An Empirical Investigation of the Strategic Use of Debt*

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Abstract

In this paper I test two models of strategic debt behavior. 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 are perhaps less surprising since there are several potential difficulties using U.S. or OECD data to test the strategic explanation. One problem with the U.S. data is the scarcity of degrees of freedom while a problem with the OECD data is the pooling assumption. To come to grips with these two problems I use a data set from Swedish local governments. The main advantages of this panel data set are the homogeneity of the sample and the large number of observations from elections, nearly 2000. 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 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 and raise taxes. These results are consistent with the predictions from a model developed by Persson and Svensson (1989).

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I. INTRODUCTION

In the last 20 years many countries have accumulated large government debts. Several explanations of this stylized fact have been put forward. Some stress economic reasons while others use political economy arguments.[1] This paper will explore one of the political economy explanations.

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.

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. Crain and Tollison (1993) conduct their empirical analysis on U.S. States and their results indicate that party stability in the legislature over time is correlated with less volatility of budget deficits/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 competing strategic debt models and only one of them necessarily predict less volatility.[2] 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

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[1] See Alesina and Perotti (1995) for a survey of political economy models of budget deficits.

[2] 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.

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.

Grilli et al. (1991), Lambertini (1996), and Franzese's (1998) 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.[3] However, with OECD panel data there could be a problem with the pooling assumption, that is, that the OECD countries are too heterogeneous to be pooled together.

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.[4]

The second example concerns the exercise of constructing primary deficits free of the effects of the business cycle variations. This exercise is of great importance, since one needs to separate the business cycle component from the strategic component (if there is one), to assess the role of strategic debt behavior. The more the countries of the sample differ from each other the more difficult is the exercise, since one has to take a stand on the benchmark value of the macroeconomic environment against

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[3] 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).

[4] 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.

which the cyclical adjustment is defined and different countries are likely to have different macroeconomic environments.[5]

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 etc., and the large number of observations from elections, nearly 2000.

Furthermore, this paper tries to make a direct test of strategic debt behavior by generating predictors of the expectation of electoral defeat from an auxiliary model and by discriminating between two theories of strategic debt behavior; Alesina and Tabellini (1990), and Persson and Svensson (1989).

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 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.

These results are consistent with a 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 taxation and spending. The evidence from this paper shows that this is indeed the case. A high debt forces the new government to decrease spending and raise taxes.

A reader with no prior knowledge of the general Swedish governing system, and the relationship between the state and local governments in particular, might raise the natural question as to whether local governments have any freedom of action of their own. My reading of the literature on this issue is that local governments have a large degree of autonomy.[6]

At this stage, a short description of local governments and their relationship to the state might be helpful. Local governments are the most decentralized level of government in Sweden and they constitute a very large fraction of the total

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[5] See Perotti (1997) for a discussion of cyclical adjustments of fiscal variables.

[6] For an overview of Swedish local governments and a comparison with local governments in the U.S. and Great Britain, see Gramlich and Ysander (1985).

government sector in Sweden.[7] They primarily finance their expenditure through a local income tax (55 percent of the total income), and each local government is free to independently adjust its tax.[8] Other important income sources are user fees (16 percent of the total income), and intergovernmental grants (22 percent of the total income). Education, childcare and the care of the elderly are the main expenditure programs. Local governments are required by national law to provide these programs.[9] However, the amount to be spent on each compulsory program is optional as long as it is provided. There is also prescribed by national law that local governments balance their budgets. This requirement has been rather ineffective since balanced budgets are only a prospective or beginning of year balance.[10] To conclude, I find that Swedish local governments meet the required autonomy so that strategic debt theories are applicable.

The remainder of the paper is organized as follows: in the next section, I give a short and non-technical presentation of two theories of strategic debt behavior. Furthermore, I discuss the measures of the expectation of electoral defeat employed by previous studies. The estimation method of the expected probability used in this paper is also described. Section III outlines the empirical procedure and a discussion of the data to which it is applied. Section IV and V presents the empirical results. I conclude with a discussion of my findings.

II. TESTING TWO STRATEGIC EXPLANATIONS OF DEFICITS

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[7] The ratio of spending to GDP for the total government sector in Sweden is 60,6 percent in 1991, while this ratio for local governments is 28 percent. This can be compared with U.S. numbers for 1990. The ratio of total government spending to GDP is 33,7 percent, while the State/Local level ratio is 11.3 percent.

[8] Local governments were temporarily deprived of this right between 1991 and 1993.

[9] According to Ysander and Murray (1983), approximately 45 percent of local government's total expenditures are considered mandatory.

[10] For an evaluation of the effect of balanced budget requirements on Swedish local governments, see Ysander and Murray (1983) 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.

A. Models

There are several political economy explanations of the recent accumulation of government debt in industrialized countries. In this paper, I will concentrate on 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 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.[11] 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,[12] it will issue more debt than the successor would prefer. On the other hand, the left wing government has

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

[12] Persson and Svensson (1989) refer to this as stubbornness.

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. 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 the right-wing government should issue debt. Instead, the left-wing government should leave a surplus. Nevertheless, both models predict that the strategic use of deficits or surpluses are larger, the greater the disagreement between different policymakers and the more likely that the current government will be replaced.[13] 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,

$$DEBT^{14} = a + bP + \boldsymbol{X}\boldsymbol{g} + u \quad (1)$$

where P is the probability of defeat and $\boldsymbol{X}$ 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

$$DEBT = a_i + b_i P + \boldsymbol{X}\boldsymbol{g} + u \quad (2)$$
$$i \in L, R$$

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[13] Although Persson and Svensson (1989) assume no uncertainty of re-election, Lambertini (1996) makes a formal extension and derives this result.

[14] There is an issue whether the theories are about the level of debt or about deficits. In a two period model, with no initial debt, there is no distinction between these two, but in a multi-period model there is a difference. If we include the lagged level of debt in $\boldsymbol{X}$, we can rewrite (1) as

$DEBT_t - DEBT_{t-1} = a + qDEBT_{t-1} + bP + \boldsymbol{X}\boldsymbol{g} + u$. Thus, this equation can be interpreted in terms of deficits. The regressor $DEBT_{t-1}$ can be thought of as a control for the burden of the interest payment on the outstanding debt.

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 be one if there is a left wing incumbent and zero otherwise. Thus I rewrite (2) as

$$DEBT = \alpha_1 + \alpha_2 D_L + \beta_1 P + \beta_2 D_L P + \boldsymbol{X}\boldsymbol{\gamma} + D_L \boldsymbol{X}\boldsymbol{\mu} + u \tag{3}$$

The introduction of the dummy variable enables us to differentiate between the intercepts and slope coefficients of the two groups. Thus, α_2 should be interpreted as the difference between the intercepts, and β_2 and $\boldsymbol{\mu}$ as the difference between the slope coefficients. [15]

With equation (3), we can test the different hypotheses 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 $\beta_1>0$ ($\Leftrightarrow \beta_R>0$) and $\beta_2=0$ ($\Leftrightarrow \beta_R=\beta_L$, i.e., both types of governments have the same positive slope coefficient). 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 $\beta_1>0$ but that $\beta_2<0$ ($\Leftrightarrow \beta_R>\beta_L$). The sign of β_L ($\beta_L=\beta_1+\beta_2$) could be positive or negative depending on the stubborness of the left-wing government.[16]

B. Electoral System

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

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[15] Formally, one can show from Persson and Svensson's model that left and right wing incumbents could have different slope coefficients of $\boldsymbol{X}$, i.e., $\boldsymbol{\mu} \neq \boldsymbol{0}$.

[16] Stubborness 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. A negative sign of the coefficient β_L would implicate a stubborn left-wing government. For further details see Persson and Svensson (1989).

as if it were a two-party system since there has traditionally been two main opposing party blocs, the socialist and the non-socialist bloc.[17] 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.[18] 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.[19]

C. Empirical Measures of the Probability of defeat

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

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[17] 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.

[18] 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.

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 Tollision (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.

In summary, 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.[20] The basic idea is to specify an auxiliary equation that links the unobservable variable to a set of explanatory variables. More formally,

$$P^* = P + h = \boldsymbol{W}\boldsymbol{w} + h \tag{4}$$

where P is the expectation of defeat (unobservable), $\boldsymbol{W}$ is some variables describing the formation of expectations, P^* is the actual election outcome and h is an error term.

Pagan (1984) shows that an instrumental variable estimator applied to (3), with the predicted values of P^* as an instrument for P, will give a consistent estimator of the standard errors.[21] The remainder of this section describes the estimation procedure of equation (4).[22]

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[19] I had to delete 309 observations.

[20] The unobservable variable problem is equivalent (in this case) to an error-in-variables problem, i.e.; one of the explanatory variables is correlated with the error term because it is an error-ridden variable.

[21] An added advantage of this method is that deals with a potential endogenity 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. If this is the case, this will make the error term

The actual outcome from elections P^* is a dichotomous variable, P^* is either zero or one. Since there are two different incumbents, left or right wing governments, and either of these incumbents could have been defeated or not, there are four distinct cases. Table 1 shows the different cases.

TABLE I
INCUMBENT GOVERNMENTS

	Left-wing incumbent	Right-wing incumbent
Change of power, $P^*=1$	107	192
No change of power, $P^*=0$	710	621
Total sum	Σ 817	Σ 813

From Table I, we can see that the total number of government changes are 299 during the sample period, 1974-1994. [23] In 107 cases a left-wing incumbent and in 192 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 municipalities included in the sample.[24] During the sample period, there was no change of power in 117 municipalities. Of these, 69 had left-wing governments and 46 had right-wing governments.

TABLE II
THE FREQUENCY OF GOVERNMENT CHANGES[a]
1974-1994

Frequency	0	1	2	3	4	5	6	7
Number of municipalities	117	29	42	38	30	12	9	0

a. In this table I have also included the observations from the undefined bloc.

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and the regressor P in equation (3) correlated. Thus, the solution to this potential endogeneity problem calls for an instrumental variable framework.

[22] In an earlier version of my paper, I tried several other methods of estimating the probability of defeat and reaching qualitatively similar results. I believe the results I report are robust to the estimation procedure of the probability of electoral defeat.

[23] 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. The first election was held in 1976.

[24] Since there are seven elections during this period, the maximum number of changes of power is 7.

To estimate equation (4) we need to find the variables $\boldsymbol{W}$ describing the formation of expectations of electoral defeat. A prerequisite is that the variables are predetermined. One predetermined variable that could be used to predict the election outcome is the share of seats that the legislative majority received in the previous election. This variable can be taken as a fairly good indicator of the incumbent's electoral uncertainty in the pending election. Apart from the share of seats I also include fixed effects, both municipal and time specific effects.[25] 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 (4) is estimated with a Probit model, i.e. $\Pr(P^*=1)=\Phi(\boldsymbol{W}\boldsymbol{w})$, where $\Phi(\cdot)$ is the standard cumulative function.[26]

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 effect of a change in the share of seats on the probability of defeat, we calculate it at its mean value. 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

[25] 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. I have also tried economic variables, such as the growth of income, at the municipality level. These variables do not help us to predict the election outcome.

[26] I have used a fixed effect probit model, although it does not lend itself well to fixed effect treatment. I have also tried the random specification developed by Butler and Moffitt (1982), but this specification gives much worse predictions than the fixed effect. Since I am mainly interested in the predictions from the model I choose the fixed effect specification. However, I also tried to use the predictions from the random effect specification in the subsequent analysis and found qualitatively similar results.

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	-0.28
	(-7.11)
Pseudo R^2 (Likelihood ratio index)	0.47

The regression include year and municipality effects

III. EMPIRICAL PROCEDURE AND DATA

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.[27] The dependent variable is public debt measured in per capita terms and at constant prices.[28] 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.[29] I made this choice so as to have a comparable measure of debt during the sample period.[30] 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 (3) as

$$(6)\quad DEBT_{it} = \alpha_1 + \alpha_2 D_L + \beta_1 P_{it} + \beta_2 D_L P_{it} + \delta_1 DEBT_{it-3} + \delta_2 D_L DEBT_{it-3} + \boldsymbol{X}_{it}\boldsymbol{\gamma} + D_L \boldsymbol{X}_{it}\boldsymbol{\mu} + u_{it}$$

$i = 1,\ldots,277$
$t = 76, 79, 82, 85, 88, 91 \text{ and } 94$

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

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[27] 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.

[28] 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.

[29] 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.

[30] There is one exception; temporary loans are counted twice in 1988, but only half of the municipalities make use of temporary loans and usually they are small in number.

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. But which variables should be included in the $\boldsymbol{X}$ vector of equation (4)? The strategic debt theories do not provide much guidance and there is still no consensus concerning the process that generates government spending decisions.[31] However, there are usually some economic and demographic factors included in the estimation of a jurisdiction spending 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 (0-19) and the share of people older than 65. The main parts of revenues come from a 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.[32] 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 preferences of the electorate, 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.

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[31] See Inman (1988) for a survey of various model of government expenditure determination.

[32] 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*.

TABLE IV
POLITICAL, ECONOMIC, AND DEMOGRAPHIC VARIABLES 1974-1994[a]

Variable	Number of observations [b]	Mean	Std. Deviation
Debt	1623	10182	4749
Income tax base	1630	60352	12993
Population	1630	28562	46763
Proportion of elderly (65+)[c]	1630	17.54	4.31
Proportion of young (0-19)[d]	1630	25.96	3.04
The actual outcome from elections	1630	0.185	0.389
Predicted values of the actual outcome	1630	0.185	0.312

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.

c. Information on the proportion of elderly for 1974 and 1976 was only available for 67+.

d. Information on the proportion of young for 1974, 1976 and 1979 was only available for 0-17.

IV. RESULTS

In this section I present empirical evidence of the strategic use of debt and check the robustness of these results.[33]

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, while table VI shows the results when I use all the control variables (including time effects).

In table V, the coefficient of D_L is positive and statistically significant in both regressions. This indicates that the socialist bloc has on average a higher level of debt when there is no probability of defeat. A test of the strategic debt models is easily carried out. The coefficient of P is positive and highly significant with t-values of 5.11 and 4.27.[34] This strongly suggests that a non-socialist bloc accumulate more debt the higher the possibility of defeat. For example, in the instrumental variable (IV) case, a non-socialist incumbent increases, on average, the level of debt with 1418 SEK/capita (which is roughly 14 percent of the total debt) when it is certain to be defeated compared to when it is certain to remain in power. However, the coefficient of PD_L is negative and highly significant in both regressions.[35] Hence this result strongly suggests that the two blocs have different slope coefficients. For example, in the IV-case, a socialist incumbent decreases, on average, the level of debt with 1160 SEK/capita (1418-2578) when it is certain to be defeated compared to when it is certain to remain in power. Figure I plots the relationship between the level of debt

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[33] 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.

[34] I am using a one-sided test, i.e., $b_1>0$ (null hypothesis $b_1=0$) 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.

[35] Since I am trying to discriminate between the two theories, the alternative hypothesis is that $b_1>b_2$ (with the null hypothesis $b_1=b_2$). 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.

and P when $a_1=a_R$ is normalized to zero for the IV-case. This figure shows that a socialist bloc who is certain to be defeated has 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 replaced with certainty, has a higher level of debt compared to a socialist bloc, which is certain to stay in power.

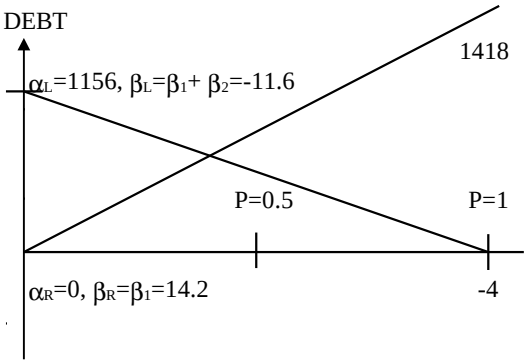

FIGURE I
The effect of P on the level of debt

TABLE V
THE IMPACT OF P ON THE LEVEL OF DEBT,[a]
1974-1994
(*t*-STATISTICS IN PARENTHESES)

Explanatory variables	Actual election result[b]	Instrumental variable method[c]
Socialist incumbent D_L=1	1160	1156
	(2.76)	(3.02)
Probability of defeat P	1397	1418
	(5.11)**	(4.27)**
D_LP	-3046	-2578
	(-6.54)**	(-4.78)**
Inherited debt	0.71	0.71
	(28.55)	(27.86)
D_L Inherited debt	-0.02	-0.02
	(-0.48)	(-0.71)
R^2	0.5419	0.5413
Number of observations	1617	1617

***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., $election\ result_{it} = m + g + l_t + share\ of\ seats_{it} + e_{it}$, 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.

In table VI, where I use all control variables, I get qualitatively similar results for the coefficients of P and PD_L as in table V. They are all statistically significant at least at the 5 percent level (one-tail tests). In other words, all regressions 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 and the proportion of elderly all seem to have a positive and significant effect on the level of debt, while the tax base and the proportion of young seem to have none. Furthermore, the value of the coefficient on inherited debt, 0.74, indicates that the level of debt is a mean reverting process.[36] There is also some support for that the two incumbents have different slope coefficients since one of the interaction terms is significant, D_L Tax base.[37]

B. Econometric Issues

There are some econometric issues when estimating equation (6). The first one concerns a lagged dependent variable and the possibility of existence of municipality specific effects. If there were municipal specific effects, the correlation between these effects and lagged dependent variable would seriously bias the OLS estimator. The estimator of the coefficient of the lagged dependent variable would be biased upward, and the coefficient of the exogenous variables would be biased toward zero, Trognon (1978). I have therefore conducted the Lagrange multiplier test for random effects, i.e., the null hypothesis that municipal specific effects do not exist. I cannot reject this hypothesis at the 5 percent significance level for any of the regression models in Table VI, when I am using all control variables. However, I have estimated the models in Table V and Table VI via a random effects specification and I find virtually the same results as presented in those Tables.

Another econometric issue concerns measurement error of the probability of defeat P. If P is the only variable that is measured with an error then its coefficient is biased toward zero, Green (1997). I have tried to deal with this problem through the instrumental variable method suggested by Pagan (1984). We can make a test of no

[36] I have not checked this statistically since the time series dimension only include 7 observations.

[37] See footnote 15.

measurement error (or equivalently exogeneity of the regressors) with a Hausman test.[38] I cannot reject that there is no correlation between the error and the regressors, P and $D_L P$, in any of specifications in Table V or VI.

[38] Hausman (1978)

TABLE VI
THE IMPACT OF P ON THE LEVEL OF DEBT,[a]
1974-1994
(*t*-STATISTICS IN PARENTHESES)

Explanatory variables	Actual election result[b]	Instrumental variable method[c]
Socialist incumbent D_L=1	1863	1830
	(0.61)	(0.58)
Probability of defeat P	525	734
	(1.91)*	(1.91)*
$D_L P$	-1476	-1563
	(-3.17)**	(-2.67)**
Inherited debt	0.74	0.74
	(24.59)	(28.52)
D_L Inherited debt	-0.04	-0.04
	(-0.82)	(-1.02)
Tax base	-0.00009	0.0004
	(-0.01)	(0.03)
D_L Tax base	0.035	0.037
	(2.80)	(2.74)
Population size	0.012	0.012
	(2.26)	(4.61)
D_L Population size	-0.0056	-0.0056
	(-0.92)	(-1.53)
Proportion young (0-19)	104	112
	(1.55)	(1.64)
D_L Proportion young	-49	-52
	(-0.64)	(-0.65)
Proportion elderly (65+)	109	113
	(1.89)	(2.20)
D_L Proportion elderly	-75	-76
	(-1.22)	(-1.34)
R^2	0.6259	0.6257
Number of observations	1617	1617

***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.

The regressions also include time effects.

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., $election\ result_{it} = m + g + l_t + share\ of\ seats_{it} + e_{it}$, 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.

V. EXTENSIONS

My results seem to support the predictions from Persson and Svensson's model. However, this section makes some additional checks on the implications of their model. I make two extensions. The first one is based on the notion that a high frequency of government changes creates an over accumulation of debt. A rejection of this hypothesis would give further support to Persson and Svensson's model, since this would be consistent with right-wing incumbents creating deficits while left-wing incumbents creating surpluses when there is a change of power. The second extension tests whether the inherited debt influences a newly elected government's decision on taxation and spending or not. The basic mechanism of Persson and Svensson's model rests on the assumption that the inherited debt has an impact on these decisions.

A. High Frequency of Government Changes

The main prediction from Alesina and Tabellini's model is that countries with a high frequency of government changes start to accumulate debt to a larger extent than countries with a stable political leadership. This follow from that the incumbent government has an initiative to issue more debt, when it expects not to be re-elected, to influence the next governments choice of fiscal policy. Thus, Alesina and Tabellini's model makes no behavioral distinction, regarding the strategic use of debt, between incumbents with different ideological inclination.

To make an empirical assessment of this hypothesis I follow a similar approach to that taken by Grilli et al.(1991). They construct a political variable, which takes higher values as the frequency of government changes increases and define a government change as a transfer of power from one leading group to another. Similarly, I define a government change as a transfer of power between a socialist, a non-socialist or an undefined bloc.[39] During this period there has been a total number of seven elections, thus the highest value of the political variable is seven and the lowest is zero. Table II provides information about the political variable.

I use an estimation procedure similar to the one in the last section, except that I now use average values for the economic and demographic explanatory variables, to

[39] Now I include those municipalities, which have had an undefined bloc as incumbent prior to an election.

explain the accumulation of debt during 1974-1994. Thus, I estimate the following cross section equation:

$$(5) \qquad DEBT_{i94} = a + bFREQ_i + \mathbf{g}DEBT_{i74} + \underline{\mathbf{X}}_i \mathbf{g} + u_i$$

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, this result confirms the previous findings that the two blocs have opposite incentives regarding the strategic use of debt. Furthermore, it shows that it can be very misleading to use the frequency of government changes to infer strategic debt behavior.

TABLE VII
THE ACCUMULATION OF DEBT DUE TO FREQUENT GOVERNMENT CHANGES,[a]
1974-1994
(*t*-STATISTICS IN PARENTHESES)

Explanatory variables	Dependent variable: Level of debt 1994
Frequency of government changes	-77
	(-0.49)
Level of debt 1974	0.17
	(3.10)
Tax base	-0.11
	(-2.32)
Population size	0.024
	(5.11)
Proportion young (0-19)	-380
	(-1.58)
Proportion elderly (65+)	-181
	(-0.93)
R^2	0.1448
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.

B. Influences of the Inherited Debt on Policy[40]

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 taxation or spending. To investigate if this is the case I estimate the following regressions

(6) $$Exp_{it+1} - Exp_{it} = a + b_1^E DEBT_{it} + b_2^E D_L DEBT_{it} + u_{it}$$

(7) $$Tax_{it+1} - Tax_{it} = a + b_1^T DEBT_{it} + b_2^T D_L DEBT_{it} + u_{it}$$

$i = 1,...277$

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

where i stands for municipalities and t for election years. Time effects are also included in all regressions.

Before I proceed with the results, some comments on these empirical specifications are necessary. If the inherited debt should cause any changes in policy one would expect that it would happen within the next year after the election. Thus, I look at the change in spending and taxes after one year.

According to Persson and Svensson's model, we should expect that sign of b_1^E and $b_1^E + b_2^E$ to be negative but the sign of b_1^T and $b_1^T + b_2^T$ to be positive since a larger inherited debt would force the newly elected government to decrease spending or/and increase taxes.

Table VIII reports results of the influences of the inherited debt on policy. The results are in accord with Persson and Svensson's model, i.e., a negative relationship between inherited debt and change in spending and a positive relationship between inherited debt and taxes.

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.

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[40] I am grateful to Eva Johansson for providing me with data on expenditures.

TABLE VIII
INFLUENCES OF INHERITED DEBT ON EXPENDITURE AND TAXES
1976-1995
(t-STATISTICS IN PARENTHESES)

Explanatory variables	Dependent variable: change in expenditures	Dependent variable: change in tax rates
Level of inherited debt	-0.036	0.0008
	(-2.61)**	(2.59)**
D_L Level of inherited debt	0.0008	-0.0005
	(0.08)	(-2.50)*
R^2	0.44	0.81
Number of observations	1614	1623

***Statistically significant at the 5 percent level**

**** Statistically significant at the 1 percent level.**

All regressions include a full set of time dummy variables.
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.[41] Yes, one could conclude that voters punish socialists or conservatives depending on whether or not they are violating their campaign pledges. If people vote for socialists when they want high spending and they vote for conservatives when they want low spending, one could argue that socialists and conservatives loose their respective elections because socialists spend too little while conservatives spend too much. However, I have three objections to this explanation. Firstly, I use an instrumental technique to take care of the endogeneity problem. Secondly, in my sample the effect of the level of debt on election outcomes is never statistically significant.[42] The third objection is that if this explanation is true, then this story either imply that the incumbent is irrational, since he never learns that the voters will punish him every time he breaks his campaign pledge, or that he does not care about being re-elected.

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.[43] However, this is inconsistent with my results because only the non-socialist government increases its level of debt when the probability of defeat is high.

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[41] Francisco Rodriguez and Henry Ohlsson made this interpretation.

[42] The results from the panel probit regression with election outcomes as the dependent variable are available upon request. Peltzman (1992) and Alesina, Perotti, and Tavares (1997) come to the same conclusion, that deficits have no significant impact on election outcomes.

[43] See Barber and Sen (1986) for the use of debt financing as a means of increasing the likelihood of electoral success.

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.[44] 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.

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

[44] Roubini and Sachs (1989). Edin and Ohlsson (1991) argue that minority governments, rather than coalition governments, are associated with larger debt issue.

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, except for the years 1974 and 1976 when it is greater or equal to age 67. The proportion of young is the fraction of people between the ages of 0 and 19, except for the years 1974, 1976 and 1979 when its between 0 and 17. 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*.

REFERENCES

Aghion, P., and P. Bolton 1990. Government domestic debt and the risk of default: a political-economic model of a strategic role of debt, in R. Dornbush and M. Draghi (eds), *Public Debt Management: Theory and History*, Cambridge: Cambridge University Press.

Alesina, A., and G. Tabellini 1990. A Positive Theory of Fiscal Deficits and Government Debt. *Review of Economic Studies* 57:403-414.

Alesina, A and R. Perotti 1995. The Political Economy of Budget Deficits, *IMF Staff Papers*, 42:1-31.

Alesina, A., Perotti R., and J. Tavares 1997. The Political Economy of Fiscal Adjustments, mimeo, Harvard University.

Barber, W. R. and P. Sen. 1986. The political process and the use of debt financing by state government. *Public Choice* 48:210-215.

Bohn, H. and R. P. Inman 1996. Balanced Budget Rules and Public Deficits: Evidence from the U.S. States, NBER working Paper 5533.

Butler, J. and R. Moffit 1982. A Computationally Efficient Quadrature Procedure for the one Factor Multinomial Probit Model. *Econometrica* 50:761-764.

Crain M. R. Tollison 1993. Time inconsistency and fiscal policy: Empirical analysis of U.S. States, 1969-89. *Journal of Public Economics* 51:153-159.

Edin, P.A. and H. Ohlsson (1991). Political determinants of budget deficits: Coalition effects versus minority effects, *European Economic Review* 35: 1597-1603.

Franzese, R.1998. The Positive Political Economy of Public Debt: An Empirical Examination of the OECD Postwar Experience. mimeo, The University of Michigan.

Green,W.1997.*Econometric Analysis*. Prentice-Hall.

Gramlich E. and B.-C. Ysander (1985). Control of Local Governments. IUI Conference Reports series 198:1.

Grilli, V, D. Masciandaro, and G. Tabellini. 1991. Political and Monetary Institutions and Public Financial Policies in the Industrial Democracies. *Economic Policy*, 13:341-392.

Hausman, J. 1978. Specifications Tests in Econometrics. *Econometrica*, 46:1251-1271.

Inman, R.1988. Markets, governments and the new political economy, in Alan Auerbach and Martin Feldstein, eds., *Handbook of public economics*. Amsterdam, North-Holland.

Kiewiet, R and M. McCubbins 1992. *The Logic of Delegation*. Chicago, The University of Chicago Press.

Lambertini, L. 1996. ”Are Budget Deficits used Strategically?”.Mimeo, University of California.

Lane, J. and S. Back. 1991. *Kommunernas affärer*. Stockholm: SNS Förlag.

Norling, J. and P. Pettersson. 1994. Kan skillnader i kommunernas skuldsättning förklaras av politiska faktorer, Undergraduate thesis, Uppsala University.

Pagan A. 1984. Econometric Issues in the Analysis of Regression with Generated Regressors. *International Economic Review* 25:221-47.

Peltzman, S. 1992. Voters as Fiscal Conservatives. *Quarterly Journal of Economics*, 107:327-361.

Perotti, R. 1997. Fragmented Fiscal Policy. Mimeo Columbia University.

Persson, T., and L. Svensson 1989. Why a Stubborn Conservative Would Run a Deficit: Policy with Time Inconsistent Preferences. *Quarterly Journal of Economics*, 104: 325-46.

Persson, T., and G. Tabellini 1997. Political Economics and Macroeconomic Policy Seminar Paper No. 630. Institute for International Economics Studies. Stockholm University.

Roubini, N. and J. Sach. 1989. Political and Economic Determinants of Budget Deficits in the Industrial Democracies, *European Economic Review*, 33:903-933.

Trognon, A.,1978. Miscellaneous asymptotic properties of ordinary least squares and maximum likelihood estimators in dynamic error components models, *Annales de L’INSEE* 30-31, 631-657.

Ysander B.-C., and R. Murray. 1983. *Kontrollen av kommunerna*. Stockholm: Industriens utredningsinstitut.