expenditures.

year after the election. I made this particular choice of the dependent variable because if the inherited debt should cause any change in spending policy one would expect that it would happen within the next year after the election. In my specification I also allow for different responses for left and right wing incumbents by introducing a dummy variable,  $D_L=1$  if there is a left-wing incumbent and  $D_L=0$  otherwise. The control variables from the previous section and time effects are also included. To sum up, I estimate the following regression

$$(9) \quad \text{Exp}_{it+1} - \text{Exp}_{it} = \alpha + \beta_1 \text{DEBT}_{it} + \beta_2 D_L \text{DEBT}_{it} + X_{it} \boldsymbol{\psi} + D_L X_{it} \boldsymbol{\mu} + u_{it}$$

$$i = 1, \dots, 277$$

$$t = 76, 79, 82, 85, 88, 91 \text{ and } 94$$

where  $i$  stands for municipalities and  $t$  for election years.

According to Persson and Svensson's model, we should expect that  $\beta_1 < 0$  and  $\beta_1 + \beta_2 < 0$  since a larger inherited debt would force the newly elected government to decrease spending.

Table IX reports the results of the influences of the inherited debt on expenditures. Column (1) shows the results when left and right wing governments are constrained to have the same slope coefficients and column (2) when they are allowed to differ. The results in both columns are in accord with Persson and Svensson's model, i.e., a negative relationship between inherited debt and spending. The interpretation of the coefficient of the inherited debt implies that a 100 SEK per capita increase in the level of debt leads to a reduction in the level of spending with 6 SEK per capita.

Overall, the results of this section further strengthen the support for strategic manipulations in the making of debt policies along the lines of Persson and Svensson's model.

TABLE IX  
 INFLUENCES OF INHERITED DEBT ON EXPENDITURES  
 1976-1995  
 (t-STATISTICS IN PARENTHESES)

Explanatory variables		
Level of inherited debt	-0.06 (-4.42)	-0.06 (-3.08)
$D_L$ Level of inherited debt		-0.0007 (-0.02)
Tax base	-0.06 (-0.67)	-0.06 (-0.50)
Population size	-0.002 (-0.08)	0.006 (0.19)
Proportion young (0-16)	-3289 (0.08)	44647 (1.03)
Proportion elderly (65+)	1280 (0.41)	10911 (0.32)
$D_L$ Tax base		-0.002 (-0.20)
$D_L$ Population size		0.001 (0.31)
$D_L$ Proportion young (0-16)		-709 (-0.46)
$D_L$ Proportion elderly (65+)		1427 (0.76)
Number of observation	1615	1614
Time effects	Yes	Yes
$R^2$	0.62	0.65

All income, tax base and debt are per capita in 1991 SEK.  
 White standard errors were used in calculating  $t$ -statistics.

## VI. DISCUSSION AND CONCLUSION

This paper principally posits that there are strategic considerations in the making of the debt policies of local governments. My results strongly suggest that a right-wing government accumulates more debt during its term of office if it thinks that it is going to be defeated in the next election compared to when it expects to remain in office. On the other hand, a left-wing government decreases the level of debt the higher the probability of its defeat.

What are the possible objections to my findings? Some might argue that reversed causality might provide an explanation, that is, that the level of debt could have an impact on the election result. However, I have tried to deal with this problem via an instrumental technique.

Another objection to my findings could be that my results points to electoral competition, that is if the policymaker has a desire to win the election and be re-elected, he will try to increase his probability of re-election any way he can.<sup>41</sup> However, this is inconsistent with my results because only the right-wing government increases its level of debt when the probability of defeat is high.

A third objection to my results could be that I treat the blocs, non-socialist and socialist, as if they behave as a single decision-maker once in power. The socialist bloc consists of two parties and the non-socialist bloc is made up of several parties, thus, they are both coalition governments. There is empirical evidence that coalition governments have larger budget deficits than majority governments, the deficit is higher the larger the number of parties in the governing coalition.<sup>42</sup> But my results suggest that the socialist incumbent (the smaller coalition) increases the level of debt compared to a non-socialist (the larger coalition) when they are both certain to be re-elected. So this finding is inconsistent with the coalition explanation.

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<sup>41</sup> See Barber and Sen (1986) for the use of debt financing as a means of increasing the likelihood of electoral success.

<sup>42</sup> Roubini and Sachs (1989). Edin and Ohlsson (1991) argue that minority governments, rather than coalition governments, are associated with larger debt issue.



In conclusion, it seems that my empirical findings strongly favor the strategic explanation of the use of debt.

## APPENDIX 1

Data used in my analysis come from several sources. Data on debt are taken from *Kommunernas finanser* 1974-1988 and *Vad kostar verksamheten i din kommun* 1988-1994. Data on municipality population are taken from *Årsbok för Sveriges kommuner* 1974-1994. The proportion of elderly is a fraction of state population greater than or equal to age 65. The proportion of young is the fraction of people between the ages of 0 and 15. Data on elections are taken from *Kommun aktuellt* 1979-1994 and *Kommunal tidskrift* 1973-1976. My data on income tax base are taken from *Årsbok för Sveriges Kommuner* and *Kommunernas finanser*.

## APPENDIX 2

In this appendix I formally derive the implications from Persson and Svensson (1989), and Alesina and Tabellini (1990). To make the exposition as clear as possible, a number simplifying assumptions has been made. This section builds on Persson and Tabellini (1997).

*Economic Equilibrium*

Consider a simple two period closed economy model with a continuum of individuals with identical preferences over consumption and labor. Preferences over private economic outcome are given by the utility function:

$$(1) \quad U = U(c_1) + c_2 - V(l_1) - V(l_2)$$

where  $c$  denotes private consumption and  $l$  labour. Every consumer faces the same budget constraints.

$$(2) \quad c_1 + b = (1 - \tau_1)w_1l_1$$

$$(3) \quad c_2 = (1 - \tau_1)w_2l_2 + Rb$$

where  $b$  is holding of public debt (which is the only form of saving),  $\tau_1$  and  $\tau_2$  are labor tax rates in period 1 and 2,  $R$  is the gross interest rate, and  $w_1$  and  $w_2$  are wage rates in period 1 and 2. For simplicity normalize the gross rate of return  $R$  and the wage rates  $w_1$  and  $w_2$  to one, i.e.,  $R = w_1 = w_2 = 1$ . Solving the consumer problem gives the labor supply functions

$$(4) \quad L(1 - \tau_i), \quad i = 1, 2$$

For simplicity, we only allow public spending in period 2. Let  $g$  denote total per capita public spending. The government budget constraints are:

$$(5) \quad -b = \tau_1l_1 = \tau_1L(1 - \tau_1)$$

$$(6) \quad b + \theta g = \tau_2l_2 = \tau_2L(1 - \tau_2)$$

where  $\theta$  is the cost of providing government consumption.

We can re-express private utility as an indirect utility function defined over the policy variables  $b$  and  $g$ . Thus, using (5) and (6) we can rewrite (1) as

$$(7) \quad J(b, g; \theta) = \max [U(c_1) + c_2 - V(l_1) - V(l_2)]$$

This indirect utility function has the following properties:

(8a)  $J_g < 0$ , is the private marginal cost of public spending and it is increasing in  $g$ :  $J_{gg} < 0$ .

(8b)  $J_b$  is the private marginal cost of government debt. The symmetry of the labor supply in period 1 and 2 implies:  $J_b = 0$  when  $b = b^*(g, \theta) = -\theta g/2$ , and  $J_{bb} < 0$ . That is when tax rates are equal over time, tax distortions are optimally smoothed out.

(8c)  $J_{gb} < 0$ , since taxes are distortionary and as higher  $b$  adds to the government's tax bill in period 2  $J_{gb}$  is negative.

### *Political system*

There are two different groups of individuals. The two groups are identified with the supporters of two political parties: Left and Right, L and R. Party I = L, R maximizes the utility function

$$(9) \quad J(b, g; \theta) + \alpha^I g$$

Events in the model unfold as follows:

(a) One of the parties holds office in period 1. This party sets  $b$ .

(b) Economic decisions in period 1 are made.

(c) The elected party takes office and sets spending  $g$ . The level of expenditures is with probability  $P$  (from the viewpoint of government in period 1) set by the other party, thus we take  $P$  as exogenous.

(d) Economic decisions in period 2 are made.

We consider a sequentially rational equilibrium. Thus, we start by characterizing optimal spending policy in period 2. Since the debt  $b$  is given, it is optimal for party I to set

$$(10) J_g(b, g; \theta) + \alpha^I = 0$$

This condition defines a reaction function  $g = G(b, g; \theta)$  which is the same for both parties. Since higher debt implies period-2 tax distortions, any government type is less willing to spend on public goods if it inherits a higher public debt; hence  $G_b < 0$ .

Comparative statics:

$$(11) \quad G_b < 0, G_\theta < 0 \text{ and } G_\alpha > 0$$

*Alesina and Tabellini's model*

The parties disagree over the composition of spending, i.e, (12). For simplicity, assume that they only derive utility from their own public good, i.e, (13).

$$(12) \quad g = g^L + g^R$$

$$(13) \quad \alpha^I = \alpha \text{ if } g = g^I, \text{ or } \alpha^I = 0 \text{ if } g = g^J \text{ where } J \neq I$$

We first characterize optimal spending policy in period 2. From (10), (12) and (13), we get

$$(14) \quad g^L = G^L(b; \theta) = G^R(b; \theta) = g^R = G(b; \theta)$$

Thus, both parties spent equal amounts of money but on different goods.

We now characterize optimal debt policy in period 1 for party R (the identity of the government does not matter for the results).

$$(15) \quad \max J(b, G(b; \theta); \theta) + (1-P)\alpha G(b; \theta)$$

$$(16) \quad \text{f.o.c} \Rightarrow J_b - P\alpha G_b = 0$$

Strategic incentive if  $P > 0$ , since  $J_b < 0$  this implies that  $b > b^*(g, \theta)$ .

Comparative statics:

$$(17) \quad db^R/dP > 0, db^R/d\theta < 0 \text{ and } db^R/d\alpha > 0$$

The problem is analogous for party L, thus we have exactly the same solution for both type of parties.

*Persson and Svensson's model*

There is only one type of public good  $g$  but the disagreement is between different levels of spending, i.e. (18).

$$(18) \quad \alpha^L > \alpha^R.$$

Thus, optimal spending policy in period 2 is characterized by

$$(19) \quad G^L(b;\theta) > G^R(b;\theta)$$

Thus, party L spends more (*ceteris paribus*)

Optimal debt policy for party R in period 1:

$$(20) \quad \max (1-P)[J(b, G^R(b;\theta); \theta) + \alpha^R G^R(b;\theta)] + P[J(b, G^L(b;\theta); \theta) + \alpha^R G^L(b;\theta)]$$

$$(21) \quad \text{f.o.c} \Rightarrow J_b - P(\alpha^L - \alpha^R)G^L_b = 0$$

Thus, if  $P > 0$  than  $b$  is larger than the optimal value  $b^*(g, \theta)$ .

Comparative statics:

$$(22) \quad db^R/dP > 0, db^R/d\theta < 0 \text{ and } db^R/d(\alpha^L - \alpha^R) > 0$$

Optimal debt policy for party L in period 1.

$$(23) \quad \max (1-P)[J(b, G^L(b;\theta); \theta) + \alpha^L G^L(b;\theta)] + P[J(b, G^R(b;\theta); \theta) + \alpha^L G^R(b;\theta)]$$

$$(24) \text{f.o.c} \Rightarrow J_b + P(\alpha^L - \alpha^R)G^L_b = 0$$

Thus, if  $P > 0$  than  $b$  is smaller than the optimal value  $b^*(g, \theta)$ .

Comparative statics:

$$(25) \quad db^L/dP < 0, db^L/d\theta > 0 \text{ and } db^L/d(\alpha^L - \alpha^R) < 0$$

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