

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

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Abstract Previous research has established that taxation may impose significant electoral costs on 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 1959–2006 period). Our results support this proposition. Specifically, we find a negative impact from the magnitudes 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

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 regard taxes ambiguously. They support extra revenues as it helps them to achieve their aims (be those providing public goods or rent-seeking), but want to avoid their political costs. The existence of such political costs of taxation has been analysed through vote and popularity functions (VP-functions) (e.g., Niskanen 1979; Besley and Case 1995). While identifying

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taxation as a determinant of election outcomes and approval ratings, this literature 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 reelection odds of incumbents are maximized, *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 provided by those who benefit from tax structure changes are likely to be smaller than the electoral punishment meted out by those who lose in the reform. Indeed, individuals generally dislike losses more than they appreciate gains (cf. the grievance asymmetry, Mueller 1970). Also, when tax reform takes place the electorate's attention is drawn to the tax burden, the least popular aspect of government (Peters 1991).

Ashworth and Heyndels (2002) provided 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 showed that OECD governments have a tendency not to change tax structures 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 from 1959 to 2006. Our results are consistent with the hypothesis that changes in the tax structure have a political cost even if total tax revenues are unaffected (indicating a fixed cost of tax reform). Hence, politicians' reluctance to change tax structures before elections appears warranted.

The outline of the paper is as follows. In Sect. 2, we discuss the literature on the taxation-popularity nexus 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 Sect. 3, we describe the evolution of the federal tax burden and structure in the United States over the 1959–2006 period, using data provided by the Bureau of Economic Analysis. In Sect. 4, we use this information to extend previous work on the electoral cost of taxation by taking into account 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 Turett (1971) could not uncover a consistent relation between taxation and the results of US gubernatorial elections. Hansen (1999) corroborated this finding using gubernatorial popularity ratings. In contrast, Peltzman (1992), Sobel (1998), Lowry et al. (1998) and Kelleher and Wolak (2005) did uncover an electoral cost of taxation on US governors. Empirical analyses at higher levels of government are also inconclusive. Niskanen (1975, 1979), for example, showed that federal tax

revenues significantly affect the vote for the US presidential candidate of the incumbent party (see also Peltzman 1992; Cuzán and Bundrick 1999) and Pissarides (1980) and Geys and Vermeir (2007) confirmed this using data on the popularity of the British and German governments respectively. Hibbs (2000), however, did not find a significant impact of fiscal variables on US presidential elections. Lowry et al. (1998) and Sobel (1998) argued that this ambiguity 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

Recognizing the heterogeneity of real-world tax systems and differences in the visibility of various taxes, several scholars investigated the political consequences of specific tax instruments rather than total tax revenues. Hibbs and Madsen (1981), for example, showed 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) reported that Danish voters' responses to tax policy varies both over time and revenue source (see also Landon and Ryan 1997; Stults and Winters 2005; Johnston et al. 2005).

Finally, some authors studied the electoral effects of tax policy 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, found that an increase in the tax liabilities for high-income earners significantly increases the probability of a governor not being re-elected. Eismeier (1979) and Gibson (1994) showed that the enactment of a new tax has a significant negative impact on incumbents (see, however, Kone and Winters 1993). Relatedly, Eismeier (1979); Kone and Winters (1993); Niemi et al. (1995) and MacDonald and Sigelman (1999) also demonstrated 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 assessed at the electoral impact of specific taxes rather than of the aggregate tax burden. While this implies that tax structure matters, an explicit distinction between the electoral cost of an increase in the (overall) tax burden and that arising from a change in the tax structure has not previously been made. This, however, may be overly restrictive. Indeed, as Rose (1985) and Rose and Karran (1987) argued, tax reform may have important fixed costs irrespective of whether taxes are increased or lowered. Why? Firstly, electoral costs of revenue-neutral changes in tax policies may derive from the attention that is drawn to the tax system. 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 financial cost of public goods provision by the government.

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 neutralizing 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 VP-function literature, this concept has been called the

¹ The significance of these effects depends on the presence of unified or divided government. In particular, no significant effect of taxation is found under divided government.

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

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 behavior is referred to as loss aversion (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). As an individual’s valuation of losses is larger than the valuation of gains of corresponding magnitude, the value function is steeper for losses than for gains. 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 an analysis of political budget cycles, Ashworth and Heyndels (2002) provided 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, analysing year-to-year turbulence in tax structures using OECD data from the 1965–1995 period, their results showed that OECD governments have a tendency not to change tax structures prior to elections.³ This points to a belief among politicians that changing the tax structure impairs their popularity (which could cost them reelection) and provides indirect evidence that such behavior may have political costs. In the present paper, we provide a more direct test of the same hypothesis, 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 Fig. 1, we present quarterly data on US federal government revenues (as a share of GDP) taken from the National Income and Product Accounts Tables (NIPA) provided by the Bureau of Economic Analysis. The data are seasonally adjusted using the US Census X-12 seasonal adjustment procedure and run from 1959:1 up to 2006:3.⁵ We use NIPA data because these are available on a quarterly basis (as opposed to OECD revenue data). The seven lines in the figure display revenues 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 Fig. 1 due to their small revenues as a share of GDP) and contributions for government social insurance. These seven categories together account for more than 94% of total revenues in each quarter over the period 1959–2006.

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

³Relatedly, the introduction of new taxes is often found to be significantly less likely in election years (Mikesell 1978; Berry and Berry 1992, 1994 and Ashworth et al. 2006).

⁴One might here draw a parallel with the theory of irreversible investment under uncertainty (Dixit 1989; Dixit and Pindyck 1994; Belke and Goecke 1999; Rose 2000) to explain inertia in government behavior (and low tax structure turbulence) prior to elections. That is, governments can be seen as investors in fiscal policy (which cannot be reversed costlessly). 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 changing the tax structure (i.e., investing) until the uncertainty has resolved (i.e., after the election) (cf. Dixit 1989). Hence, there is an “option value” to waiting. We are grateful to an anonymous referee for pointing this parallel out to us.

⁵The data (NIPA Tables, Table 3.2.) are available as of 1947, but in their current form they start in 1959.

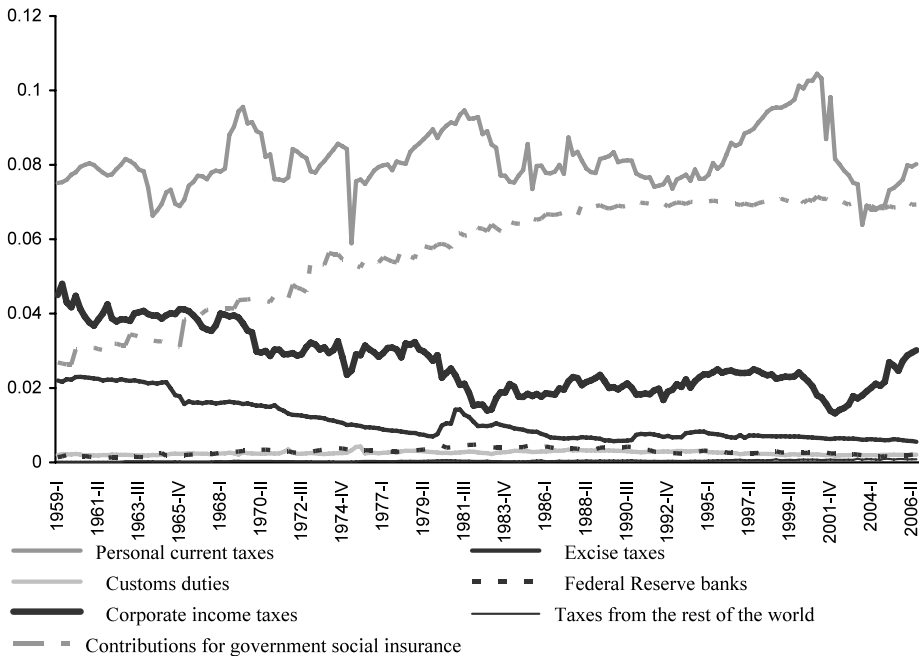


Fig. 1 Revenues for seven revenue sources 1959–2006 (as share of GDP)

income taxes and excise taxation have been growing at a (much) slower pace than GDP, thus generating the downward sloping curve in Fig. 1. Social insurance contributions as a share of GDP have on the other hand been steadily increasing—though their growth has leveled off since the early 1990s. The three remaining sources of tax revenues have made only marginal contributions to total tax revenues and remained relatively stable in relation to GDP over the period analyzed. 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 represented as $(R_{1,t}, \dots, R_{n,t})$, where $R_{i,t}$ is the share of tax i in total tax revenue in year t and n is the number of taxes levied (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 $\Delta R_t = \sum_{i=1}^n |R_{i,t} - R_{i,t-1}|$ and takes on values between 0 and 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 $t - 1$ were not collected in period t and vice versa.

We calculate ΔR_t for the United States based on the NIPA Tables and using the seven categories of receipts mentioned above. Figure 2 depicts the data resulting from these calculations (TURB). Though we use quarterly data to calculate the turbulence measure used in the analysis later on, in Fig. 2 we present the results from calculations using yearly data. This prevents Fig. 2 from containing a massive number 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

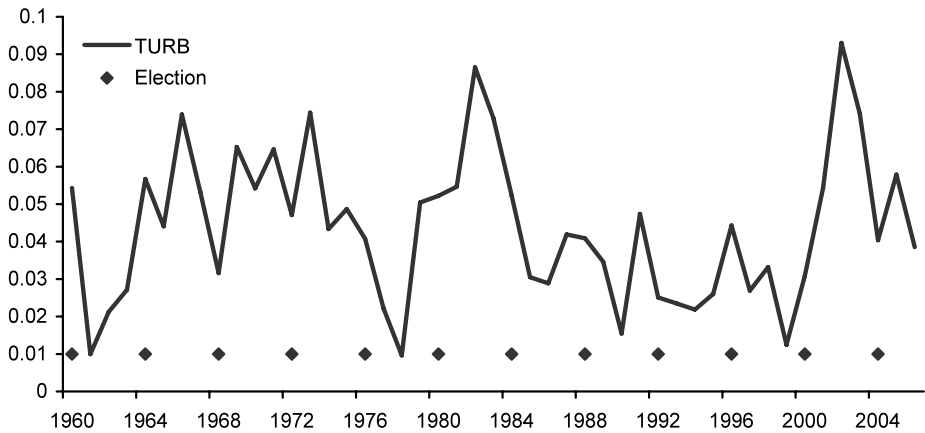


Fig. 2 Year-on-year tax structure turbulence (1960–2006)

a given year is depicted on the *Y*-axis, while time is set on the *X*-axis. The dots in Fig. 2 represent presidential election years.

A first thing of note in Fig. 2 is that the mean 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, year-to-year fluctuations are mostly minor. Still, two significant peaks emerge. 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. Finally, there is a tendency for tax structure turbulence to decrease in presidential election years. Seven 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, it indicates higher tax 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 (e.g., growth, inflation and so on) that affect revenue levels and structures. However, voters “should penalize incumbents only for that part of any tax change which is unanticipated, given economic changes” (Besley and Case 1995, 40). Effects from economic factors should thus be separated from those of discretionary tax policy changes. Obviously, however, the underlying assumption that voters understand the effect of economic conditions on

⁶The turbulence measure based on quarterly data has a mean value of about 0.023 such that about 1.15% of revenues is “shifted” on a quarterly basis.

⁷Our 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) contended 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. Shifts between categories in the OECD data thus 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.

fiscal outcomes—and care about the source of changes in their tax burden—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 United States 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:

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

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 the ratio of the total tax burden to GDP and $TURB$ is our measure of tax structure turbulence (summary statistics for all variables are provided in Table 1). Note that the dependent variable (P_t) represents a logistic transformation of the US president's popularity in quarter t : $\ln(APP_t/(100 - APP_t))$, whereby APP is the average Gallup approval rating in that quarter. We apply this transformation because popularity is bounded between 0 and 100 (and transforming the popularity ratings prevents estimated coefficients from lying outside this interval).

As explanatory variables, we first of all include lags of the dependent variable P_{t-i} (with $i = 1, 2$). The number of lags (i.e., two) was chosen so as to avoid problems of autocorre-

Table 1 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

lation (cf. Veiga and Veiga 2004).⁸ Central to the analysis 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 of the total tax burden and operationalized as the sum of current tax receipts and contributions for social insurance divided by GDP. In line with 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 factors. 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 dummies (as is customary in the literature) to control for president-specific effects on popularity ratings. Secondly, we control for the period of goodwill that a president enjoys in the first quarters of his presidency (a "honeymoon" effect; Mueller 1970; Smyth and Dua 1989) 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. Thirdly, we include a dichotomous variable that is 1 in case of divided government to account for the lower "clarity of responsibility" in quarters with divided government (Powell and Whitten 1993; Nicholson et al. 2002).

Next, we account for the effects of wars fought by the US army. While war casualties are often found to be bad for presidential popularity (e.g., Gronke and Newman 2003), short wars may actually improve his position as voters heed the "united we stand, divided we fall" warning and be more supportive towards their president (a "rally around the flag" effect; Mueller 1970). We control for the effects of the Vietnam War with a variable measuring the number of US military casualties in the period 1964–1975. The effects of both Gulf Wars are measured by two dichotomous variables equal to 1 in the quarters 1990:3–1991:1 (cf. Nickelsburg and Norpoth 2000) and the first two quarters of 2003 respectively (the 2nd Gulf War's combat mission was declared accomplished by President George W. Bush on May 1st of that year).¹⁰ We also control for the patriotic revival after 9/11. This upturn in public opinion has been remarkably longer and slower to decay than previous rallies (Gaines 2002; Hetherington and Nelson 2003). Therefore, instead of including a dichotomous variable,

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

⁹An anonymous referee indicated that popularity may affect *contemporaneous* economic and fiscal variables (i.e., growth, inflation, unemployment, deficit, revenues), leading to a reverse causality problem. However, although the president may react to low popularity ratings by initiating certain policy measures, this is likely to take some time in leading to observable results in terms of 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.

¹⁰Using data from www.icasualties.org (which are based on official statistics from the US Department of Defense), we also analysed the effect of the number of US killed and wounded in action in the current Iraq campaign. This, surprisingly, appears not to have a statistically significant detrimental effect on President Bush' popularity (not reported). Most likely, however, this effect is already taken up in the slowly decaying 9/11 effect. Indeed, removing the 9/11 variable leads to a strongly negative impact of Iraq war casualties on approval.

we create a variable that is zero in the quarters prior to 2003:3, and $1/i$ starting from that quarter (with $i = 1, 2, 3, \dots$). In addition, we control 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 zero otherwise. 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 approval ratings and tax structure turbulence both exhibit significant seasonal trends. Hence, it is important to introduce a set of dummy variables equal to 1 in quarters 1, 2 and 3 (and 0 otherwise) to avoid spurious regression results (whereby seasonal trends in popularity are mistakenly judged to derive from tax structure turbulence).

4.2 Results

As stated, we test the model using data on US presidential approval ratings from 1959:3 to 2006:3.¹² Before turning to the results, we should note that unit root tests were performed to assess the stationarity of our variables. The results of these tests indicate that all variables are stationary (see Table 2), with the exception of unemployment and inflation. As first differences of these variables are stationary, we include them in that form.¹³

We present two sets of results. In Table 3, we assume that TURB accurately captures tax structure turbulence and ignore, for the time being, the fact that part of its variation might derive from the effect of economic outcomes on tax revenues (we explore this assumption further later on, see Table 4). Column (1) in Table 3 shows results using OLS, presented mainly for reasons of comparison. In the remainder of the table, however, we use 2SLS to account for the likely endogeneity of tax structure turbulence (Ashworth and Heyndels 2002). Given the difficulty of finding appropriate instruments, we follow two different strategies. Column (2) exploits a set of ‘economic’ instruments which have been shown to influence tax structure turbulence in OECD countries (Ashworth and Heyndels 2002), viz., a dummy variable equal to 1 in election years and the absolute value of the growth rate, the inflation rate and the unemployment rate. Column (3) employs a set of ‘econometric’ instruments based on third (and higher) moments, as espoused by Dagenais and Dagenais

¹¹ Interestingly, a dummy variable controlling for the (failed) impeachment procedure against President Clinton following the Lewinsky affair fails to reach statistical significance (and is not retained in the final 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. Inclusion of these outliers leaves the general inference unaffected (but weakens the statistical significance of the tax structure turbulence effect). We also drop the first observations of each administration, as we lack lags of the dependent variable for these quarters.

¹³ We perform augmented Dickey-Fuller tests 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) in setting $k_{\max}$ equal to 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 quarterly, semi-annual and annual frequency for the approval and turbulence variables (Hylleberg et al. 1990) (results available upon request).

Table 2 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 τ_{μ} , are in Fuller (1976). We use interpolated critical values as provided by Stata. Seasonal dummies were included for the Approval and Turbulence variables

(1997) and Lewbel (1997).¹⁴ These are by construction highly correlated with the turbulence measure, but uncorrelated with the dependent variable—making them intrinsically useful instruments (though arguably harder to interpret than the ‘economic’ instruments). In each case, we provide the Anderson canonical correlation test and the Sargan test for over-identifying restrictions to support the appropriateness of our instruments (see bottom rows of Table 3).

Before discussing the central—fiscal—variables, we note that none of the economic control variables has a significant effect on approval ratings. Growth and the change in unemployment are, however, highly correlated. When either of them is omitted, the effect of the other has the expected sign and (at least approaches) significance at conventional levels. The political control variables confirm the results of the prior literature: i.e., strong president-specific effects, a significant and positive honeymoon effect, lower popularity ratings following the Watergate and Iran-Contra affairs and higher ratings in wartime as well as after 9/11 (in line with a “rally around the flag” effect; Mueller 1970).

Turning to the fiscal variables, the results indicate a 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 revenue as a share of GDP also has the expected negative effect (in line with Niskanen 1975, 1979; Peltzman 1992 and Cuzán and Bundrick 1999). Interestingly, 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 suggests that voters dislike current 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

¹⁴These 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 (Dagenais and Dagenais 1997). 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 these are likely to be predetermined but not completely exogenous (and, as such, their correlation with the dependent variable may cause problems).

Table 3 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 [$\chi^2(9)$]	YES 37.16***	YES 32.17***	YES 37.12***

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.

Table 3 (continued)

	(1) OLS	(2) 2SLS	(3) 2SLS
Quarter dummies	YES	YES	YES
$[\chi^2(3)]$	10.94**	11.92***	11.05**
R^2	92.24	89.62	92.24
AR(2)	0.79	0.05	0.77
Anderson test		16.64*** (4)	255.58*** (18)
Sargan-test		2.63 (3)	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 χ^2 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)

Importantly, tax structure turbulence has the anticipated negative effect on presidential popularity. This effect is statistically significant in the OLS regression as well as when using the various sets of instruments and supports the contention that shifts in the tax structure impose a political cost for the incumbent, even when these changes are revenue-neutral (cf. Rose 1985; Rose and Karran 1987). Politicians' reduction of tax structure turbulence in election years (see Ashworth and Heyndels 2002) thus represents a rational response to these costs.¹⁵ To assess the *size* of the estimated effects, we calculate the *marginal effects* on the untransformed dependent variable as: $(100\beta \exp(\beta x))/(1 + \exp(\beta x))^2$, where β is the estimated coefficient in Table 3. As x we take the sample mean of the explanatory variable. Using the results in column (3), we find that a one percentage point increase in tax revenues (as a percentage of GDP) lowers presidential approval by approximately 0.85%. An increase in the deficit by one percentage point lowers approval by 2.57%. Finally, an increase in tax structure turbulence by one standard deviation (0.017) decreases approval by around 1.18%.¹⁶

Up to this point, we have (implicitly) assumed that our tax structure turbulence variable accurately reflects policy initiatives. However, as mentioned before, although TURB indi-

¹⁵ As our 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 effects 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 significant at the 15% 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. We are grateful to a referee for suggesting this extension to our model.

cates greater tax structure turbulence in years with significant changes in the federal tax law (and thus picks up the effect of important policy changes—see Sect. 3), it is likely also to be 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. Consequently, one can argue that these ‘economic’ effects should be separated from those of discretionary tax policy changes. While this argument has some theoretical merit, 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 both effects. This appears, at best, implausible (for a similar argument, see Besley and Case 1995, 40). Moreover, voters may simply *want* to punish unfavorable fiscal outcomes independent of their cause (be it the economy or tax reform).

Nevertheless, following Besley and Case (1995), we test whether voters perceive a difference between variations in fiscal outcomes caused by discretionary policy decisions and those generated by the economy. 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 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 indicate the effect of discretionary policy changes and may be termed ‘unanticipated’ (in the sense 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 tax revenues and deficits 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 4 (as the results for the control variables mirror those in Table 3, we suppress their results here for space reasons). Column (1) presents results for the baseline model (using all control variables as presented in Table 3), 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.

The findings in Table 4 appear counterintuitive at first sight. We find that presidential popularity is significantly negatively affected by anticipated increases in total tax revenues and deficits, but not by unanticipated increases. However, approval is significantly negatively affected by unanticipated changes in tax structure turbulence, but not by anticipated changes. While F-tests—reported at the bottom of Table 4—indicate that the difference between ‘anticipated’ and ‘unanticipated’ effects is statistically significant only for revenues (at the 95% confidence level), these findings suggest that both sources of variation do not lead to consistent reactions. 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 skeptical as to the “plausibility of assuming that voters are doing regression-based evaluations of incumbents in their heads”. So are we. Given the inconsistency of the results in Table 4, the overall inference 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.

¹⁷In 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). 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.

Table 4 Effects of ‘anticipated’ and ‘unanticipated’ fiscal outcomes

	(1) full	(2) no unemployment	(3) no quarter dummies
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 3—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

5 Conclusion

The literature on VP-functions shows that taxation at times has an important effect on the popularity and reelection odds of politicians. However, previous studies on the electoral cost of taxation have concentrated on the effect of changes in the 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 maximized, *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 US president over the 1959–2006 period. As a measure of 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 both from 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 an independent 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

- 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.
- 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., & 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.
- 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, 641–672.
- 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 edn.). Hoboken: Wiley.
- Fuller, W. A. (1976). *Introduction to statistical time-series*. New York: Wiley.
- 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, 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.
- 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.
- Hymers, S., & Pashigian, P. (1962). Turnover of firms as a measure of market behavior. *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). *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 No. 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. Eismeyer (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. *Nationaløkonomisk 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, C. (2000). The I-R hump: irreversible investment under uncertainty. *Oxford Economic Papers*, 52, 626–636.
- Rose, R. (1985). Maximizing tax revenue while minimizing political costs. *Journal of Public Policy*, 5, 289–320.
- 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.