Geys, Benny; Vermeir, Jan

Working Paper

Taxation and presidential approval: separate effects from tax burden and tax structure turbulenceTaxation and presidential approval: separate effects from tax burden and tax structure turbulence

Discussion papers // WZB, Wissenschaftszentrum Berlin für Sozialforschung, Schwerpunkt Märkte und Politik, Abteilung Marktprozesse und Steuerung, No. SP II 2007-09

Provided in cooperation with:
Wissenschaftszentrum Berlin für Sozialforschung (WZB)

Suggested citation: Geys, Benny; Vermeir, Jan (2007) : Taxation and presidential approval: separate effects from tax burden and tax structure turbulence, Discussion papers // WZB, Wissenschaftszentrum Berlin für Sozialforschung, Schwerpunkt Märkte und Politik, Abteilung Marktprozesse und Steuerung, No. SP II 2007-09, http://hdl.handle.net/10419/51099

WISSENSCHAFTSZENTRUM BERLIN
FÜR SOZIALFORSCHUNG

SOCIAL SCIENCE RESEARCH
CENTER BERLIN

Benny Geys *
Jan Vermeir **

Taxation and Presidential Approval: Separate Effects from Tax Burden and Tax Structure Turbulence

* WZB
** Vrije Universiteit Brussel

SP II 2007 – 09

October 2007

ISSN Nr. 0722 – 6748

Research Area
Markets and Politics

Research Unit
Market Processes and Governance

Schwerpunkt
Märkte und Politik

Abteilung
Marktprozesse und Steuerung

Zitierweise/Citation:

Benny Geys and Jan Vermeir, **Taxation and Presidential Approval: Separate Effects from Tax Burden and Tax Structure Turbulence**, Discussion Paper SP II 2007 – 09, Wissenschaftszentrum Berlin, 2007.

Wissenschaftszentrum Berlin für Sozialforschung gGmbH,
Reichpietschufer 50, 10785 Berlin, Germany, Tel. (030) 2 54 91 – 0
Internet: www.wz-berlin.de

ABSTRACT

Taxation and Presidential Approval: Separate Effects from Tax Burden and Tax Structure Turbulence

by Benny Geys and Jan Vermeir

Previous research has established that taxation may entail significant electoral costs to politicians. This literature, however, focuses exclusively on the effect of the tax burden. In this paper, we test the hypothesis that both the *level* of the tax burden and the change in the tax *structure* affect the US president's approval ratings (over the period 1959-2006). Our results support this proposition. Specifically, we find a negative impact from the levels of the tax burden and the deficit as well as from changes in the tax structure on presidential approval ratings.

Keywords: Tax policy, tax structure turbulence, presidential approval ratings, popularity function

ZUSAMMENFASSUNG

Besteuerung und Popularität von Politikern: Gibt es unterscheidbare Wirkungen aufgrund der Steuerlast und aufgrund von Veränderungen der Steuerstruktur?

Bisherige Untersuchungen haben gezeigt, dass Besteuerung mit erheblichen Kosten für Politiker bei Wahlen einhergeht. Die entsprechende Literatur fokussiert allerdings ausschließlich den Effekt der Steuerbelastung. Im vorliegenden Artikel testen wir die Hypothese, dass sowohl das *Niveau* der Steuerbelastung als auch Veränderungen der Steuer*struktur* den Grad der Zustimmung für den US-Präsidenten beeinflussen (im Zeitraum 1959-2006). Die empirischen Ergebnisse stützen diese Behauptung. Es wird gezeigt, dass neben dem Defizit sowohl das Niveau der Steuerbelastung als auch Änderungen in der Steuerstruktur negative Auswirkungen auf den Zustimmungsgrad für den Präsidenten haben.

1. Introduction

Taxation – and, more generally, revenue generation – by the government is necessary for the provision of public goods. Still, although we like to benefit from publicly provided goods, none of us enjoys paying the taxes to finance them. Politicians are also likely to have an ambiguous relation with taxation. They might well support extra revenues as it helps them to achieve their aims (be those providing public goods or rent-seeking), but generally shun the political costs inherently associated with these revenues. The existence of such political costs of taxation has been analysed through vote and popularity functions (VP-functions). This literature generally supports the idea that increases in tax revenues have a negative effect on a politician's popularity and re-election odds (e.g. Niskanen, 1979; Besley and Case, 1995).

While identifying taxation as an important determinant of election outcomes and approval ratings, the literature on VP-functions disregards the possible effects of tax structure reforms. Nonetheless, in his seminal work on the politics of taxation, Rose (1985) argues that the popularity and re-election odds of incumbents are maximised, *ceteris paribus*, under a stable and unchanging tax system (see also Rose and Karran, 1987). The underlying argument is that tax changes have non-negligible fixed costs, irrespective of whether taxes are increased or lowered. These costs arise because the political rewards from those who benefit from tax structure changes are likely to be lower than the electoral punishment by those who lose in the reform. Indeed, individuals generally dislike losses more than they appreciate gains (cfr. the grievance asymmetry, Mueller, 1970). Also, when tax reform takes place the electorate's

attention is drawn to the least popular side of the government, i.e. the (high) tax burden (Peters, 1991).

Ashworth and Heyndels (2002) provide indirect evidence for Rose's (1985) hypothesis that a change in the tax structure has – in itself and irrespective of the direction of the change – a political cost for the incumbent. They show that OECD governments have a tendency not to change tax structures in the year prior to elections. This points to a belief among politicians that changing the tax structure lowers their popularity, which – when elections are imminent – could cost them their position. In the present paper, we provide a more direct test of Rose's (1985) hypothesis and assess whether politicians' apparent reluctance to change the tax structure prior to elections is justified. Specifically, we test the hypothesis that both the *level* of the tax burden and the change in the tax *structure* affect the incumbent US president's approval ratings using a time series of quarterly data covering the period 1959-2006. The prediction is that changes in the tax structure have a political cost even if total tax revenues are unaffected (indicating a fixed cost of tax reform). Our results are consistent with this hypothesis. Hence, politicians' reluctance to change tax structures before elections appears warranted.

The outline of the paper is as follows. In section 2, we discuss the literature on the electoral effects of taxation and bring forward the argument, based on Rose (1985) and Rose and Karran (1987), that there may well be a cost to changes in the tax structure, irrespective of a change in the tax burden associated with this reform. In section 3, we describe the evolution of the federal tax burden and structure in the United States over the period 1959-2006, using data provided by the Bureau of

Economic Analysis. In section 4, we use this information to extend previous work on the electoral cost of taxation by regarding both the burden of taxation and changes in the structure of tax revenues in a popularity function for the US presidents since 1959. Section 5 concludes.

2. The electoral cost of taxation

2.1. A review of the literature

The relation between taxation and incumbent popularity has been the subject of an extensive empirical literature. Three groups of studies can be distinguished depending on the indicator of tax policy used: (a) total tax revenues, (b) revenues from specific taxes and (c) tax rates, tax liability and new taxes. Starting with studies regarding the political cost of total tax revenues, two early analyses by Pomper (1968) and Turrett (1971) cannot uncover a consistent relation between taxation and US governor's election results. Hansen (1999) corroborates this result using gubernatorial popularity ratings. In contrast, Peltzman (1992), Sobel (1998), Lowry *et al*. (1998) and Kelleher and Wolak (2005) do find some evidence of an electoral cost of taxation on US governors. Empirical analyses at higher levels of government are equally ambiguous. Niskanen (1975; 1979), for example, shows that an increase in federal tax revenues significantly depresses the vote for the US presidential candidate of the incumbent party (see also Peltzman, 1992; Cuzán and Bundrick, 1999) while Pissarides (1980) and Geys and Vermeir (2007) confirm this using data on the popularity of the British government and German Chancellor respectively. Hibbs

(2000), however, does not find a significant impact of fiscal variables on US presidential elections. In two more recent studies, Lowry *et al*. (1998) and Sobel (1998) argue that this ambiguity of results may be driven by the fact that the cost of taxation depends on the incumbent party. Republicans are punished for increasing tax revenues and rewarded for lowering them, while the opposite is true for Democrats.[1]

Recognising the heterogeneity of real-world tax systems and differences in the visibility of various taxes, several scholars investigate revenues from specific taxes rather than total tax revenues. Hibbs and Madsen (1981), for example, show that decreases in direct income taxation and increases in transfers have a positive influence on government popularity (see also Happy, 1992; Cusack, 1999; and, for contrasting findings, Peltzman, 1992). More generally, Paldam and Schneider (1980) underscore that Danish voters' response to tax policy differs over various taxes and over time (see also Landon and Ryan, 1997; Stults and Winters, 2005; Johnston *et al*., 2005).

Finally, some authors study the electoral effects of tax policy in a more direct way by relying on changes in tax liability for certain income groups, tax rate adjustments or introductions of new taxes.[2] Case (1994) and Besley and Case (1995), for example, find that an increase in the liability for high-income earners significantly increases the probability of a governor not being re-elected. Eismeier (1979) and Gibson (1994) illustrate that the enactment of a new tax has a significant negative impact on incumbents (see, however, Kone and Winters, 1993). Related, Eismeier (1979), Kone and Winters (1993), Niemi *et al*. (1995) and MacDonald and Sigelman (1999) also

[1] The significance of these effects depends crucially on the presence of unified or divided government. Republican governors only lose votes when they control both branches of the government. In case of divided government at the state level, no significant effect is found.

demonstrate that (more numerous) changes in income and sales tax rates in the US affect the incumbent's popularity rating or vote share.

2.2. Cost of tax structure changes

As mentioned, several authors have looked at the electoral impact of specific taxes rather than the aggregate tax burden. While this implies that tax structure matters, empirical work has thus far failed to explicitly distinguish between the electoral cost of an increase in the (overall) tax burden and that arising from a change in the tax structure. This, however, may be overly restrictive. Indeed, as Rose (1985) and Rose and Karran (1987) argue, tax reform may have important fixed costs irrespective of whether taxes are increased or lowered. The possibility of such effects has, however, been disregarded in previous empirical work. Hence, in this paper we look at the effect of tax structure changes, controlling for the effect of the total tax burden. Indeed, once controlling for the effect of the tax burden, the effect from changes in the tax structure are indicative of the fixed cost of changing the tax legislation.

Why would tax structure changes affect voters' decisions, over and above the effect of the tax burden? Firstly, electoral costs of revenue-neutral changes in tax policies may derive from the attention that is drawn to the tax system. That is, tax changes direct media attention to the tax burden voters are facing (Peters, 1991). As a consequence, changes to the tax system may, even if revenue-neutral, be politically unrewarding as the public is made more aware of the (possibly high) financial cost of public goods provision by the government.

---

[2] Ashworth and Heyndels (2000) investigate the electoral impact of tax policy decisions indirectly by analysing politicians' stated preferences on tax reform, using a survey of Flemish local politicians.

Secondly, Rose and Karran (1987, 14) observe that "politicians will have to pay the costs of defending their proposals to decrease taxes against those who will be hurt by the neutralising increase, and those gaining from tax cuts may not provide compensating electoral benefits". This argument is in line with the observation that people generally dislike losses more than they like gains. In the empirical literature on elections, for example, this concept has been called the grievance asymmetry (Mueller, 1970; Nannestad and Paldam, 1994) and evidence supporting its existence has been found in various settings (e.g. Mueller, 1970; Bloom and Price, 1975; Nannestad and Paldam, 1997). In cognitive psychology, the same characteristic of human behaviour is generally referred to as loss aversion (for a discussion and empirical findings, see Tversky and Kahneman, 1991; McCaffery and Baron, 2004). This loss aversion also drives the specific shape of the value function in 'prospect theory' as proposed by Kahneman and Tversky (1979). Indeed, an important property of their value function is that it is steeper for losses than for gains: an individual's valuation of losses is larger than his valuation of gains of corresponding magnitude. With respect to our setting, loss aversion (or grievance asymmetry) implies that even revenue-neutral tax reforms (i.e. reforms in which tax structure changes create winners and losers, while leaving the overall tax burden unaffected) could have significant political costs.

In a recent analysis of political budget cycles, Ashworth and Heyndels (2002) provide indirect evidence for the hypothesis that tax structure turbulence has – in itself and irrespective of the direction of the change of the overall tax burden – a political cost for the incumbent. Specifically, they consider the year-to-year turbulence in tax

structures using OECD data from the period 1965-1995. The results show that OECD governments have a tendency not to change tax structures in the year prior to elections.[3] This points to a belief among politicians that changing the tax structure impairs their popularity (which could cost them re-election) and provides indirect evidence that such behaviour may have political costs. In the present paper, we provide a more direct test of the hypothesis that a change in the tax structure has – in itself and irrespective of the direction of the change – a political cost for the incumbent, thus assessing whether politicians' apparent reluctance to change the tax structure prior to elections is warranted.[4]

3. Evolution of the US tax burden and tax structure

In Figure 1, we present quarterly data on US federal government revenues (as a share of GDP). The data are seasonally adjusted using the US Census X-12 seasonal adjustment procedure and run from 1959:1 up to 2006:3. They are from the National Income and Product Accounts Tables (NIPA) provided by the Bureau of Economic Analysis.[5] We use NIPA data because these exist on a quarterly basis (as opposed to OECD revenue data) and thus allow us to analyse the impact of tax variables on quarterly presidential approval ratings. The seven lines in the figure display revenues

[3] Relatedly, it has been shown that the introduction of new taxes is significantly less likely in election years (Mikesell, 1978; Berry, 1988; Berry and Berry, 1992; 1994 and Ashworth *et al*., 2006).

[4] One might here draw a parallel with the theory of irreversible investment under uncertainty (cfr. Dixit, 1989; Dixit and Pindyck, 1994; Belke and Goecke, 1999; Rose, 2000) to explain inertia in government behaviour (and thus limited tax structure turbulence) prior to elections. That is, governments can be seen as investors in fiscal policy (which cannot be reversed without incurring additional costs). The outcome of their fiscal projects is a priori uncertain. Some of these projects are profitable in terms of popularity while others are not. Given this uncertainty, there is an incentive for the government to wait with changes in the tax structure (i.e. investing) until the uncertainty has resolved (i.e. after the election) (cfr. Dixit, 1989). Hence, there is an "option value" to waiting. We are grateful to an anonymous referee for pointing this out to us.

[5] The data (NIPA Tables, Table 3.2.) are available from the year 1947, but in their current form they start in 1959.

from the seven main revenue categories distinguished in the NIPA-tables: personal current taxes, excise taxes, customs duties, taxes on Federal Reserve banks, corporate income taxes, taxes from the rest of the world (barely visible in Figure 1 due to their small revenues as a share of GDP) and contributions for government social insurance. These seven categories together make up more than 94% of total revenues in each quarter over the period 1959-2006.

Figure 1

about here

Figure 1 shows that revenues from personal current taxes have been the major source of tax revenues over most of the period, hovering around 8% of GDP. Revenues from corporate income taxes and excise taxation have been growing at (much) slower pace than GDP over the period, thus generating the downward sloping curve in Figure 1 for these two revenue sources. Social insurance contributions as a share of GDP have on the other hand been steadily increasing – though their growth has levelled of since the early 1990's. The three remaining sources of tax revenues have generated only marginal contributions to total tax revenues and have remained relatively stable in relation to GDP over the period. Overall, these various evolutions imply that significant shifts have taken place in the US federal tax structure.

Following Hettich and Winer (1984, 1988) the tax structure can be thought of as the shares of various taxes in total tax revenues. For example, in a situation with *n* taxes, the tax structure can be represented as $(R_{1,t,\ \ldots,}\ R_{n,t})$, where $R_{i,t}$ is the share of tax_i in

the total tax revenue in year *t* (whereby the revenue share of each tax necessarily lies between 0 and 1 and tax shares sum to unity over all taxes). Now, to measure tax structure turbulence – or the change in the tax structure over time – we use the index proposed by Ashworth and Heyndels (2002). This index – based on Hymer and Pashigian's (1962) market share mobility index – is defined as:

$$\Delta R_t = \sum_{i=1}^{n} \left| R_{i,t} - R_{i,t-1} \right|$$

The turbulence index, ΔR_t, takes on values between a minimum of 0 and a maximum of 2. The former is reached when no changes occur in the tax structure from one year to the next such that it is perfectly equal at times *t* and *t-1*. The maximum occurs when all revenues "shift", that is, when all taxes raised in period *t-1* are non-existent in period *t* and vice versa.

We calculate a tax turbulence index for the US based on the NIPA Tables and using the 7 categories of receipts mentioned above (TURB). Figure 2 depicts the data resulting from these calculations. Though we use quarterly data to calculate the turbulence measure used in the analysis later on, in Figure 2 we present the results from calculations using yearly data. This prevents Figure 2 from containing a massive amount of data-points (obscuring a clear reading of the graph) and allows for comparison with similar data based on the OECD accounts (presented in Ashworth and Heyndels, 2002). The level of tax structure turbulence in a given year is depicted on the Y-axis, while time is set on the X-axis. The dots in Figure 2 represent presidential election years.

Figure 2

about here

A first thing of note in Figure 2 is that the average value of tax structure turbulence lies around 0.044. This implies that, on average, about 2.2% of total tax revenues is "shifted" to other tax instruments between consecutive years.[6] Secondly, though the data suggest ample variation in tax structure turbulence over time in the US, year-to-year fluctuations are mostly of minor size. Still, two significant peaks are clearly visible. The first occurs the year after the Economic Recovery Tax Act of 1981 and the second closely follows the Economic Growth and Tax Relief Reconciliation Act of 2001. Interestingly, the Tax Reform Act of 1986 leads to a much weaker increase in tax structure turbulence compared to the previously mentioned major tax reforms. Finally, there is a tendency for tax structure turbulence to decrease in presidential election years. Indeed, 7 of the 11 presidential election years in the sample show a lower level of tax structure turbulence than the year prior to the election (though only three of these represent a local minimum: 1968, 1972 and 2004) while two more have a lower level than the year after the election.[7]

One important final remark needs to be made with respect to our measure of tax structure turbulence. Although, as mentioned above, our measure indicates higher tax

[6] The turbulence measure based on quarterly data has an average value of about 0.023 such that about 1.15% of revenues is "shifted" on a quarterly basis.

[7] Our data thus allow for a less strong conclusion than those using OECD data. Indeed, based on OECD data from 1965-1995, Ashworth and Heyndels (2002, 351) contend that "turbulence appears to be systematically lower in election years". The reason for this difference is that tax revenues are subdivided in somewhat different categories in the NIPA Tables than by the OECD such that shifts

structure turbulence in years with significant changes in the federal tax law (and thus picks up the effect of significant policy changes), it is also likely to be influenced by changes in economic conditions that affect government revenues levels and structures (e.g. growth, inflation and so on). However, under the assumption that voters understand the effect of economic variables on fiscal outcomes "they should penalize incumbents only for that part of any tax change which is unanticipated, given economic changes" (Besley and Case, 1995, 40). In that case, effects from economic factors should be separated from those of discretionary tax policy changes. Obviously, however, this assumption with respect to voters' understanding of economic conditions – and their effects on fiscal outcomes – may not be too credible. We return to this issue in the following section.

4. Empirical Analysis

4.1. Empirical specification

To test whether there is a fixed cost to changing tax policies – irrespective of whether the total tax burden is increased or decreased – we estimate a presidential popularity function for the US over the period 1959:1-2006:3 including both the *level* of the tax burden and the *change* in the tax structure. Specifically, our basic specification is:

$$P_t = a + b_i P_{t-i} + b_3 X_t + b_4 DEF_t + b_5 REV_t + b_6 TURB_t + e_t \qquad \text{with } i = 1, 2$$

between categories in the OECD data may not constitute a shift in the NIPA data, and vice versa. As mentioned, we prefer the use of the NIPA data as these allow for an analysis of quarterly data.

Where P represents US Presidential Popularity, X is a vector of control variables (explained below), DEF refers to the US Federal Government budget deficit (as a % of GDP), REV equals the total tax burden (as a % of GDP) and TURB is our measure of tax structure turbulence.

In line with Baum and Kernell (2001), the dependent variable of our model (P_t) represents a logistic transformation of the US president's popularity level in quarter t: $\ln(APP_t /(100 – APP_t))$, whereby APP is defined as the average Gallup approval rating in that quarter (summary statistics for all variables are provided in Appendix A). We apply this transformation as popularity is bounded between 0 and 100 (and transforming the popularity ratings prevents estimated coefficients to lie outside this allowable interval).

As explanatory variables, our model first of all includes lags of the dependent variable P_{t-i} (with i = 1, 2). The number of lags (i.e. two) used in the final model is thereby chosen such as to avoid problems of autocorrelation (cfr. Veiga and Veiga, 2004). This occurs when two lags of the dependent variable are introduced.[8] X_t is a vector comprising a number of standard control variables (more extensively discussed later on). Central to the analysis, however, are three fiscal variables. DEF_t represents the budget deficit, measured by the difference between current expenditures and current revenues of the US federal government, as a percentage of GDP, in the current quarter. This is included to test the hypothesis that voters are averse to budget deficits (Niskanen, 1979; Peltzman, 1992; Kelleher and Wolak, 2005). As such, we expect $b_4 < 0$. REV_t is a measure for the total tax burden. It is operationalised as the sum of

[8] When including only one lag of the dependent variable, the null hypothesis of no autocorrelation is significantly rejected for all specifications.

current tax receipts and contributions for government social insurance, as a percentage of GDP. In line with findings in previous empirical work, we expect a higher tax burden to lower the president's approval ratings such that $b_5 < 0$. Finally, $TURB_t$ measures the effect of tax structure turbulence on presidential approval ratings. Following the arguments of Rose (1985) and Rose and Karran (1987), we expect this index to have a negative effect on popularity, $b_6 < 0$.[9]

Our vector of control variables, X_t, contains both economic and political controls. As economic variables, we incorporate the real growth rate of GDP, the inflation rate and the unemployment rate in the current quarter. While the former is expected to lead to higher approval ratings, the latter two are expected to lower the president's popularity.

As political variables, we first include a set of administration dummy variables (as is customary in the literature). These assess the existence of any president-specific effects on popularity ratings. Our second political variable assesses the existence of a "honeymoon" effect. This relates to the period of goodwill that a president faces in the first quarters of his presidency (Mueller, 1970). We measure this by including a variable that is 3 in the second quarter of each administration, 2 in the third quarter, 1 in the fourth quarter and 0 in all other quarters (Smyth and Dua, 1989; Fox and Phillips, 2003). Thirdly, we include a dichotomous variable that is 1 in case of divided government, 0 otherwise. In quarters with divided government, it is less clear which party should be held responsible for policy, which might benefit the president's

[9] An anonymous referee indicated that popularity may affect *contemporaneous* economic and fiscal variables (i.c. growth, inflation, unemployment, deficit, revenues), leading to a reverse causality problem. However, although the president may react to low popularity ratings by initiating given policy measures, this is likely to take some time in leading to observable results in economic outcomes. Hence, the *contemporaneous* (causal) effect of popularity on economic and fiscal variables is likely to be weak and unproblematic for the interpretation of our results.

popularity (Nicholson *et al*., 2002). This argument is in line with the "clarity of responsibility" hypothesis suggested by Powell and Whitten (1993).

Then, we account for the effects of wars fought by the US army. We control for the effects of the Vietnam War through a variable measuring the number of US military casualties in the period 1964-1975. Earlier studies show that Vietnam represented a political cost for the US president (Gronke and Newman, 2003). Though war-casualties are bad for presidential popularity, short wars may actually improve his position as voters might adhere to the "united we stand, divided we fall" adagio and be more supportive towards their president. This "rally around the flag" effect then creates a boost to approval ratings (Mueller, 1970). The effect of the first Gulf war is analysed through a dichotomous variable equal to 1 in the quarters 1990:3-1991:1 and 0 otherwise (Nickelsburg and Norpoth, 2000). The second Gulf war is controlled for with a dummy that is 1 in the first two quarters of 2003 (official combat was declared over by President George W. Bush on May 1st).[10] We also control for the rally effect after 9/11. This rally has been remarkably long and slowly decaying compared to previous rallies (Gaines, 2002; Hetherington and Nelson, 2003). Therefore, instead of including a dichotomous variable, we allow for the 9/11 effect by creating a variable that is zero in the quarters prior to 2003:3, and 1/i starting from that quarter (with i = 1, 2, 3, …). In addition, we allow for the effects of scandals involving the president. A dummy to control for the Watergate scandal is 1 in the quarters 1973:2-1974:2, and

[10] We also analysed the effect of the number of US killed and wounded in action in the current Iraq campaign. These data were retrieved from www.icasualties.org and are based on official statistics from the US Department of Defense. Interestingly, however, the number of casualties and wounded soldiers does not appear to have a statistically significant detrimental effect on President Bush' popularity over the period studied (not reported). Most likely, this effect is already taken up in the 9/11 effect. Indeed, removing the slowly decaying 9/11 variable from the estimations leads to a strongly negative impact of Iraq war casualties on approval ratings.

zero otherwise. The effect of the Iran-Contra affair is captured with a dummy equal to 1 in the quarters 1986:4-1987:1, and zero otherwise.[11]

Finally, (unreported) preliminary analyses showed that both approval ratings and tax structure turbulence witness significant seasonal trends when regressing these variables on three dummies for the different quarters of the year. Hence, it is important to include such dummy variables also in our final regression equations. Failing to do this could lead to spurious regression results (whereby seasonal trends in popularity are mistakenly judged to derive from tax structure turbulence). Hence, dummy variables equal to 1 in quarters 1, 2 and 3 (and 0 otherwise) were included in the final regression model.

4.2. Results

As mentioned, we test the model using data on US presidential approval ratings from 1959:3-2006:3.[12] Still, before we turn to the estimation results, it is important to note that unit root tests were performed to assess the stationarity of our variables. Failing to test for this could lead to spurious inferences in time series analyses (Harris, 1995). The results of the unit root tests (given in Table 1) indicate that all variables are stationary, with the exception of unemployment and inflation. As first differences of

[11] Interestingly, a dummy variable controlling for the (failed) impeachment procedure against President Clinton following the Monica Lewinsky affair fails to reach statistical significance and is not retained in the final regression model. This corroborates Zaller's (1998) finding that this affair did not harm Clinton's popularity.

[12] Two outliers were removed before estimation (i.e. second and third quarter of 1975). In these quarters tax structure turbulence was well above 0.10 whereas the average is only 0.023. We do not have an explanation for these outliers. We also drop the first observations of each administration, as we lack lags of the dependent variable for these quarters.

these variables are stationary, we include them in first-differenced form in our regression model.[13]

Table 1

about here

We present two sets of results. In Table 2, we assume that TURB accurately captures tax structure turbulence. Hence, for the time being, we ignore the fact that part of the movement in TURB might derive from changes in economic outcomes and their effect on tax revenues (cfr. supra). We will explore this assumption further later on (see Table 3). Column (1) in Table 2 presents results using simple OLS estimation, presented mainly for reasons of comparison. In the remainder of the table, we instead use 2SLS results to account for the fact that tax structure turbulence is likely to be endogenous (see Ashworth and Heyndels, 2002). Given the difficulty to find appropriate instruments, we thereby follow two different strategies. Column (2) exploits a set of 'economic' instruments which have previously been shown to influence tax structure turbulence in OECD countries (Ashworth and Heyndels, 2002): viz. a dummy variable indicating whether the quarter is in an election year or not and the absolute value of the growth rate, the inflation rate and the unemployment

[13] We perform augmented Dickey-Fuller regressions where the number of lagged first differences was decided by a sequential *general to specific* rule (Hall, 1994; Maddala and Kim, 2004). This amounts to starting with a large number of lags (k_{max}) and to iteratively test the significance of the largest lag until one finds a significant one. Specifically, we follow Schwert (1989) to determine the starting lag length and set k_{max} = the integer part of $[12\ (T/100)^{1/4}]$, with T representing the number of observations. Consequently, we use 13 lags as the point of departure (as T=183). When testing for a unit root in the turbulence and approval variables, we included quarterly dummies to control for seasonal effects (Enders, 2004). This was not necessary for the other economic and fiscal variables as these are seasonally adjusted data. Note also that a HEGY test for seasonal unit roots rejects the null hypothesis of unit root at zero, semi-annual and annual frequency for the approval and turbulence variables (Hylleberg *et al*., 1990) (results available upon request).

rate. Column (3) employs a set of 'econometric' instruments built based on third (and higher) moments, as espoused by Dagenais and Dagenais (1997) and Lewbel (1997).[14] These are by construction highly correlated with the turbulence measure, but are uncorrelated with the dependent variable – making them intrinsically useful instruments (though, unlike the 'economic' instruments, arguably harder to interpret substantively). In each case, we provide the Anderson canonical correlation test and the Sargan test for overidentifying restrictions to attest the appropriateness of the instruments (see bottom rows of Table 2).

Table 2

about here

Before discussing the central – fiscal – variables of the model, we should note that all three economic control variables perform poorly. None of them has a significant effect on approval ratings. Growth and the change in unemployment are highly correlated. When leaving out either of them, the effect of the other has the expected sign and (at least approaches) statistical significance at conventional levels. The political variables also confirm our expectations (and the results of the prior literature). Particularly, we find clear evidence of president-specific effects, a highly significant positive honeymoon effect, lower popularity ratings following the

[14] These instruments involve demeaning the model's explanatory variables. Denoting these demeaned variables as x, the instruments used are a constant, $z_1 = x*x$ and $z_4 = x*x*x - 3x[E(x'x/N)*I_k]$ with * designating the Hadamard element by element matrix multiplication operator (see Dagenais and Dagenais, 1997, 197-198). This choice was dictated by the Monte Carlo simulations of Dagenais and Dagenais (1997) and involve the same terms as suggested by Lewbel (1997). Note that in the construction of these instruments, we exclude the lagged dependent variables as they are likely to be predetermined but not completely exogenous (and, as such, their internal correlation with the dependent variable may cause problems).

Watergate and Iran-Contra affairs and higher ratings in war-time as well as after 9/11 (in line with a "rally around the flag" effect; Mueller, 1970).

Turning our attention to the fiscal variables, the results provide support for the negative impact of budget deficits on presidential popularity. This corroborates the results of – among others – Niskanen (1979), Peltzman (1992) and Kelleher and Wolak (2005) and indicates a desire for sound financial management and an aversion to fiscal deficits in the electorate. Total government revenues as a share of GDP also have the expected negative effect on US presidential popularity. This is in line with the findings of Niskanen (1975; 1979), Peltzman (1992) and Cuzán and Bundrick (1999). We should note at this point that a Wald test shows the coefficients for revenues and deficit to be statistically distinct ($Chi^2(1) > 3.80$ in all cases, $p<0.10$). This result points out that voters dislike taxes slightly more than deferred taxation (through deficit financing). That is, voters appear not to fully recognize that, given the current value of future spending, "a deficit-financed cut in current taxes leads to higher future taxes that have the same present value as the initial cut" (Barro, 1989, 38). Hence, against the basic tenet of the Ricardian Equivalence Theorem (which states that a rearrangement of the timing of taxes has no first-order effect on aggregate demand, and thereby on economic growth), shifting taxes into the future through deficit financing has a small direct positive effect on government popularity.

Importantly, tax structure turbulence has the anticipated negative effect on presidential popularity and this effect is statistically significant in the OLS regression and when using the various sets of instruments. This finding thus is robust over all specifications. This supports the contention that shifts in the tax structure impose a

political cost for the incumbent, even when these changes are revenue-neutral (cfr. Rose, 1985; Rose and Karran, 1987). As a corollary to this finding, we can conclude that politicians' reduction of tax structure turbulence in election years (see Ashworth and Heyndels, 2002) represents a rational response to these costs.[15]

Now we know that there is an independent effect of tax structure turbulence, we might be interested in assessing the *size* of the estimated effects of our fiscal variables. The coefficients in Table 2 are, however, not readily interpretable since the dependent variable has been transformed (see above). Still, we can calculate the *marginal effects* on the untransformed dependent variable as: $(100\ \beta\ exp(\beta x))/(1+exp(\beta x))^2$, where β is the coefficient in Table 2. As x we take the sample mean of the explanatory variable. Using the results in column (3), we find that an increase in revenues (as a percentage of GDP) with one percentage point lowers presidential approval with approximately 0.85 %. An increase in the deficit with one percentage point lowers approval with 2.57 %. Finally, an increase in tax structure turbulence with one standard deviation (0.017) decreases approval with around 1.18 % (using the results in Column (3)). These effects are clearly non-negligible.[16]

---

[15] As the tax structure turbulence index has seven distinct components, it is interesting to see whether all components have the same impact on popularity. Including the revenues from the different types of taxation directly into the VP-function, we find that the strongest negative effects of taxation on popularity derive from social security contributions and excise tax revenues. Given that the major component of the excise program is motor fuel, this suggests that the US public is very sensitive to taxes on its mobility and wage income. Income and corporate taxation also significantly depress presidential popularity. Interestingly, tax revenues from the 'rest of the world' have a small positive effect (which is only significant at the 15% significance level).

[16] The model estimated thus far is essentially a short-term model. To estimate possible long-term effects, we included both the difference (to assess short-term effects) and lags (to assess long-term effects) of our economic and fiscal variables. These additional results (available upon request) indicate that the long- and short-term effects of growth and inflation are roughly similar in size (with growth having a positive and mostly significant effect and inflation an insignificant one). Unemployment appears to have a positive short-term effect and a negative long-term effect (though both are statistically insignificant). Both revenues and the deficit have significant negative long-term effects (while short-term effects are insignificant). Finally, the effect of tax structure turbulence is negative in both short- and long-term perspective, though statistical significance is generally stronger for the short-term coefficient. Hence, tax structure turbulence affects

Up to this point, we have (implicitly) assumed that our tax structure turbulence variable accurately reflects policy initiatives. However, as mentioned before, although TURB indicates higher tax structure turbulence in years with significant changes in the federal tax law (and thus picks up the effect of important policy changes - see section 3), it is likely to be also influenced by changes in economic conditions that affect government revenues (e.g. growth, inflation and so on). The same obviously might also hold for the other two other fiscal variables in the model. The results in Table 2 do not allow a clear conclusion as to whether the observed effect of tax structure turbulence (nor of the revenues and deficit) on presidential popularity is due to the effect of discretionary policy decisions or effects from the economy. Consequently, one might argue that these 'economic' effects should be separated from those of discretionary tax policy changes. While this argument has some theoretical merit, we feel that it is empirically less satisfactory for two reasons. Firstly, it entails the assumption that voters understand the effect of economic variables on fiscal outcomes *and* (are able to) perform regression-based evaluations of politicians to distinguish between both effects. This appears, at best, implausible (for a similar argument, see Besley and Case, 1995, 40). Moreover, voters may simply *want* to punish unfavourable fiscal outcomes independent of their cause (be it the economy or tax reform).

Nevertheless, following Besley and Case (1995), we test whether voters do in reality make a difference between variations in fiscal outcomes caused by discretionary policy decisions from those generated by the economy (a related idea is exploited in

---

presidential popularity, but mainly appears to do so in the short-term (which supports the contention that it is to be avoided when elections are imminent). We are grateful to a referee for suggesting

Bordignon *et al*., 2003; Allers and Elhorst, 2005). Specifically, we estimate three auxiliary regressions with our three fiscal variables as the respective dependent variables and GDP growth, inflation and unemployment as explanatory variables.[17] Importantly, the predicted values of these auxiliary regressions are the fiscal outcomes as they are anticipated given the economic conditions in that quarter (Besley and Case, 1995). The error terms, however, indicate the effect of discretionary policy changes on the three fiscal variables. These effects may be termed 'unanticipated' – reflecting that they are not expected given changes in economic conditions. By including both the predicted values and the errors from these auxiliary regressions in a model explaining US presidential popularity, we would expect that only the latter lead to electoral punishment. The reason is that (rational) voters should not punish incumbents for changes in fiscal outcomes caused by economic forces (as such effects would be 'anticipated'), but should reserve punishment for effects caused by discretionary changes in tax policies. The results are presented in Table 3 (as the results for the control variables mirror those in Table 2, we suppress their results here for space reasons). Column (1) presents results for the baseline model (using all control variables as presented in Table 2), while columns (2) and (3) report on robustness checks in which we excluded unemployment (given its correlation with GDP growth) and the quarterly dummies, respectively, from the model.

Table 3

about here

---

this extension to our model.

[17] In the regression for tax structure turbulence, we use the absolute value of the changes in the three explanatory variables (as variations in any direction are likely to have the same effect on tax structure turbulence, where this is clearly not the case for fiscal revenue and deficit levels). Also, in all first stage regressions, we include a lagged dependent variable to correct for first-order autocorrelation and quarterly dummies to account for seasonal effects.

The findings in Table 3 look somewhat counter-intuitive at first sight. Indeed, we find that presidential popularity is significantly negatively affected by anticipated increases in total tax revenues and deficits, but not by unanticipated increases. On the other hand, approval is significantly negatively affected by unanticipated changes in tax structure turbulence, but not by anticipated changes. Taking these results at face value would imply that voters respond to changes in tax revenues and deficit caused by the economy only (which are changes they should 'anticipate') whereas they only react to tax structure turbulence if it is generated by discretionary policy changes. Still, F-tests – reported at the bottom of Table 3 – indicate that the difference between 'anticipated' and 'unanticipated' effects is statistically significant only for revenues (at the 95% confidence level). Hence, to the limited extent that voters do distinguish between these two sources of variation, it does not appear to lead to consistent reactions (since they appear to react to 'anticipated' revenues and deficits, but to 'unanticipated' turbulence). Interestingly, while Besley and Case (1995, 40) find that voters react to 'unanticipated' changes in income tax liabilities (in line with rational behavior), they nonetheless remain sceptical as to the "plausibility of assuming that voters are doing regression-based evaluations of incumbents in their heads". So are we. Hence, the overall inference to be drawn from these results appears to be that voters do not effectively distinguish between variations in fiscal outcomes caused by the economy or the incumbent's discretionary policy decisions.

5. Conclusion

The literature on VP-functions shows that taxation has an important effect on the popularity and re-election odds of politicians. However, these earlier studies on the electoral cost of taxation have concentrated on the effect of changes in overall tax burden and disregarded potential effects from changes in the tax structure. Still, as argued by Rose (1985) and Rose and Karran (1987), an incumbent's popularity is likely to be maximised, *ceteris paribus*, under a stable and unchanging tax system. The argument builds on the notion that tax changes have (fixed) costs irrespective of whether taxes are increased or lowered. Following this line of argument, in the present paper we have tested the impact of *both* the total tax burden *and* tax structure changes on US presidential popularity.

Our data consist of quarterly approval ratings for the incumbent US president over the period 1959-2004. As a measure for the change in the tax system, we use a tax structure turbulence index similar to the one used by Ashworth and Heyndels (2002). The results indicate that fiscal policy has an important influence on presidential approval ratings. Specifically, we find that approval ratings suffer from both increases in the tax burden and the deficit. In line with the theoretical predictions by Rose (1985) and Rose and Karran (1987), tax structure turbulence has a negative effect on presidential approval. Hence, politicians act rationally in trying to avoid this cost of taxation by minimizing tax structure turbulence when elections are imminent (as found by Ashworth and Heyndels, 2002).

References

Allers, M.A. & Elhorst J.P. (2005), Tax mimicking and yardstick competition among local governments in the Netherlands. *International Tax and Public Finance*, 12(4), 493-513.

Ashworth, J. & Heyndels, B. (2000). Politicians' opinions on tax reform. *Public Choice*, 103, 117-138.

Ashworth, J. & Heyndels, B. (2002). Tax structure turbulence in OECD countries. *Public Choice*, 111, 347-376.

Ashworth, J., Geys, B., & Heyndels, B. (2006). Determinants of tax innovation: The case of environmental taxes in Flemish municipalities. *European Journal of Political Economy*, 22(1), 223-247.

Barro, R.J. (1989). The Ricardian approach to budget deficits. *Journal of Economic Perspectives*, 3(2), 37-54.

Baum, M.A. & Kernell, S. (2001). Economic class and popular support for Franklin Roosevelt in war and peace. *Public Opinion Quarterly*, 65, 198-229.

Belke, A. & Goecke, M. (1999). A Simple Model of Hysteresis in Employment under Exchange Rate Uncertainty. *Scottish Journal of Political Economy*, 46, 260-286.

Berry, F.S. (1988). *Tax policy innovation in the American states*. (Ann Arbor, Michigan: UMI Dissertation Services).

Berry, F.S. & Berry, W.D. (1992). Tax innovation in the States: Capitalizing on political opportunity. *American Journal of Political Science*, 36(3), 715-742.

Berry, F.S. & Berry, W.D. (1994). The politics of tax increases in the States. *American Journal of Political Science*, 38(3), 855-859.

Besley, T. & Case, A. (1995). Incumbent behavior: Vote-seeking, tax-setting and yardstick competition. *American Economic Review*, 85, 25-45.

Bloom, H.S. & Price, H.D. (1975). Voter response to short-run economic conditions: The asymmetric effect of prosperity and recession. *American Political Science Review* 69(4), 1240-1254.

Bordignon, M., Cerniglia, F. & Revelli, F. (2003). In search of yardstick competition: a spatial analysis of Italian municipality property tax setting. *Journal of Urban Economics*, 54, 199-217.

Case, A. (1994). Taxes and the electoral cycle: How sensitive are governors to coming elections? *Business Review*, March/April, 17-26.

Cusack, T.R. (1999). The shaping of popular satisfaction with government and regime performance in Germany. *British Journal of Political Science*, 29, 641-72.

Cuzán, A.G. & Bundrick, C.M. (1999). Fiscal policy as a forecasting factor in Presidential elections. *American Politics Quarterly*, 27(3), 338-353.

Dagenais, M.G. & Dagenais, D.L., (1997). Higher moment estimators for linear regression modes with errors in variables. *Journal of Econometrics*, 76, 193-221.

Dixit, A. (1989). Entry and Exit Decisions under Uncertainty. *Journal of Political Economy*, 97, 620-638.

Dixit, A. & Pindyck, R. (1994). *Investment under uncertainty*. (Princeton: Princeton University Press.)

Eismeier, T.J. (1979). Budgets and ballots: The political consequences of fiscal choice. (In D. Rae & T. Eismeier (Eds.), *Public Policy and Public Choice* (pp. 121-149). Beverly Hills: Sage.)

Enders, W. (2004). *Applied econometric time series (2nd edition)*. (Hoboken, NJ: John Wiley and Sons Ltd.)

Fox, G. & Phillips, E.N. (2003). Interrelationship between presidential approval, presidential votes and macroeconomic performance, 1948-2000. *Journal of Macroeconomics*, 25, 411-424.

Fuller, W.A. (1976). *Introduction to statistical time-series.* (New York: John Wiley and Sons.)

Gaines, B.J. (2002). Where's the rally? Approval and trust of the president, cabinet, congress, and government since September 11. *PS: Political Science and Politics*, 35(3), 531-536.

Geys, B. & Vermeir, J. (2007). The political cost of taxation: New evidence from German popularity ratings. Paper presented at the annual meeting of the Verein für Sozialpolitik, September 2007, München.

Gibson, J.G. (1994). Voter reaction to tax change: the case of the poll tax. *Applied Economics*, 26, 877-884.

Gronke, P. & Newman, B. (2003). FDR to Clinton, Mueller to ?: A field essay on presidential approval. *Political Research Quarterly*, 56(4), 501-512.

Hall, A. (1994). Testing for a unit root in time series with pretest data-based model selection. *Journal of Business and Economic Statistics*, 12, 461-470.

Hansen, S.B. (1999). Life is not fair: Governors' job performance ratings and state economies. *Political Research Quarterly*, 52, 167-188.

Happy, J.R. (1992). The effect of economic and fiscal performance on incumbency voting: The Canadian case. *British Journal of Political Science*, 22, 117-130.

Harris, R.I.D. (1995). *Using cointegration analysis in econometric modelling*. (Harlow: Pearson Education.)

Hausman, J. (1978). Specification tests in econometrics. *Econometrica*, 46(6), 1251-1271.

Hetherington, M.J. & Nelson, M. (2003). Anatomy of a rally effect: George W. Bush and the war on terrorism. *PS: Political Science and Politics*, 36(1), 37-42.

Hettich, W. & Winer, S.L. (1984). A positive model of tax structure. *Journal of Public Economics*, 24, 67-87.

Hettich, W. & Winer, S.L. (1988). Economic and political foundations of tax structure. *American Economic Review*, 78, 701-712.

Hibbs, D.A., Jr. (2000). Bread and peace voting in U.S. presidential elections. *Public Choice*, 104, 149-180.

Hibbs, D.A., Jr. & Madsen, H.J. (1981). The impact of economic performance on electoral support in Sweden, 1967-1978. *Scandinavian Political Studies*, 4, 33-50.

Hylleberg, S., Engle, R., Granger, C. & Yoo, B. (1990). Seasonal integration and cointegration. *Journal of Econometrics*, 44, 215-238.

Hymer, S. & Pashigian, P. (1962). Turnover of firms as a measure of market behaviour. *Review of Economics and Statistics*, 44, 82-87.

Johnston, P., Lynch, F. & Walker, J.G. (2005). Income taxes and elections in Britain, 1950-2001. *Electoral Studies*, 24(3), 393-408.

Kahneman, D. & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47(2), 263-291.

Kelleher, C.A. & Wolak, J. (2005, April). Citizen confidence in State government institutions. (Paper presented at the MPSA National Conference, Chicago).

Kone, S.L. & Winters, R.F. (1993). Taxes and voting: Electoral retribution in the American states. *Journal of Politics*, 55, 22-40.

Landon, S. & Ryan, D.L. (1997). The political costs of taxes and government spending. *Canadian Journal of Economics*, 30, 85-111.

Lewbel, A. (1997). Constructing instruments for regressions with measurement error when no additional data are available, with an application to patents and R&D. *Econometrica*, 65, 1201-1213.

Lowry, R.C., Alt, J.E. & Ferree, K.E. (1998). Fiscal policy outcomes and electoral accountability in American states. *American Political Science Review*, 92, 759-774.

MacDonald, J.A. & Sigelman, L. (1999). Public assessments of gubernatorial performance. A comparative state analysis. *American Politics Quarterly*, 27, 201-215.

Maddala, G.S. & Kim, I.M. (2004). *Unit roots, cointegration and structural change*. (Cambridge: Cambridge University Press.)

McCaffery, E.J. & Baron, J. (2004), Thinking about Tax, *Center for the Study of Law and Politics working paper nr. 33*, California Institute of Technology.

Mikesell, J.L. (1978). Election periods and state tax policy cycles. *Public Choice*, 33, 99-105.

Mueller, J. (1970). Presidential popularity from Truman to Johnson. *American Political Science Review*, 64, 18-34.

Nannestad, P. & Paldam, M. (1994). The VP-function: A survey of the literature on vote and popularity functions after 25 years. *Public Choice*, 79, 213-245.

Nannestad, P. & Paldam, M. (1997). The grievance asymmetry revisited: A micro study of economic voting in Denmark, 1986-92. *European Journal of Political Economy* 13, 81-99.

Nickelsburg, M. & Norpoth, H. (2000). Commander-in-chief or chief economist? The president in the eye of the public. *Electoral Studies*, 19, 313-332.

Nicholson, S.P., Segura, G.M. & Woods, N.D. (2002). Presidential approval and the mixed blessing of divided government. *Journal of Politics*, 64(4), 701-720.

Niemi, R.G., Stanley, H.W. & Vogel, R.J. (1995). State economies and state taxes: Do voters hold governors accountable? *American Journal of Political Science*, 39, 936-957.

Niskanen, W.A. (1975). Bureaucrats and politicians. 1975. *Journal of Law and Economics*, 18, 617-643.

Niskanen, W.A. (1979). Economic and fiscal effects on the popular vote for the president. (In D. Rae & T. Eismeier (Eds.), *Public Policy and Public Choice* (pp. 93-120). Beverly Hills: Sage.)

Paldam, M. & Schneider, F. (1980). The macro-economic aspects of government and opposition popularity in Denmark 1957-78. *Nationalokonomisk Tidsskrift*, 2, 149-170.

Peltzman, S. (1992). Voters as fiscal conservatives. *Quarterly Journal of Economics*, 107, 327-361.

Peters, B.G. (1991). *The politics of taxation*. (Cambridge: Basil Blackwell.)

Pissarides, C.A. (1980). British government popularity and economic performance. *The Economic Journal*, 90, 569-581.

Pomper, G.M. (1968). *Elections in America: Control and influence in American politics.* (New York: Dodd, Mead & Company.)

Powell, G.B. & Whitten, G.D. (1993). A cross-national analysis of economic voting: Taking account of the political context. *American Journal of Political Science*, 37, 391-414.

Rose, R. (1985). Maximizing tax revenue while minimizing political costs. *Journal of Public Policy*, 5, 289-320.

Rose, C. (2000). The I-R Hump: Irreversible Investment under Uncertainty. *Oxford Economic Papers*, 52, 626-636.

Rose, R. & Karran, T. (1987). *Taxation by political inertia*. (London: Allen & Unwin)

Schwert, G.W. (1989). Test for unit roots: A Monte Carlo investigation. *Journal of Business and Economics Statistics*, 7, 147-159.

Smyth, D.J. & Dua, P. (1989). The public's indifference map between inflation and unemployment: Empirical evidence for the Nixon, Ford, Carter and Reagan presidencies. *Public Choice*, 60, 71-85.

Sobel, R.S. (1998). The political costs of tax increases and expenditure reductions: Evidence from state legislative turnover. *Public Choice*, 96, 61-79.

Stults, B.G. & Winters, R.F. (2005). *The political economy of taxes and the vote*. Unpublished Manuscript.

Turett, S. (1971). The vulnerability of American governors, 1900-1969. *Midwest Journal of Political Science*, 15, 108-132.

Tversky, A. & Kahneman, D. (1991). Loss aversion in risk-less choice: A reference-dependent model. *Quarterly Journal of Economics* 106(4), 1039-1061.

Veiga, F.J. & Veiga, L.G. (2004). The determinants of vote intentions in Portugal. *Public Choice*, 118, 341-364.

Zaller, J. (1998). Monica Lewinsky's contribution to political science. *PS: Political Science and Politics*, 31, 182-189.

Figure 1: Revenues for seven revenue sources 1959-2006 (as share of GDP)

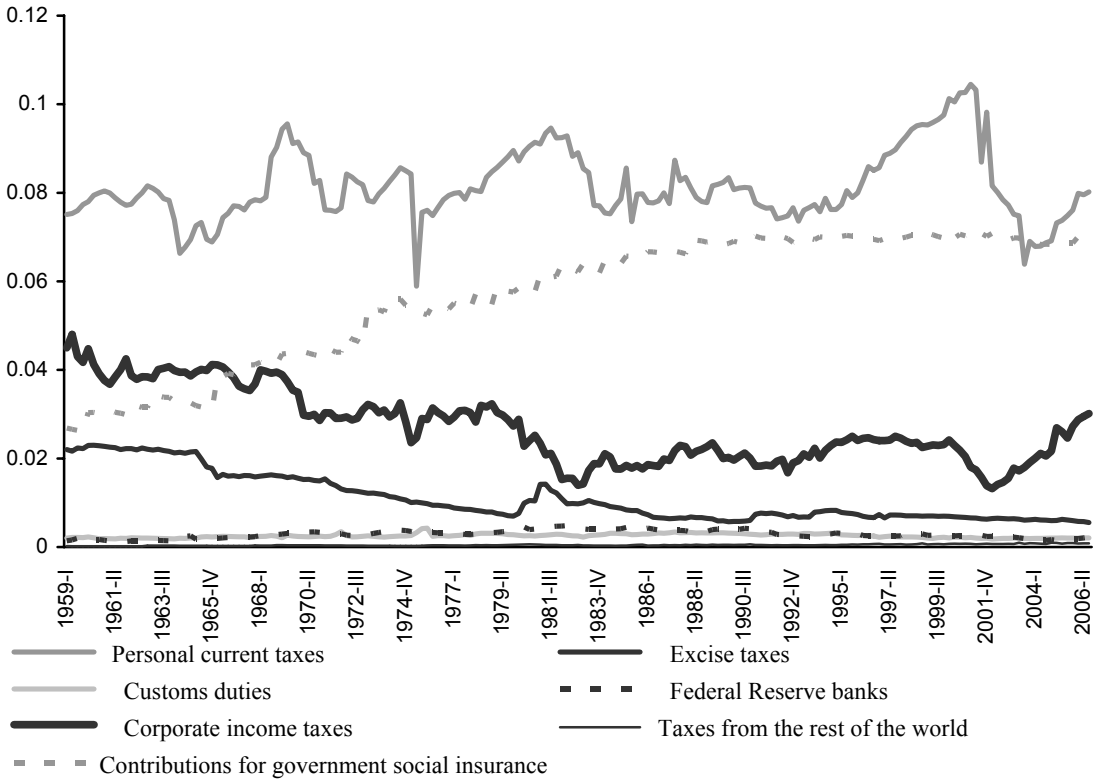

Figure 2: Year-on-year tax structure turbulence (1960-2006)

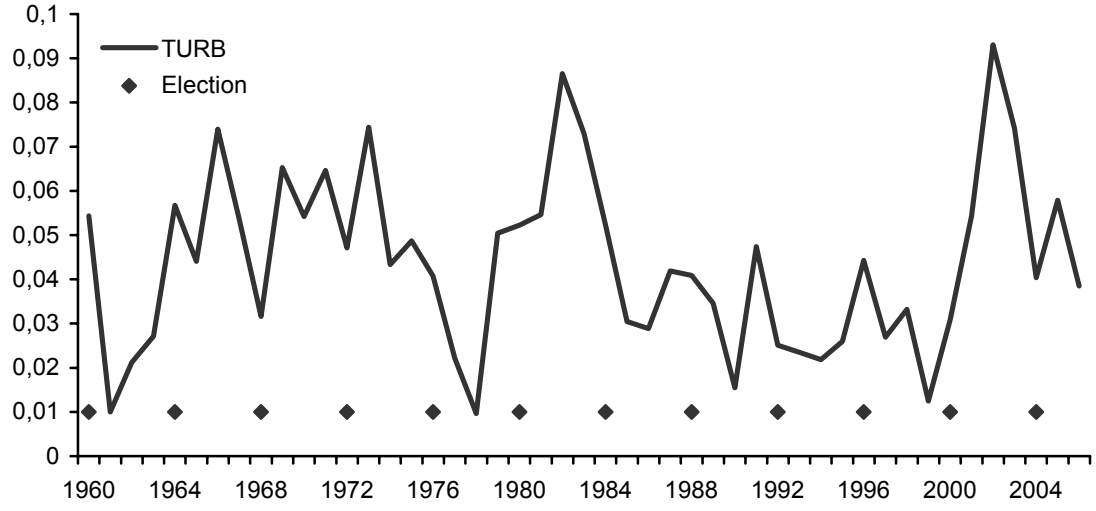

Table 1: Results from unit-root tests (using Augmented Dickey-Fuller tests)

Variable	**# lags**	τ_μ	**Inference**
Presidential Approval	0	-4.34***	Stationary
Presidential Approval (log transformed)	1	-4.41***	Stationary
TURB	12	-5.72***	Stationary
Revenues	4	-3.94*	Stationary
Deficit	2	-2.66*	Stationary
Growth	11	-4.02***	Stationary
Unemployment	12	-1.80	Unit root
Unemployment, first differences	11	-3.86***	Stationary
Inflation	12	-0.44	Unit root
Inflation, first differences	11	-5.75***	Stationary

Note: Critical values $\tau_{\mu,}$ are in Fuller (1976). We use interpolated critical values as provided by Stata. Seasonal dummies were included for the Approval and Turbulence variables.

Table 2: Determinants of US Presidential approval ratings 1959-2006

	(1) OLS	(2) 2SLS	(3) 2SLS
Intercept	2.908 *** (3.54)	3.016 *** (3.37)	2.912 *** (3.54)
Approval (t-1)	0.734 *** (12.73)	0.778 *** (11.40)	0.735 *** (12.71)
Approval (t-2)	-0.150 *** (-2.71)	-0.208 *** (-2.98)	-0.152 *** (-2.73)
Growth	0.004 (0.84)	0.008 (1.38)	0.004 (0.86)
Δ Unemployment	-0.020 (-0.37)	0.030 (0.44)	-0.019 (-0.33)
Δ Inflation	-0.020 (-0.83)	-0.015 (-0.58)	-0.020 (-0.82)
Revenues	-0.155 *** (-3.61)	-0.158 *** (-3.39)	-0.155 *** (-3.61)
Deficit	-0.104 *** (-4.51)	-0.099 *** (-3.93)	-0.104 *** (-4.50)
TURB	-2.558 *** (-2.94)	-7.345 ** (-2.38)	-2.715 *** (-2.76)
Honeymoon	0.079 *** (3.24)	0.100 *** (3.39)	0.080 *** (3.26)
Divided Government	0.102 (1.61)	0.110 (1.60)	0.102 (1.62)
Watergate	-0.509 *** (-5.56)	-0.531 *** (-5.29)	-0.510 *** (-5.56)
Iran-Contra	-0.269 ** (-2.42)	-0.302 ** (-2.47)	-0.271 ** (-2.43)
Vietnam	-0.00001 (-0.25)	-0.00003 (-0.12)	0.00001 (0.23)
Gulf I	1.130 *** (6.91)	1.237 *** (6.54)	1.133 *** (6.92)
September 11	1.452 *** (8.09)	1.679 *** (7.01)	1.460 *** (8.07)
Gulf II	0.339 *** (2.95)	0.264 ** (1.98)	0.337 *** (2.92)
Administration dummies [Chi² (9)]	YES 37.16 ***	YES 32.17 ***	YES 37.12 ***
Quarter dummies [Chi² (3)]	YES 10.94 **	YES 11.92 ***	YES 11.05 **
R^2 AR(2) Anderson test Sargan-test	92.24 0.79	89.62 0.05 16.64 *** (4) 2.63 (3)	92.24 0.77 255.58 *** (18) 43.02 (17)

Note: N = 170. Numbers between brackets are t-values. *** significant at 1%; ** at 5% and * at 10%. AR(2) tests for second-order autocorrelation and has a standard-normal distribution. Anderson examines the strength of our instruments and Sargan assesses the null hypothesis that our instruments are valid. Both follow a Chi² distribution with the number of degrees of freedom given between brackets. The instruments in the 2SLS regressions consist of 'economic' variables in Column (2) and are based on Dagenais and Dagenais (1997) in Column (3).

Table 3: Effects of 'anticipated' and 'unanticipated' fiscal outcomes

	(1) full	**(2)** no unemployment	**(3)** no quarter duzmmies
Revenues (anticipated)	-0.218 *** (-4.04)	-0.218 *** (-4.08)	-0.228 *** (-4.20)
Revenues (unanticipated)	-0.040 (-0.57)	-0.040 (-0.57)	-0.043 (-0.59)
Deficit (anticipated)	-0.125 *** (-4.68)	-0.126 *** (-4.70)	-0.132 *** (-4.88)
Deficit (unanticipated)	-0.052 (-0.93)	-0.052 (-0.96)	-0.052 (-0.92)
TURB (anticipated)	-3.653 (-1.27)	-3.651 (-1.30)	-1.310 (-0.86)
TURB (unanticipated)	-2.139 ** (-2.20)	-2.139 ** (-2.22)	-2.105 ** (-2.14)
R^2	89.72	89.80	89. 92
AR(2)	0.65	0.65	-0.05
F_{rev}	5.72 **	5.77 **	6.00 **
F_{def}	1.90	2.01	2.17
F_{turb}	0.27	0.28	0.21

Note: N = 170. Numbers between brackets are t-values. *** significant at 1%; ** at 5% and * at 10%. AR(2) tests for second-order autocorrelation and has a standard-normal distribution. A full set of controls – as in table 2 – were included in column (1), while in columns (2) and (3) we checked whether the results were robust to the exclusion of unemployment and the quarter dummies respectively.

Appendix A: Summary statistics

Table A1: Summary Statistics

Variable	Mean	Standard deviation	Minimum	Maximum
Presidential Approval (untransformed)	54.25	11.54	25.86	87.13
Growth	3.47	3.49	-7.8	16.7
Inflation	4.02	2.79	0.39	14.43
Unemployment	5.84	1.42	3.4	10.67
Revenues	17.95	0.89	16.15	20.64
Deficit	1.26	2.12	-3.04	5.47
TURB	0.023	0.017	0.003	0.092
Honeymoon	0.19	0.608	0	4
Divided Government	0.63	0.48	0	1
Watergate	0.03	0.17	0	1
Iran-Contra	0.01	0.11	0	1
Vietnam	291.84	853.92	0	5447
Gulf I	0.01	0.08	0	1
September 11	0.02	0.09	0	1
Gulf II	0.01	0.11	0	1

Appendix B: Data description

Table B1 : Data sources and description

Variable Name	Definition	Source
Approval Rating	Average of GALLUP ratings in quarter (interpolated when missing), logit–transformed: ln (approval/(100-approval)).	www.ropercenter.uconn.edu
Growth	Percent change from preceding period in real Gross Domestic Product, seasonally adjusted at annual rates.	National Income and Product Accounts Tables, Bureau of Economic Analysis
Unemployment	Unemployment rate, in percentage, average over quarter, seasonally adjusted.	US Bureau of Labor Statistics
Inflation	Percentage change in CPI (average over quarter, seasonally adjusted at annual rates).	CPI from US Bureau of Labor Statistics
Revenues	Sum of Current tax receipts and Contributions for government social insurance (billions of dollars, seasonally adjusted at annual rates), as percentage of Gross Domestic Product (billions of dollars, seasonally adjusted at annual rates).	Own calculations based on data from National Income and Product Accounts Tables, Table 3.2., Bureau of Economic Analysis
Deficit	Minus Net Federal Government saving (billions of dollars, seasonally adjusted at annual rates), as percentage of Gross Domestic Product (billions of dollars, seasonally adjusted at annual rates).	Own calculations based on data from National Income and Product Accounts Tables, Table 3.2., Bureau of Economic Analysis
TURB	See text.	Own calculations based on data from National Income and Product Accounts Tables, Table 3.2., Bureau of Economic Analysis
Honeymoon	Value 3 in second quarter of a presidency, 2 in third quarter, 1 in fourth quarter, 0 in all other quarters.	
Divided Government	Dichotomous variable coded 1 when majority party in House or Senate is different from party of the incumbent president, 0 otherwise.	www.house.gov; www.senate.gov; www.whitehouse.gov
Watergate	Dichotomous variable coded 1 in quarters 1973:2-1974:2, 0 otherwise.	
Iran-Contra	Dichotomous variable coded 1 in quarters 1986:4-1987:1, 0 otherwise.	
Vietnam	Number of casualties in quarter (Military personnel who died, were missing in action or prisoners of war as a result of the Vietnam conflict).	Records of the Office of the Secretary of Defense; Series: Combat Area Casualties Database
Gulf I	Dichotomous variable coded 1 in quarters 1990:3-1991:1, 0 otherwise.	
September 11	Variable is 1 in 2001:3, and 1/i thereafter (with i = 2, 3, …).	
Gulf II	Dichotomous variable coded 1 in quarters 2003:1-2003:2, 0 otherwise.	