Are Budget Deficits Used Strategically?*

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Abstract

This paper tests empirically the strategic explanation of budget deficits suggested by Tabellini and Alesina [13] and Persson and Svensson [12]. Tabellini and Alesina suggest that governments with different political orientation provide different public goods. The model predicts that: a) public good provision follows a political pattern; b) the incumbent that anticipates her defeat at the next election runs budget deficits to tie the hands of the future government. Persson and Svensson suggest that liberal governments prefer more public good provision than conservative ones. The model predicts that: a) the conservative (liberal) incumbent that anticipates her defeat at the next election runs budget deficits (surpluses); b) budget imbalances have a political color. Using U.S. and pooled data for sixteen OECD countries, we find little evidence that the incumbent's probability of being voted out of office explains budget deficits, that the provision of public goods follows a political pattern or that budget imbalances have a political color.

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1 Introduction

Government primary budget deficits have been common to most industrialized economies from the early 1970s to the mid 1990s. Standard economic models cannot explain this fact. If taxes are distortionary, the tax-smoothing motif should prevail: deficits arise in recessions, surpluses in expansions. The deficits of the 70s, 80s and early 90s, however, transcended several peaks and dips of the business cycle.

Two important contributions by Tabellini and Alesina [13] (TA henceforth) and Persson and Svensson [12] (PS henceforth) argue that budget deficits have a strategic explanation. TA argue that voters have heterogeneous preferences in terms of what public good the government should provide. For example, some people would like the government to be engaged in environmental issues and provide clean air; others prefer the government to provide a strong national defense. Since the political party in office represents the preferences of the voters who elected it, the provision of public goods is biased. If the incumbent anticipates to be defeated in the next election, she runs a budget deficit to bring the composition of future public spending closer to her preferences. In fact, a budget deficit allows the current incumbent to spend more on the public good she prefers (say clean air) by reducing future spending on the public good she gets little utility from (say defense). Hence, the implications of the TA model are: 1) the provision of public goods follows a political pattern; 2) the incumbent (independently of her political orientation) that anticipates her defeat at the next election runs budget deficits to tie the hands of the future government.

PS, on the other hand, argue that voters have heterogeneous preferences in terms of the size of the government. For example, some voters want the government to provide public education and universal health care, while others prefer such goods to be provided privately. Once again, the political party in office reflects the voters' tastes and acts accordingly: a more conservative incumbent keeps public spending low while a more liberal one raises public spending. PS argue that a conservative government that anticipates to be voted out of office runs budget deficits to reduce future public spending. By rasing future interest payments on public debt, the current conservative incumbent reduces the amount of future revenues that can be spent on public goods. The incentive is completely reversed for a liberal incumbent that anticipates not to be reelected: she runs a budget surplus to raise future public spending. Hence, the implications of the PS model are: 1) the conservative incumbent that anticipates her defeat at the next election runs budget deficits to tie the hands of the future liberal government; 2) the liberal incumbent that anticipates her defeat at the next election runs budget surpluses; 3) budget imbalances have a political color, i.e conservative governments run deficits and liberal governments run surpluses.

The TA and PS models are cornerstones of the political economy literature and fundamental contributions in the field of political incentives in public finance. These

models have straightforward implications that can be tested empirically. This is what this paper aims to do.

The empirical tests use U.S. quarterly data and opinion polls for the period 1960:1 to 1995:3, U.S. annual data 1960-96, and annual data for sixteen OECD countries for the period 1960 to 1992. Opinion polls are the fraction of interviewed individuals that would vote in favor of the incumbent if elections were held at the time the poll is taken; I use this measure as a proxy for the incumbent's expectation of re-election. Using quarterly data, I regress the budget surplus over the opinion poll variable and the economic variables that explain its cyclical variations (real GDP growth rate, unemployment, interest rate and lagged budget surpluses). Three sets of regressions are estimated: vector autoregression, instrumental variable estimation of the structural equation for the budget surplus and instrumental variable estimation of contemporaneous causality from the probability of re-election to the budget surplus. These estimations assume that the probability of re-election is an *endogenous* variable and allow for the possibility that the macroeconomic variables affect it. Based on this data, there is no evidence that the incumbent's probability of re-election has a significant effect on the budget surplus in either model.

Then, I do some robustness checks. To control for the fact that fiscal decisions are taken once a year and quarterly data may introduce noise and sampling errors, all the regressions are also run with annual data. A dummy variable for divided governments, namely for the situation where the political party that controls the U.S. Congress is different from the President's party, is introduced in the regressions. The probability of being voted out of office is treated as an endogenous variable in this work and can be affected by macroeconomic control variables, such as GDP growth and unemployment; one may worry that the inclusion of macroeconomic variables in the budget equation may explain opinion polls and drive them out of the regression. To control for this problem, I run a regression using only opinion polls as regressors. The lack of statistical significance of the incumbent's probability of re-election remains in all the regressions.

The second data set consists of pooled annual data over the period 1960-92 for sixteen OECD countries. This data set captures both the time-series and cross-section variation in budget surpluses; however, opinion polls are not available for such extended sample of countries and years. I run two estimations. The first jointly estimates a probit equation on the probability of a government change and an equation for the budget surplus that includes the fitted probability; the second estimation replaces the fitted probability with actual government changes. Neither the fitted probability of a government change nor actual changes of governments explain budget surpluses in the strategic models.

The strategic models have predictions that can be tested independently of the incumbent's likelihood of re-election. The TA model predicts that the provision of public goods follows a political pattern; the PS model predicts that budget imbalances have

a political color. For the TA model, I test whether government outlays on defense are higher under more conservative governments; I also test whether government outlays on social security and welfare are higher under more liberal governments. Both data sets indicate that different governments spend roughly in the same way and give no support to the TA implication that public spending follows a political pattern. For the PS model, I test whether cyclically adjusted government budget surpluses are lower under conservative than liberal governments, but find evidence neither in the U.S. nor in the pooled OECD data.

The lack of evidence in support of the strategic models does not necessarily refute them. It suggests, however, that fiscal decisions are likely to be the outcome of a more complicated political process than modelled by TA and PS. Exogenous economic events not accounted for in the theory may play an important role in explaining the deficits of the 1970s and 1980s and the surpluses of the late 1990s in the industrialized economies. The findings of this paper suggest that, even if political institutions create a bias toward deficits or surpluses, its extent hardly provide a rationale for constitutional limits such as balanced budget requirements.

This paper is organized as follows. Section 2 briefly presents the TA and PS models and summarizes their predictions in Proposition 1 and Proposition 2. Section 3 presents the empirical tests of the strategic models. Section 3.1 presents the results of the test based on quarterly U.S. data and opinion polls; section 3.2 presents the results of the test based on pooled OECD annual data. Section 4 looks for indirect evidence in support of the strategic models and Section 5 concludes.

2 The strategic models

This section briefly presents the TA and PS models and generalizes their prediction to the three electoral systems used in the sample countries: fixed-term, i.e. elections are held every n periods; fixed-term with vote of no confidence, i.e. elections are held every n periods but the government can fall before the end of its term due to a vote of no confidence; fixed-term with early election, i.e. the incumbent can call for an early election before the end of its term. Proposition 1 and 2 summarize the predictions of the strategic models.

Consider a small open economy inhabited by a group of individuals with heterogeneous preferences. The preferences of the ith individual at time t are described by

$$\sum_{s=0}^{T} \beta^s E_t \left[\phi u(c_{t+s}) + \alpha^i H(g_{t+s}) + (1-\phi)(1-\alpha^i) H(f_{t+s}) \right]. \tag{1}$$

The parameter α^i identifies the ith individual; $u(\cdot)$ and $H(\cdot)$ are strictly increasing, concave, and twice continuously differentiable. For simplicity, let $u(0) = H(0) = 0$;

$E(\cdot)$ is the expectation operator; β is the discount factor that, for simplicity, is assumed to equal to $1/(1+r)$, where r is the constant interest rate at which the government can lend and borrow from the rest of the world. In each period, the government decides how much to consume of each public good and how much to borrow from abroad under the non-negativity constraints:

$$g_t, f_t \geq 0, \quad \forall t, \tag{2}$$

and the intertemporal budget constraint:

$$b_{t+1} = (1+r)b_t + g_t + f_t - \tau_t, \tag{3}$$

where b_t is public debt and τ_t is government revenues at time t. Public debt cannot be repudiated at any time and is repaid in full by the government; this implies $b_{T+1} = 0$ when T is finite and $\lim_{T\to\infty}(1+r)^{-T}b_{T+1} = 0$ when T goes to infinity.

2.1 The TA model

The TA model assumes $\phi = 0$ so that preferences are

$$\sum_{s=0}^{T} \beta^s E_t \left[\alpha^i H(g_{t+s}) + (1-\alpha^i)H(f_{t+s})\right].$$

Individuals are heterogeneous in terms of their preferences over two public goods, g and f. Let g be national defense and f be clean air. Individuals with $\alpha^i < 0.5$ derive more utility from defense than clean air; for simplicity of exposition, these individuals are referred to as conservative. Individuals with $\alpha^i > 0.5$ derive more utility from clean air than defense, and they are referred to as liberal. Therefore, higher values of α represent a more conservative attitude in this setting. The TA model also assumes that the government is endowed with one unit of output each period, namely $\tau_t = 1$ for all t.

Inviduals elect a government by majority rule; the government in power at t decides on the provision of g and f at time t. Since individuals' preferences are single peaked over the provision of public goods, a group decision by majority rule adopts the median's preferred policy. Even though individual preferences remain stable over time, the identity of the median voter may change from period to period.[1]

Proposition 1 summarizes the predictions of the TA model; a formal appendix (Appendix TA), available on the web [2] and from the author upon request, derives the results stated in Proposition 1.

[1]Changes in the identity of the median voter may be due to either random shocks to the cost of voting that affect the participation rate, or changes in the eligibility of the voting population, such as enfranchisement of groups, geographical movement of the voting population, or minimum age requirements. See Tabellini and Alesina [13].

[2]The appendix is available at

Proposition 1 *In the TA model: 1) public goods provision follows a political pattern: conservative governments provide the f public good (defense) and liberal governments provide the g public good (clean air); 2) budget deficits are positively related to the incumbent's probability of being voted out of office at the next election, independently of its political orientation. These results hold under the following election systems: fixed-term, fixed-term with vote of no confidence and fixed-term with early election.*

Suppose the incumbent is conservative and, without loss of generality, let $\alpha^i = 0$ or 1, so that conservative individuals get utility only from defense (f good) and liberal individuals only from clean air (g good).[3] Hence, a conservative government only provides f and, vice versa, a liberal government only provides g. If the conservative incumbent is certain to be re-elected, it balances the budget because it is optimal to consume a constant amount of public good over time. On the other hand, if the conservative incumbent anticipates to be voted out with probability p, it runs a budget deficit because the reduction in future public spending, due to higher interest payments, falls with probability p on the good g, which does not provide any utility to the incumbent. The higher the probability of being voted out, the larger the budget deficit. The same logic applies to a liberal incumbent.

In a fixed-term electoral system where elections are held every n periods, changes in the probability of re-election affect the provision of the public good and thereby the budget deficit. If the probability of re-election remains constant over the n periods, public spending is also constant. For example, if p, the probability of the incumbent to be voted out at the next election, is zero over the n periods, the budget is balanced and $f = 1, g = 0$ if the incumbent is a conservative, and $g = 1, f = 0$ if she is a liberal; if $p > 0$, the conservative incumbent spends $f > 1, g = 0$ and runs a budget deficit every period while the liberal incumbent spends $g > 1, f = 0$ and runs a budget deficit every period. In response to an unanticipated increase in p, the incumbent raises the provision of the public good she prefers and thereby the budget deficit. An electoral system where $n > 1$ but the incumbent can fall at any time due to a vote of no confidence is equivalent to a fixed-term electoral system with $n = 1$. In a system where the incumbent can call for early elections, the length of the term is endogenous but budget deficits and the provision of public goods respond to changes in the probability of re-election as in a fixed-term system.

[3]More technically, for $\alpha^i \in (0, 1)$, the necessary condition for the TA results to hold is that the concavity index of $H(x)$ is decreasing in x; this condition is satisfied and the basic result of the model applies when α^i is either 0 or 1.

2.2 The PS model

In the PS model, the government provides only one public good, say g, and $\phi = 1$; the preferences of the $i-$th individual are

$$\sum_{s=0}^{T} \beta^s E_t \left[u(c_{t+s}) + \alpha^i H(g_{t+s}) \right].$$

Individuals are heterogeneous in terms of the utility derived from the amount of the public good provided. Public consumption is financed with lump-sum taxes τ, which can be either positive or negative; a private individual cannot borrow or lend and her budget constraint is

$$c_t = 1 - \tau_t. \tag{4}$$

Individuals with low α^is, the conservatives, derive little utility from g while individuals with high α^is, the liberals, derive high utility from g; the former prefer a smaller government than the latter. Without loss of generality, let $\alpha = \alpha^C$ for the conservatives and $\alpha = \alpha^L$ for the liberals, with $0 < \alpha^C < \alpha^L$.

In this economy, the government at t decides the tax and the public good provided at t. Since the government can borrow and lend from abroad, the temporal profile of taxation and public consumption need not coincide. The government is chosen under majority rule via elections. Since policy preferences are single peaked, individuals choose the government most preferred by the median voter. As in the TA model, the median voter identity can change exogenously over time.

The results of the PS model are summarized in Proposition 2.[4] A formal appendix (Appendix PS), available on the web[5] and upon request from the author derives the results stated in Proposition 2.

Proposition 2 *In the PS model: 1) a conservative incumbent runs budget deficits that are positively related to her probability of being voted out of office; 2) a liberal incumbent runs budget surpluses that are positively related to her probability of being voted out of office. These results hold under the following election systems: fixed-term, fixed-term with vote of no confidence and fixed-term with early election.*

If the conservative incumbent is certain to remain in power, she balances the budget and chooses the tax so that the ratio of marginal utility from private and public consumption is equal to α^C. This is not the optimal policy if she is uncertain to be re-elected. If the incumbent has probability $p > 0$ of being voted out at the next election but still balances the budget, public good consumption is low in the current

[4] As in the TA model, cooperative equilibria supported by trigger strategies are not considered here.

[5] The appendix is available at

term but, with probability $p > 0$, will be high next term and vice versa for private consumption. To smooth consumption over time, the conservative incumbent lowers the current tax and raises current public spending (with respect to the case where $p = 1$) and runs a budget deficit. The higher the probability p of being voted out of office and the higher the degree of polarization of the political system, $\alpha^L - \alpha^C$, the larger the budget deficit. On the other hand, a liberal incumbent that anticipates to be voted out with probability $p > 0$ runs a budget surplus by raising taxes and reducing public consumption (with respect to the case where $p = 1$).

The case of a fixed-term electoral system with elections held every n periods and the case of early elections generalize as in the TA model.

3 Empirical tests of the strategic models

3.1 United States

This section looks for empirical evidence in support of TA and PS models using quarterly U.S. data for the period 1960:1 to 1995:3.

An empirical test of TA and PS models requires data on the incumbent's expectation to be re-elected, which is not observable. I use opinion polls as a proxy for it. The *Presidential Trial Heats* published in the *Gallup's Polls* are a sequence of opinion polls conducted in the United States by the same politically independent agency since the early 1940s. A presidential trial heat is an opinion poll based on the following question: "If the presidential elections were held today, which of the following candidates would you vote for?" The question is followed by a list with a Republican candidate, a Democratic candidate, and sometimes an Independent candidate; the candidates are usually the most likely presidential candidates for their parties. Interviewed individuals can choose among the listed candidates or be undecided.

The *Gallup Polls'* record in predicting election results has been mixed. The Gallup Final Survey has been fairly accurate, with an average absolute deviation between the survey and election results for both presidential and parliamentary elections since 1940 of 2.1 percentage points, with a maximum of 5.7 in the 1992 presidential election. Within-the-term surveys have been less accurate in predicting election results, but this may reflect changes in voters' sentiment toward the candidates between elections. Opinion polls are not fully accurate in predicting the result of an election, but they are the best available proxy for it. Figure 1 plots the opinion poll data, namely the percentage of interviewed individuals in favor of the incumbent;[6] each term of office is separated by vertical lines and the name and party affiliation of each elected president

[6]In the empirical tests, I use the probability of being voted out that is calculated as 1 minus the percentage of individuals in favor of the incumbent.

are specified. Presidential elections are held at fixed interval of four years in the United States and, since a U.S. president serves for at most two consecutive terms, the incumbent's probability to be reelected is defined here as the probability that a candidate with the incumbent's party affiliation will be elected.

I use seasonally unadjusted quarterly data. Seasonal adjustment is not necessary because the data does not contain a strong seasonal component. Opinion polls measure with error the true probability that the incumbent will remain in office. I assume that the measurement error has zero mean and is uncorrelated with both the true probability of being reelected and the error in the regression equation. Appendix A gives exact definitions and sources of the data.

Recent empirical work[7] has found evidence of a political cycle, i.e. of regularities linking aggregate economic fluctuations and elections, in democracies with a two-party system or with two clearly distinguishable coalitions. For example, U.S. economic growth is relatively high following the election of a Democrat as president, whereas growth decelerates after a Republican victory. Alesina [1] argues that electoral uncertainty coupled with nominal wage contracts concluded prior to elections produce real changes in macroeconomic conditions; Garfinkel and Glazer [7] argue that electoral uncertainty is not necessary to explain the political cycle, which can be simply generated by temporal agglomeration. There is also evidence (see Fair [6] and Alesina et al. [2], just to mention a few) that presidential elections are strongly influenced by the economic conditions prior to the elections. The regressions below take these links into account by treating opinion polls, economic and electoral outcomes as jointly *endogenous.* The variables used in the regressions are described in table 1.

Preliminary statistical analysis of the data shows that the series SURPLUS is highly persistent and the null that the series is integrated of order one is not rejected. We know that the lack of rejection of the null does not necessarily imply that the series has a unit root because it is hard to differentiate between many near unit root processes. Also, 144 quarters, i.e. 36 years, of data may not be a sample large enough to conclude that a series is integrated of order one; in fact, Trehan and Walsh [14] used U.S. annual observations for the period 1890 to 1986 and rejected the hypothesis of unit root for the deficit inclusive of interest. The notion that the budget surplus to GDP ratio is non-stationary is also unappealing from the economic point of view for at least two reasons: first, the government's budget is not balanced in present value term if the deficit inclusive of interest is non-stationary,[8] which implies that public debt will eventually be repudiated and therefore people may not want to hold it today; second, fiscal policy is likely to be used to curb the growth of public debt and prevent it to reach unsustainable levels.

[7]See Alesina et al. [2], for example.

[8]See Trehan and Walsh [14].

Given the statistical properties of the series under consideration and given what economic theory suggests, should levels or first-differences be used to test the strategic models? The predictions of these models can be tested both with level and with first-differenced data; working in levels makes the economic interpretation easier; working with differences gives results that cannot be interpreted for long-run behavior, but are correct and insightful to analyze short-run behavior. For these reasons, three sets of regressions are estimated: Vector Autoregression (VAR henceforth) and Instrumental variable (IV henceforth) estimation of the structural equation, both with level and first-differenced data, and IV estimation of short-run effects of innovations.

VAR may be regarded as the reduced form of a system of interrelated time series variables. Hence, VAR allows one to estimate the reduced form relationship between budget surpluses, the incumbent's expectation of being voted out of office and macroeconomic control variables. Business cycle fluctuations affect budget surpluses: in an economic expansion, tax revenues are high and income security outlays, such as unemployment benefits and welfare benefits, are low, and vice versa in a recession. Taking the ratio of budget surplus to GDP partially dampens fluctuations as the numerator and the denominator tend to move together over the business cycle. For these reasons, the real GDP growth rate and the unemployment rate are included as regressors in the VAR. Since SURPLUS is total budget surplus,[9] the variable R is also included to capture the interest payment on the stock of existing debt.

The choice of the number of lags to be included in the VAR is constrained in this setting. Many lags are desirable but the sample period must be chosen so that the dependent variable in the regression (the budget surplus) and the incumbent's probability to be voted out of office belong to the same term of office. This explains the fragmented sample reported in table 2 and 3. For example, if 7 lags were included, only eight data points for each term would be available to estimate the parameters. The resulting reduction in the degrees of freedom would be particularly severe for the estimation of the PS model that requires to split the sample in Republican and Democratic terms of office.

Table 2 shows the results of VAR estimation of SURPLUS and DSURPLUS with four lags in the TA model; the $\overline{R}^2$ statistics and Breusch-Godfrey serial correlation LM test with four lags are also reported. VAR specifications with three and five lags, respectively, produce qualitatively similar results to those reported in table 2. For each group of variables,[10] table 2 reports the probability value for the Granger causality test, namely the upper tail area in the distribution of the F-test that the coefficients of the variables in the group are jointly equal to zero. The incumbent's probability of

[9]Data on primary budget surpluses for the period under consideration is not available at quarterly frequency.

[10]The x "group" contains x_{t-1} to x_{t-n}, where n is the largest lag.

being defeated at the next election does not Granger-cause budget surpluses, neither with level nor with differenced data; for the macroeconomic control variables, with the exception of past values of DSURPLUS, the hypothesis that they do not Granger-cause budget surpluses is rejected.

According to the PS model, a conservative incumbent that anticipates her defeat at the next election runs a budget deficit, whereas a democratic incumbent that anticipates her defeat runs a budget surplus. This means that PROB affects SURPLUS, and DPROB affects DSURPLUS, negatively under a Republican incumbent and positively under a Democratic incumbent. To test this prediction, I divide the sample in Republican and Democratic terms of office; then I run a VAR to test the lack of Granger-causality between PROB and SURPLUS with level data, and DPROB and DSURPLUS with differenced data. The results of VAR estimation of SURPLUS and DSURPLUS for Republican and Democratic governments are reported in table 3.

Both SURPLUS and DSURPLUS are forecasted quite accurately under Republican governments; real GDP growth, unemployment and interest payments Granger-cause budget surpluses; however, PROB does not Granger-cause SURPLUS and DPROB does not Granger-cause DSURPLUS. The VAR for Democratic governments is based on a small sample: there are only thirty-nine observations in the regression with differenced data. For this reason, I dropped the variable DR from the regression. SURPLUS is estimated quite well, as indicated by a goodness-of-fit comparable to that of the Republican sample; PROB, as well as UNEMP and R, do not Granger-cause SURPLUS whereas Y and the four lags of SURPLUS Granger-cause the current budget surplus. DSURPLUS is estimated quite poorly, on the other hand. The hypothesis that four lags of DPROB, as well as DUNEMP and DSURPLUS, do not Granger-cause DSURPLUS is not rejected.

To sum up, VAR analysis with U.S. quarterly data over the period 1960:1 to 1995:3 suggests that the incumbent's probability of being voted out of office, as measured by opinion polls, does not affect (i.e. does not Granger-cause) budget deficits.

The second set of regressions is an IV estimation of the structural equation for budget surplus/GDP, both with level and first-differenced data. The advantage of estimating a structural rather than a reduced-form equation is that the coefficients of the regression can be easily interpreted; the disadvantage is that the structural equation must be specified, which requires more knowledge of the model. The structural equations estimated here allow for the current as well as the last four lags of the explanatory variables to affect the current value of SURPLUS and DSURPLUS, respectively. Lags in the probability of being voted out are introduced because fiscal policy may take time to be implemented.

The TA model predicts that PROB and/or its lagged values should be negative and significant. The results of IV estimation for the TA model are presented in table 4. SURPLUS is well estimated and many macroeconomic control variables are signifi-

cant;[11] PROB(-3) is significant at the 10% level, but its coefficient is positive, contrary to the implications of the model that predicts a negative overall effect of PROB (and its lags) on SURPLUS. The Pseudo F-test at the bottom of the table is the p-value of the test that the coefficients of PROB to PROB(-4) are all equal to zero; this hypothesis cannot rejected and therefore current and lagged values of PROB do not significantly affect SURPLUS. DSURPLUS is also estimated quite well; changes in current and past opinion polls, however, do not enter significantly in the regression.

The PS model predicts that PROB (and its lagged values) should affect SURPLUS negatively under a Republican government and positively under a Democratic government. Table 5 reports the IV estimations for the PS model. The coefficient of SURPLUS(-1) is positive and close to one for the Democratic sample, as a consequence of the strong autoregressive nature of budget deficits. The likelihood that the incumbent will be voted out, PROB and its four lags, do not significantly affect SURPLUS when considered separately or jointly, as shown by the Pseudo F-tests; this is true both for Republican and Democratic Presidents. Table 6 shows the IV estimation of the PS model with first-differenced data. DPROB and its four lags do not enter significantly in the regression for the Republican governments and the hypothesis that all the coefficients of DPROB and its lags are jointly equal to zero cannot be rejected. For the Democratic sample, there is some evidence that an increase in the probability that the incumbent President will be defeated at the next election raises budget surpluses: the coefficient of DPROB(-1) is positive and significant at the 10% level (and the coefficient of DPROB(-4) is positive but significant only at the 12% level); however, the hypothesis that all coefficients of DPROB and its lags are jointly equal to zero cannot be rejected.

At last, I test for the existence of contemporaneous causality from the incumbent's expectation of being voted out of office to the budget surplus. More precisely, I test whether innovations in PROB have a short-run effect on SURPLUS. I do not assume that changes in budget surpluses and innovations in the probability of being voted out of office are linked by a long-run relationship; I am only interested in testing the existence of a short-run relationship between innovations in PROB and DSURPLUS. I define an innovation in a variable as the difference between the current value of the variable and its average over the last three quarters. The innovation in variable X is labeled DXM. IV must be used because the regressors and the disturbance in the estimated equation are likely to be correlated. Once again, the TA model predicts a negative coefficient for DPROBM, and the PS model predicts a negative coefficient in the Republican sample and a positive coefficient in the Democratic sample.

Table 7 and table 8 summarize the results for the TA and the PS model, respec-

[11]Since the residuals are serially correlated, the regression also contains an AR(4) term that has not been reported to avoid cluttering.

tively. There is little contemporaneous causality in the data from the incumbent's likelihood of not being re-elected to budget surpluses: innovations in PROB do not significantly affect DSURPLUS in either model. Innovations in unemployment and in the lagged budget surplus/GDP are statistically significant: a 1% unemployment innovation reduces the budget surplus to GDP ratio by almost 1% with respect to the previous quarter, whereas a 1% innovation in the lagged budget surplus/GDP reduces the current budget surplus/GDP by 0.3% with respect to last quarter. GDP growth innovations are statistically insignificant in all three regressions. Since the PS-Democratic regression is based on a small sample, the innovation in the debt term, DRM, has been dropped; nevertheless, the regression is poorly estimated.

In summary, empirical tests of the hypothesis that the incumbent's probability of re-election matters for the budget surplus are largely negative with U.S. quarterly data.

To check if these results are robust, I consider some alternative specifications. So far, I have equated the party in power with the President, ignoring the role of Congress. This assumption seems warranted when President and Congress belong to the same party, but may fail to do so under a divided government - i.e. when President and (the majority of) Congress belong to different parties. Using U.S. states data, Alt and Lowry [3] show that divided governments raise revenues following an unexpected deficit less than unified governments, which may lead to larger deficits. In what follows, I test the TA and PS model controlling for divided governments.

Over the period 1960 to 1995, U.S. Congress has been controlled by the Democratic Party except for the year 1995; this implies that all Republican presidencies were divided governments and almost all Democratic presidencies were unified governments. Hence, I can control for divided governments when testing the TA model and the PS model-Democratic presidencies.[12] I run again the three sets of regressions for the TA and PS-Democratic governments model both including a dummy for divided governments[13] or interacting the probability of defeat at the next election with a unified government dummy,[14] which is supposed to capture the effect of opinion polls under unified governments. In all regressions, the probability of being voted out at the next election, by itself or interacted with the unified government dummy, remains insignificant.

Table 9 presents the VAR estimations in levels for the TA and PS models; the left panel includes the divided government dummy (DIVID) and the hypothesis that opinion polls and the divided government dummy do not Granger-cause budget deficits

[12]For the PS model-Republican presidencies, it is not possible to control for divided governments. However, casual time-series comparison over the period 1960-96 shows that the largest budget deficits, even after adjusting for the business cycle, have been run under Republican presidencies. The budget deficits under the Reagan presidency of the early 1980s is an example.

[13]The dummy is equal to one with divided governments and zero otherwise.

[14]The unified-government dummy is defined as 1 minus the divided-government dummy.

is never rejected; the right panel includes the opinion polls interacted with the unified government dummy (UNIFIED), which does not Granger-cause budget deficits. In the VAR with differenced data, not reported here, the opinion poll variable DPROB, by itself or interacted with DUNIFIED, does not Granger-cause changes in budget deficits.

Table 10 reports the IV estimation of the structural budget equation with level and differenced data and the IV estimation of short-run effects of innovations when controlling for divided governments. To avoid cluttering, the estimated coefficients and $t-$ statistics of the macroeconomic variables are not reported here; however, they are similar to those in tables 4, 5, 6, 7 and 8. In the TA model, DIVID should enter positively because Congress tries to undo the deficits chosen by the President; PROB and its lags should enter negatively, as before; the inverse is true for the PS model-Democratic presidencies. The inclusion of the divided government dummy leaves the opinion polls insignificantly different from zero in the TA model and actually reduces their explanatory power in the PS model-Democratic governments, especially when we compare it to the result of table 6, which was the only instance so far where DPROB entered a regression significantly and with the sign predicted by the theory. When I control for divided governments via the DIVID dummy, none of the opinion poll variables is significantly different from zero at the 10% level; controlling by interacting PROB with UNIFIED (and DPROB with DUNIFIED) does not qualitatively affect the results.

How can we reconcile this result with that on U.S. states by Alt and Lowry [3] and with the recent struggle to enact a Presidential line-item veto? Almost all U.S. states operate under some kind of balanced budget requirement but the federal government does not; moreover, Alt and Lowry [3] study revenues and expenditures, not deficits. In fact, Bohn and Inman [4] look directly for and find no evidence that divided governments or party labels have a significant effect on deficit behaviors in U.S. states over a similar sample period.

Since a number of empirical studies[15] have shown that there is a relationship between Presidential election outcomes and the state of the economy, one may worry that the inclusion of macroeconomic control variables may explain poll results and drive them out of the surplus regression. This may be a serious problem if the opinion polls data is noisier than the economic data. To check if this is the case, I estimated a naive VAR using only opinion polls as regressors: if opinion polls explain budget deficits, as argued in the strategic models, they should Granger-cause budget deficits. The results are presented in Table 11: opinion polls do not Granger-cause budget deficits, either with level or with first-differenced data, even if all the macroeconomic control variables are omitted from the regression.

If fiscal decisions are taken once a year, quarterly data may introduce sampling

[15]See, for example, Fair [6].

errrors. To control for this problem, I test the theories using annual data over the period 1960-1996; Appendix B presents the results. There is some evidence that the probability of being voted out Granger-causes budget deficits in the VAR for the PS model, Democratic presidencies; however, in the IV estimation of the structural budget equation, the probability of defeat at the next election enters significantly but negatively, while the theory predicts a positive sign. In the other tests, PROB and DPROB are not significantly different from zero.

3.2 OECD panel data

This section tests the strategic models with pooled time-series cross-section annual data over the period 1960 to 1992 for the following sixteen OECD countries: the United States, Japan, Germany, France, Italy, the United Kingdom, Canada, Australia, Austria, Belgium, Denmark, Finland, Ireland, the Netherlands, Norway, and Sweden. The data sources are described in Appendix A. These countries have all been democracies over the sample period. Since opinion polls, to be used as proxy for the incumbent's expectation of being voted out of office, are not available for such large set of countries and extended sample period, I run two estimations. The first is a joint estimation of a probit equation on the probability of government change and a budget deficit equation; the second is the estimation of the budget equation with the fitted probabilities replaced by the actual changes of governments.

There is substantial heterogeneity in the political systems of the countries in the sample: the United States, France and Finland are presidential systems whereas the other countries are parliamentary systems. Within the sample period, France and Finland have experienced coalition governments and the United States have experienced divided control of the executive and legislative branch of the government. As for the parliamentary regimes, one-party majority have governed in the United Kingdom, Japan, Ireland and Austria; coalition majority have governed in Belgium and Germany; coalition minority governments have ruled in Italy, Sweden and Denmark.

The political data are election dates, change-of-government dates, the direction of change in government, and the political affiliation of the government compiled from the *Keesing's Contemporary Archives*. A change of government is any change in the executive branch of the government that shifts its political composition;[16] it may be due to a vote of no confidence before the end of the term, a change in the governing coalition in a parliamentary system, or simply follow an electoral vote. Therefore, changes of government and elections may not coincide as the former can take place between elections in some political systems.

[16]A replacement of one or more cabinet members with members of the same political party is not considered as a government change.

Using the political data described earlier, I created an index of the political affiliation of the government $I_{i,t}$, for each country i in each year t; the index ranges from +2 for conservative to -2 for liberal, with minimum step changes of plus or minus 0.5. A change in government is therefore a change in the value of the index I; a change toward the right is an increase in I and a change toward the left is a decrease in I. Japan was eliminated from the sample at the regression stage because it did not experience any relevant government change throughout the period 1960 to 1992.

The first empirical test is the joint estimation of a two-equation system. One is a probit equation for a change in government using the data on actual government changes. Let $POLTA_{i,t} \equiv 1_{TA}(I_{i,t} - I_{i,t-1})$, where 1_{TA} is an indicator function that assumes a value of 1 for any value of its argument different from zero, i.e.

$$POLTA_{i,t} = \begin{cases} 1 & \text{if a change of government occurred in country } i \text{ at time } t \\ 0 & \text{otherwise.} \end{cases}$$

The TA model does not distinguish between a change of government toward the left or the right, as any expected change leads to a budget deficit.

To test the PS model, I need to divide the changes of government according to their direction. Let $POLPSR_{i,t} \equiv 1_{PSR}(I_{i,t} - I_{i,t-1})$, where 1_{PSR} is an indicator function that is equal to 1 for any government change toward the right and 0 otherwise. Similarly, let $POLPSL_{i,t} \equiv 1_{PSL}(I_{i,t} - I_{i,t-1})$, where 1_{PSL} is an indicator function that is equal to 1 for any government change toward the left and 0 otherwise, namely

$$POLPSR_{i,t} = \begin{cases} 1 & \text{if a change of government from right to left occurred in} \\ & \text{country } i \text{ at time } t \\ 0 & \text{otherwise,} \end{cases}$$

$$POLPSL_{i,t} = \begin{cases} 1 & \text{if a change of government from left to right occurred in} \\ & \text{country } i \text{ at time } t \\ 0 & \text{otherwise,} \end{cases}$$

The probability of a change in government in model X=TA,PSR,PSL, is estimated using pooled time-series cross-country data with the following Probit model:

$$\text{Prob}[POLX_{i,t} = 1] = \Phi\left(\sum_i \beta_{1i} C_i + \beta_2 YPC_{i,t} + \beta_3 U_{i,t} + \beta_4 INF_{i,t} + \beta_5 SURPLUS_{i,t} + \beta_6 POLX_{i,t-1}\right) \quad (5)$$

where $\Phi(\cdot)$ is the standard normal cumulative function, βs are parameters and the Cis are the fixed-country effects, with i = us,wg,fr,it,uk,ca,as,au,be,dk,fi,ir,ne,no,sw. The economic control variables in (5) are chosen according to the findings of Fair [6] that changes of governments depend on the current performance of the economy. Fair

[6] looked at Presidential elections in the United States over the period 1889 to 1976 and concluded that economic events, as measured by the growth rate of real GDP per capita and the change in the unemployment rate within the year of the election, affect the presidential election outcome. In (5), other non-economic factors that influence voters' decisions, such as scandals or failures in international relations, are treated as random events that are equally likely to affect left- and right-wing governments. The fitted probabilities will be referred to as FITX, with X=TA, PSR, PSL.

Fixed-country effects capture the heterogeneity of the political systems. Some political systems are characterized by more frequent changes of government than others. A government may fall before the end of its legal term in parliamentary systems because of a vote of no confidence, but it cannot do so in a pure fixed-term electoral system or in a presidential system. To confirm that, notice that there are 14 changes of government in Italy, 3 in France and Australia and 0 in Japan during the period 1960 to 1992. To account for such institutional heterogeneity, I estimate a fixed-effects probit model (under the assumption that government changes are serially independent conditional on the fixed effect); such estimation is feasible with this panel because the number of countries is relatively small with respect to the number of years.[17]

The second equation of the system estimates government budget surpluses including the fitted probabilities from (5) among the regressors. The dependent variable poses problems in terms of its stationarity, as the hypothesis of unit root in SURPLUS cannot be rejected for most countries in the sample. As previously suggested, it is hard to differentiate between many near unit root processes and 32 years of data may not be enough to conclude that a series is non-stationary. For this reason, I estimate a budget equation with level data:

$$SURPLUS_{i,t} = \sum_i \gamma_{1i} C_i + \gamma_2 SURPLUS_{i,t-1} + \gamma_3 Y_{i,t} + \gamma_4 U_{i,t} + \gamma_5 FITX_{i,t} + \gamma_6 U_{i,t-1}, \quad (6)$$

and a budget equation with first-differenced data:

$$DSURPLUS_{i,t} = \delta_1 C + \delta_2 DSURPLUS_{i,t-1} + \delta_3 DYM_{i,t} + \delta_4 DUNEMPM_{i,t} + \delta_5 DFITX_{i,t} \quad (7)$$

where DYM and DUNEMPM are innovation to real GDP growth and unemployment rate, respectively, calculated as the difference between the current value and the average over the last three years, and DFITX is the first difference of FITX, with X=TA, PSR, PSL depending on which model is being tested. Since (7) uses first-differenced data, the fixed-country effects drop out.

The strategic models can be assessed empirically by estimating (6) and testing if γ_5 is consistent with their predictions: $\gamma_5 < 0$ according to the TA model and the PS

[17] Chamberlain [5] and Heckman and Willis [9] have proposed means to estimate qualitative response models when the number of cross-sectional units is large respect to the time-series dimension.

model for changes from right to left, and $\gamma_5 > 0$ for the PS model for changes from left to right. Regression (7) tests for contemporaneous causality between changes in government surplus and changes in the incumbent's probability of reelection; the TA and PSR models predict $\delta_5 < 0$ whereas the PSL model predicts $\delta_5 > 0$.

Equations (5) and (6) are jointly estimated with nonlinear three-stage least squares (NL3SLS).[18] In fact, the regressors in equation (6) are likely to be correlated with the error term: a random event, such as a natural disaster, affects the government surplus directly via increased government spending and indirectly via its effect on the economy. This is true also for the fitted probabilities that depend on economic factors as long as the parameters β_2 to β_5 are significantly different from zero. Therefore, instrumental variables must be used in estimating (6). The advantage of using a joint estimation rather than a two-step procedure is that, under appropriate assumptions, it yields efficient estimators and the standard errors are asymptotically correct.

The results of NL3SLS estimation of equations (5) and (6) for the TA and PS models with fixed effects are presented in table 12; for conciseness, the fixed country effects are not reported and the regression statistics are at the bottom of the table. The results are qualitatively similar across the three estimations. As for the probit estimation, high inflation increases the probability of a change in government whereas high per capita income reduces it; this is consistent with the findings in Fair [6]. A change in government in the previous year lowers the probability of a change in government in the current year; unemployment and government budget surpluses do not significantly affect the likelihood of a government change. The fitted probabilities have correlation coefficients between 0.2 and 0.3 with the actual changes of governments. As for the budget estimation, the fitted probabilities enter negatively but barely explain government budget surpluses: the $p-$values are 0.13 for FITTA, 0.21 for FITPSR, and 0.26 for FITPSL. Real GDP growth raises government budget surpluses and unemployment lowers them, as we would expect.

The estimation of (5) without fixed effects emphasizes the cross-section variation in the data. The results of the joint estimation of (5) and (6) without fixed effects are reported in table 13. Inflation, GDP per capita and previous changes of governments significantly affect the probability of a change of government; in the budget equation, which is estimated quite precisely, the fitted probability is one of the few regressors whose coefficient is not statistically different from zero.

The results of the joint estimation of equations (5) and (7) by NL3SLS are summarized in table 14. The estimation of the budget equation reveals lack of contemporaneous causality from changes in the incumbent's probability of being voted out of power,

[18] An earlier version of the paper used a two-step procedure to estimate the system and calculated asymptotically correct standard errors using the procedure suggested by Murphy and Topel [10]. The estimated coefficients and associated standard errors in the two-step procedures are similar to those obtained here from NL3SLS.

DFITX, to DSURPLUS; on the other hand, unemployment and real GDP growth rate innovations and the lagged change in budget surplus significantly affect DSURPLUS and with the expected signs. Estimation of (5) without fixed effects (not reported here but available from the author) and (7) gives results similar to those in table 14.

Based on pooled OECD annual data over the period 1960-92, the fitted probabilities of government changes are not correlated with budget surpluses.

Using fitted probabilities as proxies for the true probabilities of being voted out of power raises some issues. First, the fitted probabilities are a bad proxy if non-economic factors, which have been treated as random events in this analysis, are important in determining the chances of re-election. Second, the probit estimates may be too noisy and therefore unable to estimate the effects of the true probabilities. To deal with this issue, I estimate the budget equation (6) using actual changes of governments (i.e. the variable POLX) instead of the fitted probabilities; this is equivalent to assume that the incumbent can perfectly forecast the outcome of next-period elections (but cannot forecast two periods ahead.) For the TA model, POLTA enters negatively in the regression, but with a $p-$value of 0.18; for the PS model, changes from right to left, POLPSR enters negatively with a $p-$value of 0.44 and, for changes from left to right, POLPSL enters negatively with a $p-$value of 0.24. Adding the lead of POLX does not affect the results. To control for the inability to forecast more than one period ahead using actual government changes, I create a new variable that is equal to POLX for all countries that do *not* have fixed-term elections; for countries with fixed-term elections, the new variable is set equal to one for the entire term before an actual change of government. While using POLX may lead to underestimation, this newly constructed variable is likely to lead to overestimation, as it assumes that a government anticipates from the very beginning of the term its eventual defeat at the next election. This new variable is still insignificantly different from zero in the IV estimation of the budget equation.

These empirical tests have some limitations. When there are more than two political parties, the incumbent may be replaced either by a more conservative or a more liberal opponent. The predictions of the TA model are still valid, but those of the PS model need not be. For example, if the incumbent faces an equal probability of being replaced a more conservative and a more liberal opponent, it is not clear whether and in which direction the budget will be biased. In testing the PS model, I have used the direction of actual government changes to divide the observations and I have therefore assigned zero probability to changes of government in the opposite direction.

The empirical tests of this section have not corrected for the degree of political cohesion of governments, namely for divided governments in presidential systems or for coalition governments in parliamentary systems. Roubini and Sachs [11] found that the OECD countries characterized by governments with low degree of political cohesion have a bias for larger deficits. The results in Roubini and Sachs are not in contrast

to those obtained here. Government instability, defined as short-lived governments with low degree of political cohesion, does not imply political instability, defined as frequent changes of power between governments with very different preferences; in fact, most parliamentary systems in the OECD have been characterized by high government instability but low political instability. According to Roubini and Sachs [11], it is the former that causes a deficit bias but not the latter. Italy is a striking example: over the period 1960 to 1992, Italy had 35 cabinet changes; of these, only 14 involved a shift (often rather small) in the political composition and were classified as government changes.

4 Indirect evidence for the strategic models

This section looks for indirect evidence in support of the TA and PS models. In fact, these models have implications that can be tested independently of the incumbent's likelihood of being reelected. The TA model predicts that public goods provision should follow a politically dependent path because governments provide relatively more of their preferred public good. In terms of the model presented in section 2.1, conservative governments provide relatively more public defense, g, and liberal governments provide relatively more clean air, f. As a result, government changes should be accompanied by changes in the composition of public spending. The PS model predicts that government budget deficits should be run by conservative governments whereas surpluses should be run by liberal governments. Hence, government budget imbalances have a political color.

I start with the TA model and test whether U.S. federal government outlays on national defense are higher under Republican than under Democratic governments; the data is annual for the period 1942 to 1996. DEFENSE is federal government expenditure on national defense as a % of GDP, WAR is a dummy variable for war years,[19] and POLITICAL is the index of political affiliation of the government, $I_{i,t}$, described in section 3.2, that is equal to +2 under a Republican presidency and -2 under a Democratic presidency. The left panel of table 15 shows the OLS estimation results; the hypothesis that the estimated coefficient of the index of political affiliation is equal to zero cannot be rejected. This suggests that government spending on defense is not higher during Republican terms of office. National defense is highly persistent[20]

[19]It is assumed that neither party is more likely to enter a war. The United States was involved in four conflicts during the period 1942 to 1996: U.S. involvement in World War II (1942-1945) started and ended under Roosevelt (Democratic); the Korean War (1950-1953) started under Truman (Democratic) and ended under Eisenhower (Republican); the Vietnam War (1964-1973) started under Johnson (Democratic) and ended under Nixon (Republican); the Gulf War (1991) started and ended under Bush (Republican).

[20]The hypothesis that DEFENSE is integrated of order one cannot be rejected; in the test with

and higher during wars. If GDP growth is included in the regression, present and/or lagged, POLITICAL remains insignificant, the war dummy loses its power while GDP growth enters positively and significantly.

The right-hand side of table 15 reports the OLS panel estimation with fixed effects for the OECD countries.[21] POLITICAL is not significant in explaining defense outlays, whereas it should have a positive significant coefficient according to the TA model.

Next, I test whether federal government outlays for social security and welfare are higher under liberal governments. Here I am extending the implications of the TA model, as government outlays on social security and welfare are transfers rather than public goods. The left-hand side of table 16 shows the results of IV estimation of SSW, federal government outlays on social security and welfare as a percentage of GDP, for the United States over the period 1946 to 1996; the right-hand side shows the results for the OECD panel over the period 1960 to 1992. The macroeconomic controls enter the regressions as expected: higher GDP growth reduces social welfare spending while higher current unemployment raises it; POLITICAL, the political affiliation of the government, is not significantly different from zero in either data set. Estimation of the OECD panel data without fixed effects leaves POLITICAL insignificant with a $p-$value of 0.43.

At last, I look for evidence that government budget imbalances follow a political pattern, being in deficit under conservative governments and in surplus under liberal governments, as suggested by the PS model. Table 17 presents the results of the estimation with annual data for the United States, 1948 to 1996, in the left panel and the OECD data, 1960 to 1992, in the right panel. If the implications of the PS model are to be confirmed, the coefficient of POLITICAL should be negative because higher values of POLITICAL (more conservative) should be accompanied by lower values of SURPLUS (budget deficits). POLITICAL is not significantly different from zero in either test, bringing no evidence that the budget follows a political pattern. Once again, pooled OECD data estimation without fixed effects does not make the variable POLITICAL significant.

5 Conclusions

This paper tests empirically the models of government budget deficits proposed by Tabellini and Alesina [13] and Persson and Svensson [12]. The model by Tabellini and Alesina implies that public spending follows a political pattern and the incumbent's probability of being voted out of office at the next election is positively correlated to

first-differenced data (results not reported but available from the author), the variable POLITICAL remains statistically not significant.

[21] The fixed-country effects are not reported.

budget deficits. The model by Persson and Svensson implies that government budget imbalances have a political color (conservative governments run deficits and liberal governments run surpluses). Also, the conservative incumbent's probability of being voted out of office at the next election is positively correlated to budget deficits while the liberal incumbent's is positively correlated to budget surpluses.

These implications have been tested using U.S. quarterly data and opinion polls from 1960:1 to 1995:3, U.S. annual data and opinion polls 1960 to 1996 and pooled annual data for sixteen OECD countries over the period 1960 to 1992. The results are negative for the theories. There is no evidence, both in the United States and in the OECD overall, that more conservative governments spend more on defense and more liberal governments spend more on social security and welfare. Government budget imbalances, even after correcting for the business cycle, are not in surplus under liberal governments and in deficit under conservative governments. The indirect evidence fails to support the strategic models.

As for the direct evidence, the probability of being voted out of office, measured by opinion polls, has no significant effect on the government budget surplus. This result emerges both with quarterly and annual U.S. data; in only one case the probability of being voted out of office is statistically significant, but its sign is opposite from what predicted by the theory. The pooled OECD data set allows to test the cross-section and time-series properties of the data; since opinion polls are not available for this sample, I test the strategic models in two ways. First, I jointly estimate a probit equation on the probability of a government change and an equation for the budget surplus that includes the fitted probability; then I test the role of the fitted probabilities in the budget equation. Second, I estimate the budget equation replacing the fitted probabilities with actual government changes. Neither the fitted probabilities of government changes nor the actual changes of governments explain budget surpluses.

This empirical evidence does not necessarily refute the strategic models, but it indicates that fiscal decisions are the outcome of a more complicated political process than assumed by the models of Tabellini and Alesina, and Persson and Svensson. Macroeconomic and other exogenous events not accounted for in the theory also play an important role in explaining budget surpluses and deficits. For example, the deficit bias of the 70s, 80s and part of the 90s, has been replaced by a surplus bias since the late 1990s that is largely explained by a prolonged economic expansion in the United States and by fiscal constraints dictated by participation in the Economic and Monetary Union in Europe. The finding of this paper suggests that, even if political institutions create a bias toward deficits or surpluses, its extent hardly provide a rationale for constitutional limits such as balanced budget requirements.

Appendix

A Data sources

Section 3.1: Data on budget surpluses are from the *Economic Report to the President, 1997*, National Income and Production Account data. Data on GDP, unemployment, gross public debt, interest rate on government bonds, and CPI inflation are from *OECD Main Economic Indicators,* various issues. Opinion polls are from the Presidential Trial Heats of the *Gallup's Polls.*

Section 3.2: Economic data: GDP, unemployment, government budget surpluses, government outstanding debt, CPI inflation, interest rates and the nominal exchange rate are from the *OECD Economic Outlook*; real GDP per capita in constant US$, adjusted to changes in the term of trade is from *The Penn-World Tables 5.6.* All political data were compiled from *Keesing's Contemporary Archives.*

Section 4: United States: Data on federal outlays on national defense, social security and welfare (social insurance plus income insurance), GDP and unemployment are from the *Economic Report to the President, 1997.*
OECD: Data on GDP, government expenditure on national defense, government expenditure on social security and welfare for all the OECD countries, except the United States, is from the *OECD Economic Outlook.*

B U.S. annual data

The annual data is from the *Economic Report of the President* and it covers the period 1960-96; the opinion polls are the average over the year. Since the variable SURPLUS is now the primary, rather than the total, budget surplus as a percentage of GDP, the variables R and DR are dropped from the regressions. Because of the reduction in the number of observations caused by the change in frequency, only Y and DY are used as macroeconomic controls; when the number of observations allow it, the dummy for divided governments is entered as a regressor. To avoid cluttering, only the coefficient and t-statistics for PROB, DPROB and DIVID are reported.

Table 18 describes the VAR regressions with one lag. The hypothesis that PROB does not Granger-cause SURPLUS in the PS model-Democratic presidencies cannot be rejected at the 10% level, which may lend support to part of the PS model; in the other VARs, PROB and DPROB do not Granger-cause SURPLUS and DSURPLUS, respectively. To investigate further the positive result for PS, I estimate by IV the

structural budget equation. The probability of being voted out of office, PROB, enters significantly but with a negative sign in the PS model-Democratic presidencies estimation, while the model predicts a positive sign, as shown in table 19. In the IV regressions with differenced data, not reported here, the variable DPROB is never statistically significant. The results of the IV estimation of short-run effects of innovation are reported in table 20: the macroeconomic controls, DSURPLUSM and DYM, are strongly significant and have the expected sign while DPROBM is never significant.

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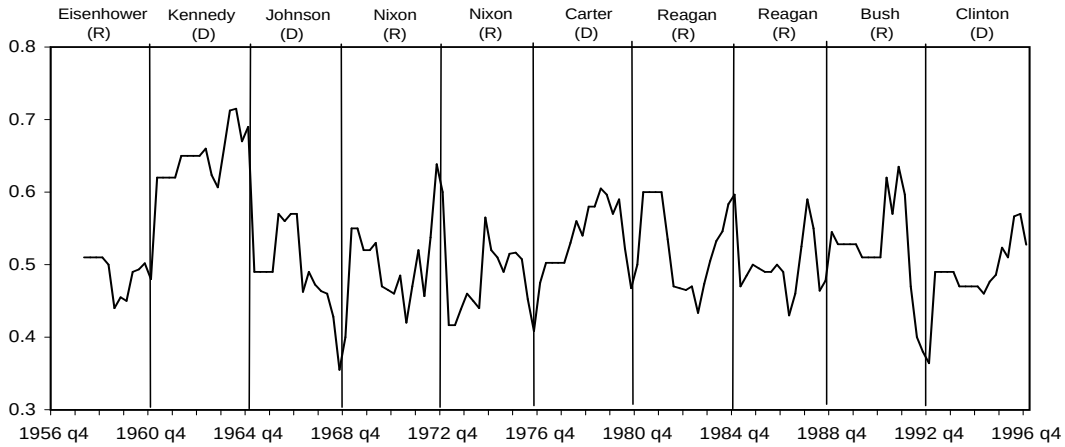

Figure 1: Percentage of interviewed individuals in favor of the incumbent

SURPLUS:	total budget surplus/GDP
DEFENSE:	government expenditure on national defense/GDP
DIVID:	dummy variable for divided governments
DX:	X-X(-1)
INF:	CPI inflation rate
PROB:	probability that the incumbent is voted out at the next election
POLITICAL:	index of political affiliation of the government, ranging from +2 (right-wing) to -2 (left-wing)
R:	real interest rate minus the real GDP growth rate, multiplied by the lagged gross debt/GDP
SSW:	government outlays on social security and welfare/GDP
UNEMP:	unemployment rate
UNIFIED:	dummy variable for unified governments, 1-DIVID
WAR:	dummy variable for war years
Y:	real GDP growth rate
YPC:	real GDP per capita in constant US$ adjusted for changes in terms of trade

Table 1: Variables used in the empirical tests

Dependent variable: SURPLUS		Dependent variable: DSURPLUS	
Lags 1-4		*Lags 1-4*	
Variable	*Granger-causality*	*Variable*	*Granger-causality*
SURPLUS	0.00	DSURPLUS	0.40
Y	0.10	DY	0.01
UNEMP	0.00	DUNEMP	0.00
R	0.03	DR	0.05
PROB	**0.68**	**DPROB**	**0.72**
$\overline{R}^2$=0.86, B-G LM test (4)=0.10		$\overline{R}^2$=0.27, B-G LM test (4)=0.08	
smpl: 62:1-64:4, 66:1-68:4, 70:1-72:4, 74:1-76:4, 78:1-80:4, 82:1-84:4, 86:1-88:4, 90:1-92:4, 94:1-95:3		smpl: 62:2-64:4, 66:2-68:4, 70:2-72:4, 74:2-76:4, 78:2-80:4, 82:2-84:4, 86:2-88:4, 90:2-92:4, 94:2-95:3	

Table 2: Forecasting SURPLUS and DSURPLUS in the TA model

Republican governments			
Dependent variable: SURPLUS		Dependent variable: DSURPLUS	
Lags 1-4		*Lags 1-4*	
Variable	*Granger-causality*	*Variable*	*Granger-causality*
SURPLUS	0.00	DSURPLUS	0.27
Y	0.02	DY	0.01
UNEMP	0.00	DUNEMP	0.00
R	0.06	DR	0.05
PROB	**0.24**	**DPROB**	**0.72**
$\overline{R}^2$=0.85, B-G LM test (4) =0.10		$\overline{R}^2$=0.48, B-G LM test (4)=0.52	
smpl: 70:1-72:4, 74:1-76:4, 82:1-84:4, 86:1-88:4, 90:1-92:4		smpl: 70:2-72:4, 74:2-76:4, 82:2-84:4, 86:2-88:4, 90:2-92:4	
Democratic governments			
Dependent variable: SURPLUS		Dependent variable: DSURPLUS	
Lags 1-4		*Lags 1-4*	
Variable	*Granger-causality*	*Variable*	*Granger-causality*
SURPLUS	0.00	DSURPLUS	0.53
Y	0.10	DY	0.60
UNEMP	0.58	DUNEMP	0.61
R	0.32	DR	
PROB	**0.68**	**DPROB**	**0.31**
$\overline{R}^2$=0.78, B-G LM test (4) =0.63		$\overline{R}^2$=0.03, B-G LM test (4)=0.59	
smpl: 62:1-64:4, 66:1-68:4, 78:1-80:4, 94:1-95:3		smpl: 62:2-64:4, 66:2-68:4, 78:2-80:4, 94:2-95:3	

Table 3: Forecasting SURPLUS and DSURPLUS in the PS model

Dependent variable: SURPLUS			Dependent variable: DSURPLUS		
Variable	*Coefficient*	*t−statistic*	*Variable*	*Coefficient*	*t−statistic*
C	0.709	0.745	C	-0.021	-0.34
SURPLUS(-1)	0.640	5.43	DSURPLUS(-1)	-0.17	-1.43
SURPLUS(-2)	0.040	0.279	DSURPLUS(-2)	-0.169	-1.177
SURPLUS(-3)	-0.041	-0.316	DSURPLUS(-3)	-0.13	-1.020
SURPLUS(-4)	0.076	0.730	DSURPLUS(-4)	0.302	2.120
Y	-0.097	-0.485	DY	-0.22	-1.120
Y(-1)	0.016	0.078	DY(-1)	-0.105	-0.835
Y(-2)	0.061	0.442	DY(-2)	0.114	0.878
Y(-3)	0.246	1.647	DY(-3)	0.183	1.519
Y(-4)	-0.271	-2.614	DY(-4)	0.-0.125	-1.073
UNEMP	-0.797	-1.864	DUNEMP	-1.173	-2.346
UNEMP(-1)	-0.058	-0.092	DUNEMP(-1)	-0.804	-2.037
UNEMP(-2)	1.261	1.963	DUNEMP(-2)	0.674	1.777
UNEMP(-3)	-0.766	2.346	DUNEMP(-3)	-0.507	-1.33
UNEMP(-4)	0.285	-1.568	DUNEMP(-4)	0.921	-2.152
PROB	**-3.801**	**-1.508**	**DPROB**	**-2.171**	**-0.757**
PROB(-1)	**3.983**	**1.557**	**DPROB(-1)**	**0.950**	**0.514**
PROB(-2)	**-2.903**	**-1.285**	**DPROB(-2)**	**-1.587**	**–0.782**
PROB(-3)	**4.043**	**1.832**	**DPROB(-3)**	**0.787**	**0.425**
PROB(-4)	**-2.368**	**-1.447**	**DPROB(-4)**	**-2.264**	**-1.105**
R	-0.209	-0.548	DR	-0.257	-0.770
R(-1)	0.082	0.214	DR(-1)	-0.052	-0.240
R(-2)	0.097	0.392	DR(-2)	0.246	1.113
R(-3)	0.363	1.377	DR(-3)	0.294	1.337
R(-4)	-0.555	-2.806	DR(-4)	-0.282	-1.233
$\overline{R}^2$=0.871, B-G LM test (4): 0.105			$\overline{R}^2$=0.36, B-G LM test (4): 0.04		
Pseudo F-test = 0.437			**Pseudo F-test = 0.63**		
instruments: lags 1-8 of SURPLUS, Y, UNEMP, PROB, R, INF			instruments: lags 1-8 of DSURPLUS, DY, DUNEMP, DPROB, DF, DINF		
smpl: 63:1-64:4,66:1-68:4,70:1-72:4, 74:1-76:4,78:1-80:4,82:1-84:4, 86:1-88:4,89:4-92:4,93:4-96:3			smpl: 63:2-64:4,66:2-68:4,70:2-72:4, 74:2-76:4,78:2-80:4,82:2-84:4, 86:2-88:4,90:2-92:4,94:2-95:3		

Table 4: IV estimation of structural equation for SURPLUS and DSURPLUS in the TA model

Dependent variable: SURPLUS					
Republican governments			Democratic governments		
Variable	*Coefficient*	*t−statistic*	*Variable*	*Coefficient*	*t−statistic*
C	-0.085	-0.051	C	-2.151	-0.804
SURPLUS(-1)	0.497	3.130	SURPLUS(-1)	0.914	3.374
SURPLUS(-2)	0.071	0.337	SURPLUS(-2)	-0.381	-1.073
SURPLUS(-3)	-0.013	-0.087	SURPLUS(-3)	-0.018	-0.051
SURPLUS(-4)	0.258	1.690	SURPLUS(-4)	0.104	0.435
Y	-0.307	-1.883	Y	-0.080	-0.330
Y(-1)	0.130	0.678	Y(-1)	0.171	0.457
Y(-2)	0.251	1.338	Y(-2)	0.285	0.688
Y(-3)	0.194	0.945	Y(-3)	-0.042	-0.100
Y(-4)	-0.423	-3.396	Y(-4)	-0.124	-0.422
UNEMP	-1.378	-2.943	UNEMP	-0.056	-0.096
UNEMP(-1)	0.003	0.003	UNEMP(-1)	0.469	0.664
UNEMP(-2)	2.053	2.656	UNEMP(-2)	-0.399	-0.459
UNEMP(-3)	-1.856	-2.419	UNEMP(-3)	1.139	1.228
UNEMP(-4)	0.986	1.648	UNEMP(-4)	-1.003	-1.123
R	-0.538	-1.821	R	-0.576	-1.306
R(-1)	0.536	1.609	R(-1)	0.442	0.604
R(-2)	0.192	0.627	R(-2)	0.399	0.475
R(-3)	0.474	1.583	R(-3)	-0.278	-0.313
R(-4)	-0.852	-3.577	R(-4)	-0.211	-0.329
PROB	**-2.374**	**-0.854**	**PROB**	**-0.323**	**-0.075**
PROB(-1)	**3.235**	**1.063**	**PROB(-1)**	**2.548**	**0.634**
PROB(-2)	**-1.882**	**-0.666**	**PROB(-2)**	**0.572**	**0.106**
PROB(-3)	**5.392**	**1.967**	**PROB(-3)**	**-5.648**	**-0.958**
PROB(-4)	**-1.659**	**-0.744**	**PROB(-4)**	**3.012**	**0.576**
$\overline{R}^2$=0.861, B-G LM test (4) = 0.58			$\overline{R}^2$=0.81, B-G LM test (4)=0.82		
Pseudo F-test = 0.50			**Pseudo F-test = 0.88**		
smpl: 70:1-72:4,74:1-76:4,82:1-84:4, 86:1-88:4,90:1-92:4			smpl: 63:1-64:4,66:1-68:4,78:1-80:4, 94:1-95:3		
instruments: lags 1-8 of SURPLUS, Y, UNEMP, PROB, R, INF					

Table 5: IV Estimation of SURPLUS in the PS model

Dependent variable: DSURPLUS					
Republican governments			Democratic governments		
Variable	*Coefficient*	*t−statistic*	*Variable*	*Coefficient*	*t−statistic*
C	-0.006	-0.065	C	-0.197	-1.347
DSURPLUS(-1)	-0.186	-0.911	DSURPLUS(-1)	0.315	1.512
DSURPLUS(-2)	-0.224	-1.052	DSURPLUS(-2)	-0.411	-1.468
DSURPLUS(-3)	-0.173	-0.943	DSURPLUS(-3)	-0.208	-1.036
DSURPLUS(-4)	0.119	0.704	DSURPLUS(-4)	0.329	1.636
DY	-0.358	-1.900	DY	-0.277	-1.062
DY(-1)	-0.020	-0.115	DY(-1)	0.133	0.552
DY(-2)	0.284	1.665	DY(-2)	0.146	0.579
DY(-3)	0.308	1.707	DY(-3)	0.168	0.666
DY(-4)	-0.324	-2.089	DY(-4)	-0.466	-1.537
DUNEMP	-1.240	-2.635	DU	-0.744	-1.195
DUNEMP(-1)	-1.249	-1.999	DUNEMP(-1)	0.369	0.794
DUNEMP(-2)	1.667	2.732	DUNEMP(-2)	-0.551	-1.127
DUNEMP(-3)	-1.368	-1.860	DUNEMP(-3)	0.276	0.465
DUNEMP(-4)	0.628	1.052	DUNEMP(-4)	-1.656	-2.368
DR	-0.382	-1.104	DR	-1.173	-2.269
DR(-1)	0.298	0.913	DR(-1)	-0.064	-0.137
DR(-2)	0.335	1.258	DR(-2)	0.072	0.150
DR(-3)	0.605	2.199	DR(-3)	0.047	0.087
DR(-4)	-0.379	-1.289	DR(-4)	-0.883	-1.654
DPROB	**-3.913**	**-1.428**	**DP**	**4.149**	**1.363**
DPROB(-1)	**1.307**	**0.489**	**DPROB(-1)**	**6.050**	**2.044**
DPROB(-2)	**-1.701**	**-0.680**	**DPROB(-2)**	**4.04**	**1.046**
DPROB(-3)	**3.380**	**1.292**	**DPROB(-3)**	**-5.143**	**-1.256**
DPROB(-4)	**-0.796**	**-0.303**	**DPROB(-4)**	**7.608**	**1.759**
$\overline{R}^2$=0.53, B-G LM test (4) = 0.34			$\overline{R}^2$=0.42, B-G LM test (4)=0.20		
Pseudo F-test = 0.59			**Pseudo F-test = 0.128**		
smpl: 70:2-72:4,74:2-76:4,82:2-84:4, 86:2-88:4, 90:2-92:4			smpl: 63:2-64:4, 66:2-68:4, 78:2-80:4, 94:2-95:3		
instruments: lags 1-8 of DSURPLUS, DY, DUNEMP, DPROB, DR, DINF					

Table 6: IV Estimation of DSURPLUS in the PS model

Dependent variable: DSURPLUS		
Variable	*Coefficient*	$t-statistic$
C	-0.026	-0.404
DSURPLUSM(-1)	-0.306	-3.175
DYM	0.058	0.690
DUNEMPM	-0.961	-5.704
DRM	0.141	0.663
DPROBM	**1.780**	**0.909**
$\overline{R}^2$=0.31, B-G LM test (4)=0.155 smpl: 62:1-64:4, 66:1-68:4, 70:1-72:4, 74:1-76:4, 78:1-80:4, 82:1-84:4, 86:1-88:4, 90:1-92:4, 94:1-95:3 instruments: lags 1-4 of DSURPLUSM, DYM, DUNEMPM, DPROBM, DRM, DINFM		

Table 7: IV Estimation of contemporaneous causality in the TA model

Dependent variable: DSURPLUS					
Republican governments			Democratic governments		
Variable	*Coefficient*	$t-statistic$	*Variable*	*Coefficient*	$t-statistic$
C	-0.013	-0.151	C	0.025	0.222
DSURPLUSM(-1)	-0.498	-4.356	DSURPLUSM(-1)	-0.045	-0.324
DYM	0.015	0.174	DYM	0.045	0.612
DUNEMPM	-1.216	-5.777	DUNEMPM	-0.542	-1.607
DRM	0.147	0.658	DRM		
DPROBM	**1.717**	**0.888**	**DPROBM**	**0.511**	**0.172**
$\overline{R}^2$=0.427, B-G LM test (4)=0.231 smpl: 70:1-72:4, 74:1-76:4, 82:1-84:4, 86:1-88:4, 90:1-92:4 instruments: lags 1-4 of DSURPLUSM, DYM, DUNEMPM, DPROBM, DRM DINFM			$\overline{R}^2$=0.092, B-G LM test(4)=0.11 smpl: 62:1-64:4, 66:1-68:4, 78:1-80:4, 94:1-95:3 instruments: lags 1-4 of DSURPLUSM, DYM, DUNEMPM, DPROBM, DRM DINFM		

Table 8: IV Estimation of contemporaneous causality in the PS model

TA model			
Dependent variable: SURPLUS			
Lags 1-4		*Lags 1-4*	
Variable	*Granger-causality*	*Variable*	*Granger-causality*
SURPLUS	0.00	SURPLUS	0.00
Y	0.02	Y	0.09
UNEMP	0.00	UNEMP	0.01
R	0.06	R	0.03
PROB	**0.24**	**PROB*UNIFIED**	**0.99**
DIVID	0.197		
$\overline{R}^2$=0.86, B-G LM test (4) =0.10		$\overline{R}^2$=0.86, B-G LM test (4)=0.11	
smpl: 62:1-64:4, 66:1-68:4, 70:1-72:4, 74:1-76:4, 78:1-80:4, 82:1-84:4, 86:1-88:4, 90:1-92:4, 94:1-95:3			
PS model - Democratic governments			
Dependent variable: SURPLUS			
Lags 1-4		*Lags 1-4*	
Variable	*Granger-causality*	*Variable*	*Granger-causality*
SURPLUS	0.00	SURPLUS	0.00
Y	0.10	Y	0.10
UNEMP	0.62	UNEMP	0.49
R	0.34	R	0.25
PROB	**0.74**	**PROB*UNIFIED**	**0.67**
DIVID	0.92		
$\overline{R}^2$=0.78, B-G LM test (4) =0.63		$\overline{R}^2$=0.78, B-G LM test (4)=0.62	
smpl: 62:1-64:4, 66:1-68:4, 78:1-80:4, 94:1-95:3			

Table 9: Divided governments - VAR estimation

Dependent variable: SURPLUS				
Model	TA		PS - Democratic	
Variable	*Coefficient*	*t−stat*	*Coefficient*	*t−stat*
PROB	**-4.00**	**-1.53**	1.35	**0.35**
PROB(-1)	**4.04**	**1.56**	**1.73**	**0.49**
PROB(-2)	**-2.80**	**-1.23**	**2.52**	**0.52**
PROB(-3)	**4.13**	**1.83**	**-7.08**	**-1.35**
PROB(-4)	**-2.28**	**-1.36**	**-2.32**	**-0.44**
DIVID	-0.04	-0.23	2.21	2.23
	$\overline{R}^2$=0.87, B-G LM test (4) = 0.09		$\overline{R}^2$=0.85, B-G LM test (4)=0.84	
	Pseudo F-test = 0.43		**Pseudo F-test = 0.60**	
instruments: lags 1-8 of SURPLUS, Y, UNEMP, PROB, R, INF, DIVID				

Dependent variable: DSURPLUS				
Variable	*Coefficient*	*t−stat*	*Coefficient*	*t−stat*
DPROB	**-3.30**	**-1.180**	**4.577**	**1.604**
DPROB(-1)	**0.757**	**0.402**	**5.131**	**1.826**
DPROB(-2)	**-2.011**	**-0.988**	**4.984**	**1.370**
DPROB(-3)	**0.643**	**0.340**	**-6.151**	**-1.595**
DPROB(-4)	**-2.054**	**-0.982**	**5.171**	**1.203**
DDIVID	-0.413	-0.577	1.231	1.605
	$\overline{R}^2$=0.34, B-G LM test (4) = 0.21		$\overline{R}^2$=0.50, B-G LM test (4)=0.52	
	Pseudo F-test = 0.54		**Pseudo F-test = 0.13**	
instruments: lags 1-8 of DSURPLUS, DY, DUNEMP, DPROB, DR, DINF				

Dependent variable: DSURPLUS				
Variable	*Coefficient*	*t−stat*	*Coefficient*	*t−stat*
DPROBM	**1.99**	**1.02**	**0.56**	**0.19**
DIVID	0.02	0.13	0.16	0.50
	$\overline{R}^2$=0.28, B-G LM test (4)=0.155		$\overline{R}^2$=0.08, B-G LM test (4)=0.05	
instruments: lags 1-4 of DSURPLUSM, DYM, DUNEMPM, DPROBM, DRM, DINFM, DIVID				
smpl:	63:2-64:4,66:2-68:4,70:2-72:4, 74:1-76:4,78:2-80:4,82:1-84:4, 86:2-88:4,90:2-92:4,94:2-95:3		63:2-64:4,66:2-68:4,78:2-80:4, 94:2-95:3	

Table 10: Divided governments - IV estimation

TA model	
Dependent variable: SURPLUS	Dependent variable: DSURPLUS
Lags 1-4	*Lags 1-4*
Variable *Granger-causality*	*Variable* *Granger-causality*
SURPLUS 0.00	DSURPLUS 0.05
PROB **0.68**	**DPROB** **0.60**
$\overline{R}^2$=0.86, B-G LM test (4)=0.10	$\overline{R}^2$=-0.03, B-G LM test (4)=0.07
smpl: 62:1-64:4, 66:1-68:4, 70:1-72:4, 74:1-76:4, 78:1-80:4, 82:1-84:4, 86:1-88:4, 90:1-92:4, 94:1-95:3	
PS model	
Republican governments	
Dependent variable: SURPLUS	Dependent variable: DSURPLUS
Lags 1-4	*Lags 1-4*
Variable *Granger-causality*	*Variable* *Granger-causality*
SURPLUS 0.00	DSURPLUS 0.00
PROB **0.24**	**DPROB** **0.68**
$\overline{R}^2$=0.85, B-G LM test (4) =0.10	$\overline{R}^2$=-0.02, B-G LM test (4)=0.28
smpl: 70:1-72:4, 74:1-76:4, 82:1-84:4, 86:1-88:4, 90:1-92:4	
Democratic governments	
Dependent variable: SURPLUS	Dependent variable: DSURPLUS
Lags 1-4	*Lags 1-4*
Variable *Granger-causality*	*Variable* *Granger-causality*
SURPLUS 0.00	DSURPLUS 0.45
PROB **0.68**	**DPROB** **0.63**
$\overline{R}^2$=0.78, B-G LM test (4) =0.63	$\overline{R}^2$=-0.04, B-G LM test (4)=0.81
smpl: 62:1-64:4, 66:1-68:4, 78:1-80:4, 94:1-95:3	

Table 11: Forecasting SURPLUS and DSURPLUS using opinion polls only

Model		TA		PS-right to left		PS-left to right	
Variable	*Param*	*Coeff*	*t-stat.*	*Coeff*	*t-stat.*	*Coeff*	*t-stat.*
YPC	β_2	-0.11	-1.73	-0.11	-1.04	-0.11	-0.75
U	β_3	0.05	1.09	-0.02	-0.21	0.04	0.88
INF	β_4	4.09	2.12	2.49	1.24	2.74	1.32
SURPLUS	β_5	0.04	0.08	-0.01	-0.11	0.05	1.05
POLX(-1)	β_6	-0.57	-2.65	-0.27	-1.23	-0.42	-1.64
SURPLUS(-1)	γ_2	0.82	23.80	0.81	19.18	0.84	22.42
Y	γ_3	0.30	3.79	0.31	3.35	0.29	3.61
U	γ_4	-0.62	-3.59	-0.67	-3.43	-0.65	-3.71
FITX	γ_5	**-1.66**	**-1.52**	**-5.17**	**-1.26**	**-2.59**	**-1.12**
UNEMP(-1)	γ_6	0.54	3.39	0.50	2.98	0.56	3.59
Eq. 1: # obs: 427; Eq. 2: # obs: 405 obs with POLTA=1: 87, obs with POLPSR=1: 39, obs with POLPSL=1: 48 Corr(FITTA, POLTA)=0.31, Corr(FITPSR, POLPSR)=0.20, Corr(FITPSL, POLPSL)=0.21 TA: $\overline{R}^2$=0.90; PS-right to left: $\overline{R}^2$=0.91; PS-left to right $\overline{R}^2$=0.90							

Table 12: NL3SLS estimation: levels

Model		TA		PS-right to left		PS-left to right	
Variable	*Param*	*Coeff*	*t-stat.*	*Coeff*	*t-stat.*	*Coeff*	*t-stat.*
YPC	β_2	-0.11	-3.59	-0.008	-2.22	-0.007	-2.23
U	β_3	0.03	1.04	-0.003	-0.08	0.04	1.12
INF	β_4	3.88	2.42	3.14	1.76	2.64	1.47
SURPLUS	β_5	0.003	0.14	-0.01	-0.48	0.02	0.55
POLX(-1)	β_6	-0.44	-2.12	-0.24	-1.01	-0.35	-1.48
SURPLUS(-1)	γ_2	0.92	38.17	0.92	35.97	0.93	37.37
Y	γ_3	0.32	3.56	0.32	3.57	0.31	3.48
U	γ_4	-0.43	-2.31	-0.43	-2.33	-0.645	-2.44
FITX	γ_5	**-0.89**	**-1.01**	**-2.04**	**-1.01**	**-1.37**	**-0.78**
UNEMP(-1)	γ_6	0.42	2.37	0.41	2.28	0.44	2.54
Eq. 1: # obs: 427; Eq. 2: # obs: 405 obs with POLTA=1: 87, obs with POLPSR=1: 39, obs with POLPSL=1: 48 Corr(FITTA, POLTA)=0.31, Corr(FITPSR, POLPSR)=0.20, Corr(FITPSL, POLPSL)=0.21 TA: $\overline{R}^2$=0.90; PS-right to left: $\overline{R}^2$=0.91; PS-left to right $\overline{R}^2$=0.90							

Table 13: NL3SLS estimation without fixed effects: levels

Model		TA		PS-right to left		PS-left to right	
Variable	*Param*	*Coeff*	*t-stat.*	*Coeff*	*t-stat.*	*Coeff*	*t-stat.*
YPC	β_2	-0.001	-1.83	-0.0001	-1.47	-0.004	-0.88
U	β_3	0.05	1.25	0.36	0.64	0.04	0.74
INF	β_4	4.24	2.18	3.54	1.52	2.36	1.08
SURPLUS	β_5	0.04	1.08	0.02	0.3	0.03	0.70
POLX(-1)	β_6	-0.53	-2.25	-0.22	-0.89	-0.39	-1.52
C	δ_1	-0.03	-0.32	-0.02	-0.27	-0.02	-0.27
DSURPLUS(-1)	γ_2	0.1	1.8	0.11	1.96	0.11	1.97
DYM	γ_3	0.31	6.63	0.29	5.24	0.29	5.29
DUNEMPM	γ_4	-0.3	-4.08	-0.29	-3.58	-0.28	-3.5
DFITX	γ_5	**-1.82**	**-0.21**	**-1.52**	**-0.41**	**-0.32**	**-0.19**
Eq. 1: # obs: 427; Eq. 2: # obs: 373 obs with POLTA=1: 76, obs with POLPSR=1: 31, obs with POLPSL=1: 45 Corr(FITTA, POLTA)=0.3, Corr(FITPSR, POLPSR)=0.2, Corr(FITPSL, POLPSL)=0.2 TA: $\overline{R}^2$=0.11; PS-right to left: $\overline{R}^2$=0.12; PS-left to right $\overline{R}^2$=0.13							

Table 14: NL3SLS estimation: first differences

Dependent variable: DEFENSE				
	United States		*OECD panel*	
variable	coefficient	*t*-stat.	coefficient	*t*-stat.
C	1.01	0.89		
DEFENSE(-1)	0.77	10.59	0.84	32.41
WAR	3.86	3.35	-0.04	-0.33
POLITICAL	**-0.47**	**-0.43**	**-0.007**	**-0.34**
	$\overline{R}^2$ = 0.72, # obs: 56 B-G LM test(2)=0.50		$\overline{R}^2$ = 0.94, # obs: 432	

Table 15: OLS estimation of defense outlays: U.S. 1942-96, OECD 1960-92

Dependent variable: SSW				
	United States		OECD panel	
variable	coefficient	t-stat.	coefficient	t-stat.
C	0.68	1.61	1.22	5.93
SSW(-1)	0.74	8.32	0.99	39.59
UNEMP	0.27	2.00	0.25	3.94
Y	-0.19	-2.18	-0.06	-1.29
POLITICAL	**-0.04**	**-0.35**	**0.02**	**0.63**
UNEMP(-1)			-0.3	-5.08
	$\overline{R}^2 = 0.93, \#obs : 32$ B-G LM test(2)=0.88		$\overline{R}^2 = 0.99, \#obs : 427$	
Instruments:	SSW(-1), UNEMP(-1), POLITICAL(-1)		SSW(-1), Y(-1), UNEMP(-1), POLITICAL(-1), UNEMP(-2)	

Table 16: IV estimation of social security and welfare outlays: U.S. 1942-96, OECD 1960-92

Dependent variable: SURPLUS				
	United States		OECD panel	
variable	coefficient	t-stat.	coefficient	t-stat.
C	2.28	1.71		
SURPLUS(-1)	0.44	3.65	0.83	18.31
Y	0.10	0.22	0.72	4.44
UNEMP	-0.67	-3.52	0.001	0.02
POLITICAL	**-0.25**	**-0.34**	**-0.002**	**-0.02**
	$\overline{R}^2 = 0.62, \#obs : 48$ B-G LM test(2)=0.18		$\overline{R}^2 = 0.81, \#obs : 421$	
Instruments:	SSW(-1), UNEMP(-1), POLITICAL(-1)		SSW(-1), Y(-1), UNEMP(-1), POLITICAL(-1)	

Table 17: IV estimation of budget surpluses: U.S. 1948-96, OECD 1960-92