UNIVERSITY OF COPENHAGEN

Late Budgets

Andersen, Asger Lau; Lassen, David Dreyer; Nielsen, Lasse Holbøll Westh

Publication date:
2010

Document version
Publisher's PDF, also known as Version of record

Citation for published version (APA):
Andersen, A. L., Lassen, D. D., & Nielsen, L. H. W. (2010). *Late Budgets*. Department of Economics, University of Copenhagen.

Download date: 17. sep.. 2019

EPRU Working Paper Series 2010-04

Economic Policy Research Unit
Department of Economics
University of Copenhagen
Øster Farimagsgade 5, Building 26
DK-1353 Copenhagen K
DENMARK
Tel: (+45) 3532 4411
Fax: (+45) 3532 4444
Web: http://www.econ.ku.dk/epru/

Late Budgets

Asger L. Andersen, David Dreyer Lassen,
and Lasse Holbøll Westh Nielsen

ISSN 0908-7745

Late Budgets*

Asger L. Andersen David Dreyer Lassen

Lasse Holbøll Westh Nielsen

Department of Economics, University of Copenhagen

April 2010

Abstract

The budget forms the legal basis of government spending. If a budget is not in place at the beginning of the fiscal year, planning as well as current spending are jeopardized and government shutdown may result. This paper develops a continuous-time war-of-attrition model of budgeting in a presidential style-democracy to explain the duration of budget negotiations. We build our model around budget baselines as reference points for loss averse negotiators. We derive three testable hypotheses: there are more late budgets, and they are more late, when fiscal circumstances change; when such changes are negative rather than positive; and when there is divided government. We test the hypotheses of the model using a unique data set of late budgets for US state governments, based on dates of budget approval collected from news reports and a survey of state budget officers for the period 1988-2007. For this period, we find 23 % of budgets to be late. The results provide strong support for the hypotheses of the model.

Keywords: government budgeting, state government, presidential democracies, political economy, late budgets, fiscal stalemate, war of attrition
JEL codes: D72, H11, H72, H83

*We are grateful to Jim Alt for comments, suggestions and advice regarding the data collection and we thank Alan Auerbach, Daniel Diermeier, Jim Snyder, Peter Norman Sørensen and participants in seminars and workshops at UC Berkeley, Copenhagen, Harvard, MIT, and University of Virginia and at the Public Choice meetings 2010 for comments. We thank Jim Poterba and Kim Reuben for sharing their data on revenue shocks with us. Anders Oltmann provided excellent research assistance. We gratefully ackonwledge funding from the program on Economic Policy in the Welfare State (WEST) at the University of Copenhagen.

1 Introduction

In the Summer of 2009, the state of California captured national headlines by failing to enact a budget before the beginning of the fiscal year. In fact, the situation in California was so severe that the state could not meet its obligations and began issuing IOUs to cover payments to local governments, private contractors, and taxpayers. After 24 days of negotiations beyond the fiscal year deadline between Republican governor Arnold Schwartzenegger and the Democratic-controlled state legislature, a budget was approved. California is not alone in finishing its budget late: in 2009, eleven states failed to approve a budget before the beginning of the fiscal year,[1] and in our entire sample, which covers the 48 continental states in the years 1988-2007, 23% of all budgets were approved after the fiscal year deadline. Delayed appropriations are even more common at the federal level: Meyers (1997) reports that in the period 1977-97, 68 percent of all federal appropriation bills were enacted after the beginning of the fiscal year.

In state governments in the United States, as across all political arenas and at all levels of government, the government budget provides the legal foundation for government spending. If a budget is not approved and enacted by the beginning of the fiscal year, the legal basis for government spending is jeopardized, and the consequences can range from a continuation of operations based on last year's budget to partial government shutdown, depending on both specific constitutional provisions and the overall institutional framework.

Late budgets are an important object of study for three reasons: Economic costs, as a measure of legislative productivity, and as a measure of good governance. We address each in turn. First, when state governments are unable to enact a full budget before the beginning of a new fiscal year, they often resort to passing temporary budget bills that allow appropriations for state government operations for a limited time only.[2] Passing a temporary budget bill is not always possible, however, in some cases because of state laws,[3] and in other cases because of political conflict among state lawmakers. In the absence of a budget, many state governments find themselves in unknown legal territory. As a result, the consequences of budget delays vary considerably across states, and sometimes even from year to year within the same state. Some state governments stop paying their employees or withhold payments to state vendors and contractors, providers of Medicaid, school districts and local governments. In the most extreme cases, the state government shuts down all so-called "non-essential" services until a new budget is in place. In addition, the mere threat of a late budget means that state agencies,

[1] These are Arizona, California, Connecticut, Delaware (by one day), Illinois, Michigan, Mississippi, New York, North Carolina, Ohio and Pennsylvania.

[2] At the level of the federal government in the US, such bills are very common and known as "continuing resolutions." When such resolutions fail, the result may be government shutdown, witnessed most recently for the case of the US federal government in 1996; see Meyers (1997) for an account.

[3] For an overview of procedures when the state budget is not passed by the beginning of the fiscal year, see the National Conference of State Legislatures: http://www.ncsl.org/default.aspx?TabId=12616

school boards and local government must spend time developing plans for what to do if a stalemate extends beyond the end of the fiscal year, whcih complicates planning and may lead to distorted decisions, such as hiring stops and hoarding of funds.[4]

Finally, state government creditworthiness may suffer.[5] In on-going, companion work (Andersen, Lassen and Nielsen, 2010), we investigate the consequences of late budgets for, among other things, state borrowing costs. We find that late budgets are associated with higher state bond yields, as measured by the Chubb Relative Value Survey.[6] Combining these estimates with state debt stocks, we find late budgets to be associated with substantial per capita interest rate premiums. In short, late state budgets have significant economic consequences within as well as beyond state governments.

Second, our measure of budget negotiation duration provides a replicable, and easily extendable, measure of *legislative gridlock*, defined as the inability of the legislative and executive branches to pass major legislation, at the state level. While a major part of the literature on legislative gridlock has focsued on the US federal government (e.g. Mayhew, 1991; Binder, 1999), the logic behind the models and arguments applies to veto player democracies everywhere (Tsebelis, 2002). There is no generally agreed-upon measure of legislative gridlock (see, e.g., Chiou and Rothenberg, 2008), but the budget arguably is the most important piece of legislation for any executive and legislature. As recognized by Mayhew (1991), and emphasized by Fiorina (1996) and Binder (1999), a true measure of gridlock should take into consideration both the supply and demand for legislation; while low legislative output could reflect high levels of gridlock, it could equally well reflect both a lack of demand for such output and a lack of supply due to less frequent introduction of bills in periods where chances of passage are lower. Our measure corrects for endogeneity both on the supply and the demand side, as the budget's (re-)appearance on the legislative agenda is exogenously given.[7]

Third, timely budgets can, more generally, be viewed as a measure of good governance. In his analysis of the effects of social capital and the civic community on governance outcomes, Putnam (1993) includes as one of his twelve indicators of institutional performance *budget*

[4] In Maine in 1991, 10,000 state government workers were sent home without pay and all non-essential services were closed. The budget was 18 days late. In Illinois, delays in payments from the state government creates problems of liquidity for counties ("County copes with cash flow", Lincoln Courier, April 8, 2010). In Michigan, late state budgets affect staffing and tuition decisions at schools and universities (Citizens Research Council of Michigan: Late Budgets in Michigan, August 2009).

[5] On July 6, 2009, a few days after the beginning of the fiscal year, Fitch Ratings dropped California's bond rating to BBB, down from A minus (Wall Street Journal, July 8, 2009: Big Banks don't want California's IOUs).

[6] The measure is based on a survey, carried out by the Chubb Corporation, of sell-side bond traders who are asked to rate the relative yield on a 20 year general obligation bond for a state i compared with a similar bond issued by New Jersey. See Lowry and Alt (2001) and Poterba and Rueben (2001) for more on the Chubb Relative Survey and Andersen, Lassen and Nielsen (2010) for the analysis.

[7] Obviously, by restricting ourselves to studying budgets as a venue for gridlock, we leave out many important policy areas; however, little agreement exists in the literature (Chiou and Rothenberg, 2008) on how to measure major bills.

promptness, defined as the (lack of) delay relative to the beginning of the fiscal year of the approval of the budget by the regional councils. Putnam (1993, p. 65-67) argues that budget promptness is a measure of a government's "essential internal affairs" which, in turn, is one component of an evaluation of good government.[8] Our rich panel data set allows us to include measures of social capital alongside economic and political explanatory variables to assess their relative importance in explaining late budgets.

A final reason for studying late budgets is methodological in nature: Empirical analyses of budget outcomes and fiscal stabilizations are almost always based on models of political bargaining, often involving a number of veto players, but the analyses are rarely based on data on the actual bargaining process. As such, studies based on real-world data linking institutions to outcomes by way of bargaining are essentially estimating reduced form-relationships by stipulating an unobserved bargaining process, weakening the link between the proposed theory and the empirical results. In contrast, our approach makes the bargaining process the center of the analysis with the aim of evaluating directly the hypoteses about the bargaining solution derived from the theoretical model.

We model the political bargaining proces as a war of attrition in the spirit of Alesina and Drazen (1991), but we focus on the time to reach an agreement on the annual budget rather than the delay in implementing crises-induced reforms. In our model, the two bargaining parties suffer costs from not being able to reach a deal. These costs may be political of nature, because the public dislikes budget delays, or they may be personal, since legislators must spend time and effort to keep battling over the budget. When a party finds that it can no longer bear the costs of continued bargaining, it concedes, and the opposing party is free to implement its preferred policy. We derive the unique symmetric equilibrium of the bargaining game and show that it implies a number of testable hypotheses. The three main predictions are: One, changes in fiscal circumstances, regardless of direction, increase the expected duration of budget stalemates; Two, the expected duration is higher in fiscal downturns than in upswings of similar magnitudes; And three, divided government increases the expected duration.

Our modeling approach is based on the key assumption that bargaining over a government budget is carried out with reference to a *budget baseline*. Budget baselines generally fall in two categories: (1) nominal spending the previous year; or (2) "current services" which is the provision of services financed by the previous year's spending. In US state governments, which form the focus of our empirical analysis, Crain and Crain (1998) report that in the 1990's 34 states used last year's spending level as baseline while the remaining 16 used a current services baseline. While the determination of baselines themselves is also subject to political

[8] This sentiment is echoed among policy makers; for example, Scott Pattison, the current executive director of the National Association of State Budget Officers, notes that "a well-managed state would never, ever" have a late budget (quoted from "*Mischief After Midnight*", governing.com, June 2009. Available online at http://www.governing.com/article/mischief-after-midnight).

manoeuvring and debate, a baseline remains, given the baseline regime, a common reference point against which all changes being bargained over are compared; as noted by Schick (2007, p. 67) in the context of the US federal government budget, "[o]nce a baseline has been constructed, any variance from it due to legislation is measured as a policy change."

We combine the notion of a formalized reference point in the form of a budget baseline with the behavioural assumption that budget negotiators have political preferences and that they are loss averse over changes from the baseline, making the preferences a variant of Tversky and Kahneman (1991). It is well documented that public responses to negative economic information is greater than responses to positive information (Soroka, 2006), that negative attitudes towards candidates have a greater impact on voting behavior than do positive attitudes (Kernell, 1977), and that negative economic trends penalize incumbents while they reap few benefits from positive trends (Bloom and Price, 1975; Nannestad and Paldam, 1997). These observations are in accord with the differential valuation of negative and positive political outcomes reported in Quattrone and Tversky (1988), suggesting that voters exhibit loss aversion over goods, services and transfers obtained from the public sector. We do not model the relationship between voters and politicians; instead, we directly assume politicians to be loss averse, which can either simply reflect loss averse voters or reflect the fact that politicians themselves are subject to the same processes of preference formation as are voters. Loss aversion implies a *status quo bias* (Samuelson and Zeckhauser, 1988), or - in our model - more precisely, a *bias towards the baseline budget*. This means that the opposing parties in our model find it relatively easy to agree on keeping the budget unchanged in years when fiscal conditions are stable. When exposed to large changes in fiscal circumstances, however, their innate differences in policy preferences make the parties disagree over how to adapt to such changes, and long stalemates become more likely. Because of loss aversion, this is more pronounced when fiscal conditions change for the worse than when they improve.

We apply the model to data on US state government budget processes. Using state and local newspaper sources as well as responses to a survey of state budget offices administered for this purpose, we collect data on dates of final budget enactment and compare these to the beginning of the state governments' fiscal years. Carrying out this comparison for all states for every year since 1988 yields a replicable measure of budget lateness (as well as legislative gridlock and governance).[9]

We find that adverse changes in economic conditions, measured by the increase in unemployment, substantially increases the duration of the budget negotiations: a one percentage point increase in unemployment rate relative to the previous year increases the expected du-

[9] The Government Performnace Project at Pew Center of the States provides overall assessments of government performance to produce an index of same. This index was employed by Knack (2002) in his cross-state analysis of the effects of social capital on governance. 'Budget timeliness' is one of many factors included in this assessment, but it is not reported separately nor is it based on hard data.

ration of the budget negotiations by about a week in our preferred specification. Similarly, divided government substantially increases both the risk of experiencing a late budget and its duration, the latter by about two weeks. On the other hand, budget negotiations are, on average, between one and two weeks shorter in election years.

The paper is structured as follows: The next subsection presents related literature, section 2 presents our theoretical model, and section 3 describes the collection and construction of data. Section 4 describes the empirical specification and section 5 reports results. We provide a discussion and some concluding remarks in the final section.

1.1 Related literature

Our study of late budgets relates to a number of different literatures, in addition to the legislative gridlock and good governance literature already mentioned. First, it is related to the political reform literature, in particular the literature on fiscal adjustments in the face of large, external shocks. This is evident not only from the descendancy of the model from the Alesina-Drazen framework, but also from the fact that budget lateness, as will become evident from the empirical analysis, is crucially related to an adverse economic environment and specific political factors. However, the theoretical and empirical literatures on fiscal adjustments are not concerned with annual budgets per se, but with fiscal imbalances over the medium- and long-term, and have as a key parameter the economic costs of continuing conflict.[10] In contrast, we set up a framework to cover all budgets, in normal times and economic crises alike, based on political costs of bargaining rather than economic costs, and provide empirical evidence to match the theory closely.

Second, our study is a part of the large literature on the effects of political, economic and institutional determinants of government budget outcomes. In this literature, government budget outcomes, i.e. realized revenue and spending patterns, are related to partisan differences (Alt and Lowry, 2000), budget institutions (Poterba, 1994; Alt and Lowry, 1994; Poterba and von Hagen, 1999) and political institutions (e.g. Grossman and Helpman, 2007). While most theoretical work in this literature explicitly recognizes the bargaining nature of government budgeting and policy determination, direct empirical tests based on quantitative data of the theoretical claims regarding the bargaining process are, to our knowledge, non-existent.

Third, our paper is related to the concept of incrementalism as well as to the general public administration literature on budgeting. Incrementalism in budgeting is traditionally associated with Wildavsky's (1964) observations that government budgets are not re-calculated from scratch every year but that they are rather, due to information processing costs, based, by-and-large, on the previous year's budget. Our approach, based on budget baselines as points

[10]In a recent contribution to this literature, Alesina, Ardagna and Trebbi (2006) provide an investigation of the determinants of fiscal balance stabilizations across countries.

of departure for budget negotiations, is not derived from incrementalism; if anything, as noted by Schick (1980, p. 217), the adoption of the current services baseline institutionalized incrementalism.[11] The role of the status quo and agenda control in models of policy determination was first recognized by Romer and Rosenthal (1978).

Fourth, the paper is closely related to a small literature studying bargaining in positive analyses of political and policy processes. Bargaining models are frequently employed in the positive political economy literature, but, as noted above, most empirical studies go on to evaluate economic and political outcomes directly, rather than studying the bargaining process by which exogenous circumstances are translated into outcomes. Analyses linking formal bargaining models to data on the bargaining process are rare outside of laboratory experiments, but notable exceptions exist: Merlo (1997) and Diermeier, Eraslan and Merlo (2005) examine government formation in Italy and parliamentary democracies, respectively, based on the stochastic bargaining model proposed by Merlo and Wilson (1995). The duration of the government formation phase can be interpreted as a measure of the intensity of the conflict, as can the duration of the budget negotiation phase.

2 A Stylized Model of Budget Delays

We consider a government with two players, A and B, who must agree to pass a budget. The players could be thought of as the executive vs. the legislature, or as majority leaders from different chambers within the legislature. Each player has veto power, so that no one player can pass a budget without the consent of the other player.

The government faces a given amount of revenue, y, which can be spent on two different types of publicly provided goods, g_1 and g_2. There is a balanced budget constraint in place, so any budget plan must satisfy $g_1 + g_2 = y$. All variables are measured in units per capita. The players derive utility from both types of spending, but they disagree on the preferred composition of total spending. An alternative interpretation is that g_1 and g_2 are public- and private consumption, respectively, and that y is the tax base, assumed for simplicity to be equal to income per capita. The tax rate is then equal to g_1/y. In this interpretation, the conflict between the two players is over the size of the budget, rather than the compostiton. Which of these two alternative interpretations is the appropriate one depends on the relevant context in which we wish to apply the model's predictions. However, for consistency, we stick to the first interpretation in the following exposition.

The political game resembles the set-up in Alesina and Drazen (1991): The two players engage in a war of attrition, during which the budget adoption is delayed. Delaying agreement

[11] The debate over incrementalism and alternative public administration models of budgeting cannot be done justice here. For a critique of incrementalism, and an alternative budgetary theory, see Meyers (1996).

is costly to both players. First, budget delays imply a political cost to those responsible, since voters disapprove. And second, there is a personal cost of delay to the players involved, since they must spend time and resources on negotiating, lobbying and servicing the press as long as the adoption phase continues.

There may also be actual budgetary costs associated with delays. As explained above, government agencies must spend time and effort to deal with the delayed appropriations and the possibility of shutdown of services, and this may divert resources away from provision of public goods and services. This would suggest a negative relationship between the duration of the delay and y in our model. However, to keep things simple we focus on the first two types of costs of delay and let y be constant over time.

The war of attrition ends when one of the players "concedes". We model our political conflict as a "winner-takes-all" game: once a player has conceded, the other player is free to choose whatever composition of spending he prefers. Thus, as in Alesina and Drazen's model, players can only "win" or "lose". Endogenously determined compromises reached during negotiations are ruled out, which is of course a major simplification.[12]

The players have reference-dependent preferences, so that budget outcomes (g_1, g_2) are evaluated relative to a budget baseline, (g_1^b, g_2^b). To be specific, we assume that their preferences over government spending can be represented by the utility functions

$$\begin{aligned} u_A(g_1, g_2 | g_1^b, g_2^b) &= \theta \cdot v(g_1 - g_1^b) + v(g_2 - g_2^b) \\ u_B(g_1, g_2 | g_1^b, g_2^b) &= v(g_1 - g_1^b) + \theta \cdot v(g_2 - g_2^b) \end{aligned} \tag{1}$$

where

$$v(x) = \begin{cases} x \ \ if \ x \geq 0 \\ \lambda x \ if \ x < 0 \end{cases} \ \ and \ \lambda > \theta > 1$$

The parameter θ captures that each player prefers spending on one type of good over the other, other things equal, but they disagree on which of the two goods is preferable. With $\theta > 1$, player A has a preference for spending on good 1, while player B prefers spending on good 2. The players evaluate budget outcomes in terms of deviations from the baseline, using the value function $v(\cdot)$. The value function is everywhere increasing and has a kink at zero, as suggested by Tversky and Kahneman (1991).[13] This implies that the players are loss-averse: They dislike negative deviations from the baseline more than they like equal-sized positive deviations.

[12] Hsieh (2000) provides an extension of a simplified Alesina-Drazen framework where the payoff distribution at stabilization is determined endogenously in a formal bargaining process.

[13] Tversky and Kahneman also argued that in order to explain observed attitudes towards risk, the value function must be concave in the positive domain and convex in the negative domain. This feature of the value function is known as *diminishing sensitivity*. Since we are not explicitly interested in explaining attitudes towards risk, we abstract from this feature and settle for the simpler, linear version adopted here.

To see what our specification of preferences implies for budget outcomes, define $y^b \equiv g_1^b + g_2^b$. We label this the *baseline revenue level.* When $y > y^b$ the players face an opportunity to raise spending on both types of goods over the baseline levels. Since $\theta > 1$, player A gets higher marginal utility from raising g_1 than from raising g_2 whenever $g_2 \geq g_2^b$. Hence, player A would never raise spending on good 2 above the baseline level. On the other hand, the assumption $\lambda > \theta$ implies that player A does not wish to drive g_2 below its baseline level. Player A thus prefers the bundle $(g_1^b + y - y^b, g_2^b)$ to all other feasible combinations of g_1 and g_2 when $y > y^b$. Correspondingly, the marginal benefit to player A from raising g_1 at the expense of g_2 is positive when $g_1 < g_1^b$ and $g_2 < g_2^b$, but negative when $g_1 \geq g_1^b$ and $g_2 < g_2^b$. If given the opportunity, player A will therefore choose the bundle $(g_1^b, g_2^b - y^b + y)$ when $y < y^b$. Of course, player B's preferences imply the same choices, only with the goods reversed.

In words, whenever the players are given an opportunity to raise overall spending, they will prefer to increase spending on their preferred good only, while leaving spending on the other good unchanged. And whenever faced with a need to cut overall spending, the players will prefer to keep spending on their preferred good unchanged, letting spending on the least preferred good carry the entire burden of adjustment.

The assumption $\lambda > \theta$ is crucial for these results. Without this assumption, both players would always prefer to spend the entire revenue on their own preferred good, irrespective of the sign of $y - y^b$. The interpretation is that the players are so averse to losses that they are willing to sacrifice increases in spending on their most preferred good in order to avoid even the smallest cuts in spending on their least preferred good. Of course, this is an extreme prediction. However, we believe that it does capture an important feature of fiscal policy: Spending cuts carry a greater weight in the minds of citizens, in the public debate, and therefore also in the minds of policymakers, than spending increases. Fiscal policymakers are therefore inclined to avoid spending cuts, even at substantial opportunity costs.

The costs from a stalemate over the budget are individual-specific and linearly increasing in the time until a concession occurs. Time is continuous and we normalize the start of the budget adoption phase to $t = 0$. If a concession occurs at time $t = T$, the players incur disutility

$$D_i = \delta_i T \ , \quad i = A, B \tag{2}$$

The parameter δ_i captures how costly delays are to player i. We assume that δ_A and δ_B are independent and drawn randomly from a uniform distribution on an interval $(\underline{\delta}; \overline{\delta}]$. As in Alesina and Drazen (1991), we assume that δ_i is private information to player i. The other player does not observe the realized value of δ_i but knows the distribution from which it is drawn.

Total utility is given by the utility from the budget outcome minus the disutility from a delayed agreement. If player i ultimately wins the war of attrition at time $t = T$, his total utility may then be written as

$$U_i^W(T) = u^W - D_i(T) = \begin{cases} \theta(y - y^b) - \delta_i T & if \quad y \geq y^b \\ -\lambda(y^b - y) - \delta_i T & if \quad y < y^b \end{cases} \tag{3}$$

while the total utility of losing at time T is

$$U_i^L(T) = u^L - D_i(T) = \begin{cases} (y - y^b) - \delta_i T & if \quad y \geq y^b \\ -\lambda\theta(y^b - y) - \delta_i T & if \quad y < y^b \end{cases} \tag{4}$$

The gain from winning is then straightforwardly computed as

$$U_i^W(T) - U_i^L(T) = u^W - u^L = \begin{cases} (\theta - 1)(y - y^b) & if \quad y \geq y^b \\ \lambda(\theta - 1)(y^b - y) & if \quad y < y^b \end{cases} \tag{5}$$

Note that the gain from winning is always positive, equal for both players and independent of the time of concession. It is increasing in $\left|y - y^b\right|$, the absolute value of the deviation of total revenue from its baseline. Note further that for a given value of $\left|y - y^b\right|$, the gain from winning is higher if $y < y^b$ than if $y \geq y^b$: because of loss aversion, the stakes are higher when revenue drops below the baseline level than when it is above it.

Each player must now choose an optimal concession time T_i. This is the date on which player i concedes and allows his opponent to choose her preferred spending plan, conditional on the opponent not having conceded already. We assume that players choose T_i so as to maximize their expected total utility. Expected utility depends on the utilities that the player gets from winning and losing, respectively, as well as the probability of winning. Player i wins whenever his chosen concession time exceeds that of his opponent. Let $H(t)$ denote the cumulative distribution function of the opponent's optimal concession date, with associated density function $h(t)$.[14] $H(t)$ is of course endogenous, but it is exogenous as seen from the point view of player i, since player i can in no way influence his opponent's choice of concession time. Integrating over the opponent's concession time, we can then express the expected utility

[14] As emphasized below, we concentrate on equilibria where each player's concession time is a differentiable function of his type. This implies that $H(t)$ is differentiable, and that the density function $h(t)$ does in fact exist.

of player i as a function of T_i as

$$
\begin{aligned}
EU_i(T_i) &= \int_0^{T_i} U_i^W(t)h(t)dt + \int_{T_i}^{\infty} U_i^L(T_i)h(t)dt \\
&= \int_0^{T_i} U_i^W(t)h(t)dt + (1-H(T_i))U_i^L(T_i)
\end{aligned}
\tag{6}
$$

If a positive, finite optimal concession time exists, it must then satisfy the first-order condition

$$
\frac{dEU_i(T_i)}{dT_i} = \left[U_i^W(T_i) - U_i^L(T_i)\right] h(T_i) - (1-H(T_i))\delta_i = 0 \tag{7}
$$

where we have used that $\partial U_i^L(T_i)/\partial T_i = -\delta_i$. Recall that the term in brackets is the gain from winning, which does not depend on T_i. We may therefore write this term as $u^W - u^L$. We can then rewrite the first-order condition as

$$
[u^W - u^L]\frac{h(T_i)}{1-H(T_i)} = \delta_i \tag{8}
$$

This representation of the first-order condition has an intuitive interpretation: The left-hand side is equal to the expected marginal benefit of waiting one more instant to concede. This is equal to the probability that the opponent will concede "within the next instant", conditional on the fact that he has not already conceded, times the gain that follows if the opponent does actually concede. The left hand side is equal to the marginal cost of postponing concession. At the optimal concession time, the marginal benefit and the marginal cost exactly balance.

We now look for a symmetric Bayesian Nash equilibrium in which each player's optimal concession time T_i is a differentiable function of his type, $T_i = T(\delta_i)$. In the appendix we show that there exists a unique such equilibrium. The equilibrium function $T(\delta_i)$ satisfies the differential equation

$$
T'(\delta_i) = -[u^W - u^L](\delta_i(\delta_i - \underline{\delta}))^{-1} \tag{9}
$$

and the boundary condition

$$
T(\overline{\delta}) = 0 \tag{10}
$$

Combining equations (9) and (10) then gives the following explicit solution for $T(\delta_i)$:

$$
T(\delta_i) = \left[u^W - u^L\right] \frac{1}{\underline{\delta}} \ln\left(\frac{\delta_i(\overline{\delta} - \underline{\delta})}{(\delta_i - \underline{\delta})\overline{\delta}}\right) \tag{11}
$$

The equilibrium distribution of concession times, H, is of course related to this solution. More precisely, we may back out the equilibrium distribution by noting that $H(t) = Prob\,[T(\delta_j) < t] = Prob\left[\delta_j > T^{-1}(t)\right]$, where T^{-1} is the inverse function to T.[15]

To understand the mechanisms of the game in the symmetric equilibrium, recall that when deciding whether to concede or keep fighting, the players weigh the expected marginal benefits of a further delay against the marginal costs, δ_i. The marginal benefit consists of the conditional probability that the opponent will concede "within the next instant", times the gain from winning that follows if he actually does so. In the beginning of the conflict, this marginal benefit can be shown to be exactly $\overline{\delta}$, implying that no player with $\delta_i < \overline{\delta}$ will concede immediately. However, since opponents with high costs from delays will concede faster, the passage of time without a concession makes players adjust their beliefs about their opponent's costs downwards. With the specific distributional assumption we have made about costs, it also implies that the conditional probability that the opponent will concede within the next instant falls.[16] Thus, the marginal expected benefit of postponing concession decreases over time, and after a certain time it becomes so low that equation (9) exactly holds. This is the optimal time for player i to capitulate and accept defeat.

A budget agreement is reached as soon as one of the players concedes. The date when this happens is given by

$$T^{agree} = \min\{T(\delta_A); T(\delta_B)\}$$

Of course, T^{agree} is a random variable. Using equations (11) and (5), and the fact that δ_A and δ_B are independent and both uniformly distributed on $(\underline{\delta}; \overline{\delta}]$, we show in the appendix that the expected date of agreement is

$$ET^{agree} = \begin{cases} (\theta - 1)(y - y^b)\Omega & if \quad y \geq y^b \\ \lambda(\theta - 1)(y^b - y)\Omega & if \quad y < y^b \end{cases} \tag{12}$$

where $\Omega \equiv \left[\overline{\delta} - \underline{\delta} - (\ln(\overline{\delta}) - \ln(\underline{\delta}))\underline{\delta}\right](\overline{\delta} - \underline{\delta})^{-2}$.

2.1 Predictions from the model

A number of predictions are immediately apparent from equation (12). First, large deviations in revenue from the baseline level increase the expected time until concession. Since baseline budgets are strongly linked to the previous budget, it follows that we should expect changes in fiscal circumstances relative to the previous year, whether to the better or worse, to increase the expected duration of budget stalemates. The intuition is that in years when revenue is

[15] The appendix also proves that the function T is strictly decreasing, so that the inverse function does exists.

[16] This conditional probability is equal to the hazard rate, $h(T)/(1 - H(T))$. The assumption that the δ_i's are uniformly distributed ensures that this rate is decreasing in T.

stable, reference dependence and loss aversion imply that both players prefer to keep spending levels unchanged. This consensus between players, which arises despite their innate differences in preferences, means that there is little at stake in the conflict over the budget, and both players will therefore prefer to concede quickly, rather than dragging the stalemate to a length and incur the political costs associated with the delay. In contrast, in the face of large changes in fiscal conditions, the players disagree on how to adapt to those changes. This increases the stakes in the budget conflict, and the opposing parties will be more willing to prolong the stalemate in the hope of getting their preferred outcome.

Second, negative deviations from the baseline have a stronger impact on the expected time of concession than positive deviations of the same size. Hence, the model suggests that we should observe longer budget delays during fiscal downturns than during upswings. This prediction follows directly from the assumption of loss aversion: since players dislike spending cuts more than they like spending increases, it becomes extra important for them to control the budget in years where revenue has dropped. Loosely formulated, "avoiding to lose" is a stronger motivation to keep fighting than "hoping to win".

Based on the first two predictions, we should expect to see longer and more frequent budget delays in states where revenue is highly volatile. On the other hand, it is the need for spending to adapt to changes in revenue, not the change in revenue in itself, which leads to delays in our model. Going slightly outside the model, we would therefore expect fiscal institutions that facilitate smoothing of fluctuations over time to dampen the impact of revenue volatility.

A third prediction relates to the parameter θ. The larger θ is, the stronger are the players' relative preferences for their favored types of spending, and the deeper is their disagreement over how to react to a change in revenue from the reference level. $\theta = 1$ corresponds to a complete consensus on the budget, in which case the model predicts immediate agreement always. Naturally, significant discrepancies between the policy preferences of the players involved in the budget process are much more likely when there is divided partisan control of the government than when all players belong to the same party. Thus, we expect budget stalemates to be longer and more frequent when the two chambers in the legislature are controlled by different parties, or when the legislature is controlled by the opposite party of the executive.

Finally, the expected date of concession is inversely proportional to the scale of the interval $(\underline{\delta}; \overline{\delta}]$. That is, multiplying $\underline{\delta}$ and $\overline{\delta}$ with a positive constant k implies that ET^{agree} is multiplied with k^{-1}. Similarly, adding a positive constant to both $\underline{\delta}$ and $\overline{\delta}$ lowers ET^{agree}.[17] Hence, a shift to the right in the distribution of the marginal costs of delay leads to shorter expected stalemates. We therefore expect to see shorter delays when the political and personal costs to

[17] To see this, totally differentiate equation (12) with respect to $\overline{\delta}$ and $\underline{\delta}$ and set $d\overline{\delta} = d\underline{\delta}$. This gives $dET^{agree}/d\overline{\delta} = -[U^W - U^L](\overline{\delta} - \underline{\delta})^{-2}(\frac{\underline{\delta}}{\overline{\delta}} - \ln(\frac{\underline{\delta}}{\overline{\delta}}) - 1) < 0$. The term in the parentheses is positive since $\ln(x) < x - 1$ for all $x \neq 1$.

politicians of late budgets are high. This may for example be the case in election years: First, electoral success is likely to depend on recent performance, so the political costs of delays are extra high in such years. And second, legislators face an extra personal opportunity cost of spending time on battling over the budget in election years, since they cannot devote their time to campaigning for re-election until the budget is done. Institutional arrangements may also influence the political and personal costs of budget delays, an issue that we address further in the empirical analyses below.

3 Defining and measuring late budgets

Budget processes vary considerably across US states. This complicates cross-state comparisons of budget timeliness somewhat, since there is no obvious, universal definition of when, and by how much, a budget is late. For any meaningful measure of budget lateness, one must identify two points in time, namely *1)* the date by which the budget is supposed to be enacted; and *2)* the date on which it is actually enacted. To begin with the former, many state legislatures face a deadline to pass the budget that is prior to the end of the fiscal year. For example, the California state constitution requires that the legislature pass the budget bill before June 15, whereas the fiscal year starts on July 1st. Other state legislatures face constitutional or statutory deadlines for ending their regular sessions. Whether such deadlines also constitute an effective deadline for passing the state budget varies from state to state, however, and is often a question of interpretation. Moreover, while violations of pre-fiscal year deadlines are often met with harsh criticism in news media, most of the political and economic costs of a budget stalemate that we discussed in the introduction do not become relevant until the stalemate approaches the end of the fiscal year. Most notably, government shutdowns can only happen if the impasse extends into the new fiscal year. In our view, therefore, the ultimate deadline for enacting a state budget will always be the end of the fiscal year.

Turning to the date of actual budget enactment, two natural candidates come to mind: the date of final legislative approval and the date of final enactment. Final legislative approval is achieved when the new budget has been passed in both chambers of the legislature in its final form. Final enactment is the event that formally makes the new budget become law. In most cases, this happens when the governor signs the budget, but important exceptions exist: For example, if the governor vetoes the entire budget, the legislature can in most states override the veto by some super majority vote in both chambers, and the budget then becomes law without the governor's signature. In such cases we interpret the date of the legislative override as the date of final enactment. Furthermore, some states have a deadline for gubernatorial action, and the governor may sometimes let the budget become law without actively signing it by letting this deadline expire. In these cases we use the date on which the deadline expired.[18] For convenience, however, we shall henceforth simply refer to the date of final enactment as the date the budget was signed into law.

It is not obvious which of the two events most accurately captures the end of budget negotiations. Sometimes, all conflict is effectively resolved when the budget has been passed by both legislative chambers, and the governor's signature appears to be a mere formality. This speaks for using the date of legislative passage as the indicator of actual budget enactment. In other cases, however, the conflict over the budget is far from resolved with the legislative passage. Many governors actively use their power to veto the budget - or the threat to do so - to influence the final budget outcome. In such cases, the final budget enactment, i.e. the signing into law, is the appropriate indicator for the end of budget negotiations. Since this is also what formally marks the end of the budget adoption process, we prefer the date when the budget is signed into law as our indicator of budget enactment.[19]

Thus, our preferred measure defines a late budget as a budget that has been signed into law after the end of the fiscal year, and we measure the length of the delay as the number of days from the end of the old fiscal year to the date of final enactment. We have also experimented with two other measures, however, namely 1) the number of days from the state-specific deadline for legislative passage of the budget to the date of actual legislative passage, and 2) the number of days from the end of the old fiscal year to the date of legislative passage.

3.1 Budget enactment data

The data for the budget enactment dates were collected from three sources: (i) State legislatures' websites; (ii) Archived newspaper articles; and (iii) a survey sent to state budget officers. Some state legislatures' websites have detailed information on the status and histories of all bills enacted in previous legislative sessions, including the budget bill(s). However, most state legislatures' bill tracking tools only cover the most recent legislative sessions, if any. We therefore supplemented with information from archived newspaper articles accessed via Newslibrary.com.[20] Finally, we also sent a survey to state budget officers asking them to confirm the

[18] Another exception is Maryland, where the governor cannot veto the budget, which means that the budget becomes law once it has been passed by both chambers in the legislature. Consequently, final legislative passage and final budget enactment coincide in Maryland.

[19] Our measurement is further complicated by the fact that some states do not pass a single, all-encompassing budget bill. Instead, their budgets consist of several individual appropriation bills. In such cases we do not consider the budget fully enacted until the last appropriation bill for state operations has been enacted. Also, state governments sometimes react to unexpected developments in state government finances by passing within-fiscal year supplementary appropriation bills. We do not view such supplementary budget bills as part of the budget adoption process that we are interested in, however, and we therefore restrict our attention to the budgets as originally enacted.

[20] Newslibrary.com is an online newspaper archive that covers more than 2,500 news sources across the United States. We also used The New York Times online archive on several occasions to access relevant news articles.

data we had collected ourselves as well as provide us with the information that we had not been able to find via any of the other sources. Out of 48 states (we exclude Alaska and Hawaii), 19 responded to our survey. When overlapping, the data they reported were virtually identical to the data we collected ourselves.[21]

In the survey, as well as in our own information search, we asked the following questions for each legislative session in which a budget was adopted:

1. When did the regular session of the legislature start?
2. When was the executive budget proposal submitted to the legislature?
3. When was the deadline for the legislature to pass the budget?
4. When did the legislature pass the budget?
5. When was the budget signed into law?

Our main dependent variable, *days_late*, is constructed as the difference between the answer to question 5 and the last day of the old fiscal year. Note that this variable is uncensored, so that both positive and negative values occur. For example, a value of *days_late* equal to -5 means that the budget was signed into law five days before the end of the fiscal year. We also construct a binary variable, *late_budget*, that takes the value one if *days_late* is strictly positive, and zero otherwise. In addition, we construct a censored variable, *days_late_cens*, that sets all negative values equal to zero. Our two alternative measures, *days_delayed*, and, *days_delayed_FY*, are constructed as the difference between the answer to question 4 and *i)* the answer to question 3, and *ii)* the last day of the old fiscal year, respectively. Binary and censored versions of these variables are constructed in a similar way. Table 1 shows descriptive statistics for all dependent variables.

<**Table 1 about here** [Descriptive statistics of dependent variables]>

For the years 1988-2007 we have recorded 167 cases where the budget was signed into law after the beginning of the new fiscal year. This amounts to 23 percent of the budgets for which we have data.[22] Figure 1 gives a detailed picture of the distribution of *days_late*. There is a clear effect of the fiscal year deadline, as can be seen from the spike at zero. This spike reflects the great number of budgets that are enacted on the last day of the old fiscal year. The

[21] The instructions for the survey are available from the authors upon request. Table A1 in the appendix gives details on the source of information on late budgets for each state.

[22] 190 budgets (26%) received legislative passage after the legislature's state-specific deadline, while 119 (17%) were finally passed by the legislature after the beginning of the new fiscal year.

budgets that were signed into law after the beginning of the new fiscal year ($days\_late > 0$) were on average 31 days late. The variation is large, however, ranging from one day to almost six months with a standard deviation of 36 days. 13 percent of the late budgets were signed into law on the first day of the fiscal year, while 33 percent were more than one month late.

<**Figure 1 about here**. [No. of days from end of fiscal year to final budget enactment]>

Figure 2 illustrates the occurrences of late budgets over time. In addition to our preferred definition of a late budget, the figure also displays the number of budgets that were passed by the legislature after the state-specific deadline for legislative passage. Such delays are generally much more common than delays that extend into the new fiscal year. For both measures, budgets delays were frequent in the early 1990s and in the beginning of the new century. The late 1990s were a period with relatively few late budgets.[23]

<**Figure 2 about here.** [The number late budgets over time, 48 states]>

Figure 3 illustrates the relative frequencies of late budgets for each of the 48 states in our data set, using our preferred definition of a late budget ($days\_late > 0$). In comparison, Figure 4 does the same for one of our alternative definitions ($days\_delayed > 0$). Most states have experienced at least once that the state legislature didn't live up to its deadline for budget passage, while 22 states have experienced a budget enacted after the beginning of the new fiscal year in the time period considered here. New York, North Carolina, California, Oregon and Wisconsin score high on both measures of budget lateness, while Southeastern, Plains- and Rocky Mountain states dominate the group that have never experienced any late budgets.

In what follows, we report results for our preferred definition of late budgets only. Table A3 in the appendix reports results for our main explanatory variables of interest using the two alternative definitions. A full set of results that parallel those reported below are available from the authors upon request. In short, all of our main conclusions are highly robust to plausible alternative definitions of a late budget.

<**Figure 3 about here.**[No. of budgets enacted after beginning of fiscal year, relative to total no. of enacted budgets 1988-2007]>

<**Figure 4 about here.**[No. of budgets passed after legislature's deadline, relative to total no. of enacted budgets 1988-2007]>

[23] Note that odd years generally have more late budgets than even years. This is due to the fact that almost all states with biennial budgeting pass new two-year budgets in odd years, so more budgets are enacted in odd years than in even years. Relative to the total number of budgets being enacted, there is no difference between odd years and even years.

4 Explanatory variables

This section describes the set of explanatory variables in our empirical analyses. More detailed descriptions of all variables, including their sources, can be found in table A1 in the appendix.

A key prediction of the model is that a shock to the fiscal climate (as compared to the previous year) should lead to a delay in the budget adoption, with the delay being longer, the greater the shock is. To test this prediction, we include different measures of changes in the fiscal climate in our estimations. Our preferred measure is the change in the state unemployment rate compared to the previous year. An important advantage of this measure over other candidates is that unemployment statistics are typically available with a much shorter time lag than, say, growth rates in state GDP. Thus, the state unemployment rate is likely to reflect the information available to policymakers at the time of budget adoption more accurately than other measures of the business cycle. Furthermore, Scheppach (2009, p. 1) notes that "the trough in state revenue generally coincides with the peak in unemployment". Finally, the change in the state unemployment has the nice property that there is a natural distinction between positive shocks to the fiscal climate (decreases) and negative shocks (increases).[24] We also consider an alternative measure that focuses more directly on fiscal conditions, namely the revenue schock measure developed in Poterba (1994) and Poterba and Rueben (2001).

As explained above, we expect divided control over the state government to produce longer and more frequent budget delays. We therefore include a dummy variable that takes the value one if either *i)* both chambers in the legislature are controlled by another party than the governor's (*split branch*), or *ii)* the two chambers are controlled by different parties (*split legislature*).We shall later look more into the difference between these two types of divided government.

An additional prediction of the model is that the greater the cost politicians incur during delays, the shorter is the expected delay. As mentioned in section 2, we expect such costs to be higher in election years than in non-election years. We also consider measures that plausibly correlate with the opportunity cost of budget stalemates for the politicians involved: Part-time legislators often have well-paid civil occupations in addition to their political office, and they typically receive only a modest compensation (and perhaps none at all if the deadline is exceeded) for spending time at the state assembly. Hence, part-time legislators have a much greater opportunity cost of delaying agreement than full-time legislators, who have no or limited outside occupation. We therefore include a variable that characterizes the state legislature on a 1 to 5 scale, where 1 corresponds to a part time "citizen legislature, while 5 corresponds to a full-time professional legislature. Our prior is that delays are both longer and more frequent

[24]No equally natural distinction exists for another potential measure, namely the growth rate in real state GDP; what constitutes a negative shock in this case? A negative growth rate? A below-average growth rate? Or a drop in the growth rate relative to last year? In our opinion, there is no obvious answer to this question.

in full-time legislatures.

In a similar spirit, we also include dummy variables for whether the legislature is required (by constitution or statute) to end its regular session before a certain deadline. Where such deadlines are present, a failure to pass the budget before the deadline means that the legislature must go into overtime session, or that a special session must be called. This increases the salience of budget impasses, and we therefore expect the political costs of proctracted negotiations to be higher in states that have such deadlines. We distinguish between two types of legislative session deadlines: *Hard* deadlines require the regular session to end by a certain, clearly specified date, with no room for extension. *Soft* deadlines are deadlines that either do not specify a certain *calendar* date by which the regular session must end (for example, the Georgia constitution limits the regular session to 40 *legislative* days, but it does not require these legislative days to be consecutive), or gives the legislature some leeway to extend the session beyond the deadline (for example, the Arkansas legislature can, and frequently does, extend its 60-days deadline by a two-thirds vote in both chambers).

Finally, states differ widely in the consequences that can arise in the event of a late budget. To capture some of these differences, we include a dummy for whether entering a new fiscal year without a budget in place could lead to a shutdown of state government activities. Unfortunately for our purposes, the reliability of this information is impaired by the fact that many states have never experienced a late budget, and their state laws do not address the issue. The true consequences of a late budget are therefore unknown in these states.

In addition to the above categories of variables that test our main predictions, we explore the impact of a range of institutional, political, cultural and demographic factors: We consider various institutions related to the budget, such as whether there any super majoritarian requirements for passing the budget (as is the case in California). Balanced budget rules are another potentially important institution. Conditional on the state of the economy, how much fiscal adjustment is needed is likely to depend on the strictness of these rules, but also on the cash available in the general fund and the stabilization fund, both of which we control for. We also control for the party affiliation of the governor, whether the governor faces a binding term limit, the length of the governor's incumbency, and whether the current budget adoption process is the first to be handled by the incumbent governor.

Knack (2002) argues that a range of cultural and demographic variables might influence government performance, including the timeliness of the budget. We therefore control for the effect of the state population size, the proportion of non-working aged people, the proportion of blacks and the proportion of college graduates in the population. Knack (2002) also documents that certain types of social capital, such as civic reciprocity, are determinants of good governance, and so we proxy for this by including the Census 1990 mail response rate as an explanatory variable.

Finally, we run all regressions both with and without state fixed effects. Unfortunately, some of the control variables mentioned above are time invariant and must therefore be dropped when state fixed effects are included. Five-year interval time dummies are included to account for nation-wide trends across time.[25]

5 Results

5.1 Binary response models

We start out with the simplest of our measures of budget lateness, the binary variable *late_budget*. Columns (1) to (4) in Table 2 present results from some basic estimations in which we have only included our two main explanatory variables of interest: The change in the state unemployment rate and a dummy variable for divided government. We use a pooled probit estimator as well as the fixed effect logit estimator.[26]

In columns (1) and (2) we simply include the change in the unemployment rate, without distinguishing positive changes from negative changes. The change in the unemployment rate and divided control of the government are both associated with more frequent occurrences of late budgets. However, these specifications impose a linear effect of changes in the unemployment rate, in the sense that decreases in the unemployment rate are restricted to have the same impact as increases, but with the sign reversed. Columns (3) and (4) relax this restriction by explicitly separating positive changes in the unemployment rate from negative changes. More precisely, the variable *unempl_increase* is equal to the change in the unemployment rate if the change is positive, and takes the value zero in all other cases. The variable *unempl_drop* is equal to the *absolute value* of the change in the unemployment rate if the change is negative, and otherwise zero.[27] This reveals an important non-linearity: As expected, increases in the unemployment rate are associated with higher probabilities of observing budget delays, relative to a stable unemployment rate. In contrast, a drop in the unemployment rate does not appear to lower the probability of budget delays. If anything, delays are *more* likely when the state unemployment rate drops below the level from the previous year, as our model would predict.

[25] In general, we wish to include time dummies to capture heterogeneity across time. But since economic conditions are highly correlated across states, it may be difficult to disentangle the effect of national trends from the effect of changes in fiscal climates. This means that precise estimation of the coefficients on the unemployment variables may be difficult if we also include yearly time dummies. As a compromise, we therefore use dummies for 5-year periods to capture national trends, rather than yearly dummy variables. Using yearly time dummies yields similar coefficient estimates but with substantially higher standard errors on the cyclical variables.

[26] The Fixed Effect logit can only be estimated for the 20 states that have have some variation in the dependent variable (not all 0's or 1's).

[27] With these definitions, the restriction imposed in columns (1) and (2) is that the coefficient on *unempl_increase* is equal to minus one times the coefficient on *unempl_drop*.

But as the model also predicts, the impact of a drop in the unemployment rate appears to be weaker than the impact of a similar-sized increase: The coefficients on drops in the unemployment rate are always smaller than the coefficients on increases, although the differences are not statistically significant.

To illustrate the magnitude of the effects, we calculate the marginal effects of the explanatory variables in the probit estimations. Columns (3) suggest that, compared to a zero change, a one percentage-point increase in the state unemployment rate increases the likelihood that the state budget will not be signed into law before the new fiscal year by 7.8%-points. The corresponding number for a one percentage-point *drop* in the unemployment rate is 6.2%-points. Compared to a unified government, divided control of the state government raises the probability of a late budget by 14.8%-points.

<**Table 2 about here.** [Binary response models, 1988-2007]>

Columns (5) to (7) include a full set of control variables, as described in the previous section. Adding control variables does not change the main results: Divided government significantly increases the probability of a late budget, and so do increases in the unemployment rate. Drops in the unemployment rate also appear to increase the probability of late budgets. The estimated effect is significant on a 5% level when using the pooled probit estimator, but not quite so when we use the fixed effect logit estimator (the p-value is 0.14). The coefficient on *unemp_drop* is in all cases smaller than the coefficient on *unemp_increase*, but the differences are again not statistically significant.

Turning to the control variables, we find no effect of election years in either of the columns, in contrast to our priors. In column (5) we omit state fixed effects to estimate the effect of a range of time-invariant state characteristics. As expected, we find a strongly significant negative impact of deadlines that limit the length of the legislature's regular session. Somewhat surprisingly, the results suggest that "soft" deadlines have a stronger impact than "hard" deadlines. At a p-value of 0.12, the difference is borderline statistically significant. Less surprisingly, the coefficient on *shut_down* shows that late budgets are less common in states where they may result in shutdowns of state government activities.[28] Also in line with our expectations is the negative and significant coefficient on *census_reponse_rate*, which suggests that late budgets are indeed less common in states with a high level of social capital. Our results for super majority requirements (not reported) do not suggest in any way that such requirements

[28] Although in line with our theoretical priors, we would advise caution in interpreting this particular result: Many of those states that list shutdown as a likely (or even unavoidable) outcome of a late budget have never actually experienced a late budget in recent times. While this could of course reflect a causal relationship from budget procedures to outcomes, the causality could also run in the opposite direction. States that have never experienced late budgets can "afford" to warn of dire consequences in case of a highly hypothetical budget delay. Experience suggests, however, that once faced with an actual budget stalemate, state governments have a tendency to soften the rhetoric and be innovative in their efforts to avoid very harsh consequences.

increase the frequency of late budgets. This is a consistent finding throughout our empirical analyses.[29] Finally, in contrast to our priors, the results in column (5) do not provide any evidence that full-time legislatures are more prone to producing late budgets than part-time legislatures. This could of course reflect that there is in fact no causal effect, but it could also be caused by a problem of multicollinearity. In particular, $full\_time\_legislature$ and *population* are highly correlated, both individually insignificant, but jointly significant at a 10% level (p-value of 0.07). In column (6) we therefore leave out *population*. This produces the expected positive and significant coefficient on $full\_time\_legislature$.

5.2 Linear regression models

The results in this section exploit the full variation in our measure of budget lateness. This allows us to study the *length* of budget stalemates, rather than the frequency. As in the previous section, we start out with some parsimonious specifications. Columns (1) and (2) in Table 3 report basic fixed effects estimations with the change in the unemployment rate (separated into drops and increases in column (2)) and a dummy for divided government as the only explanatory variables. The results are in line with those from the previous section: Divided government is strongly associated with longer budget negotiations. The change in the unemployment rate, when included in its simplest form, is also positively related to our measures of budget lateness. But as in the previous section, distinguishing positive changes from negative changes suggests that the relationship is non-linear: A rise in the unemployment rate increases the expected length of the budget adoption process, as can be seen from the positive and significant coefficient on *unempl_increase*. The coefficient on *unempl_drop*, on the other hand, is imprecisely estimated, and there is no solid evidence that a falling unemployment rate has any impact on the length of budget negotiations. These results suggest that economic slowdowns have a greater impact on the duration of budget negotiations than economic upswings. In terms of magnitude, the estimates indicate that a 1 percentage-point rise in the unemployment rate postpones final enactment by about a week.

<**Table 3 about here**. [Linear regression models, 1988-2007]>

In columns (3) to (5) we include our full set of control variables. This produces even larger coefficients on *unempl_increase*. The coefficient is significant at the 1% level in all columns. In contrast, the estimated coefficients on *unempl_drop* are small and statistically insignificant across all columns. [30] Divided government again has a large and highly significant effect on the

[29] We do not elaborate further on this but a full set of estimation results, including estimated coefficients for super majority requirements, can be obtained from the authors upon request.

[30] Unlike the results in the previous section, the coefficients on *unempl_increase* and *unempl_drop* are now significantly different at a 1% level across all columns. In contrast, the hypothesis that the coefficient

expected length of the budget process. Compared to a unified government, our results show that the expected length of the budget process is about two weeks longer (using the fixed effect estimate) when the state government is under divided control.

Unlike in the previous section, we now find a significant effect of election years. As expected, budget negotiations are shorter in election years than in non-election years. The difference is estimated to be between one and two weeks. The first budget adoption process under a new governor appears to finish a little later than in other years. Rookie governors sign the budget about a week later than governors who have led at least one budget negotiation process, although the difference is not statistically significant when state fixed effects are included.

Turning to the time-invariant variables, we again find highly significant effects of deadlines that limit the length of the legislative session. State budgets tend to be signed into law 2-3 weeks earlier in states where a delay would trigger a shutdown of non-essential services than in states where such shutdowns cannot happen. There is some evidence that higher social capital is associated with shorter delays, but the results are now not significant. Finally, parallelling the results from the previous section, we find a positive but statistically insignificant coefficient on *full_time_leg* when we also control for state population size. The coefficient becomes much bigger and statistically significant when *population* is excluded, as shown in column (4).

5.3 Censored models

A potential issue with our dependent variable *days_late* is the manner in which negative values are treated. To illustrate, governors usually sign the budget quickly after receiving it from the legislature. *Days_late* will then record a negative value if this happens before the end of the fiscal year. But some governors sometimes choose to postpone signing the budget until the last day of the fiscal year for ceremonial reasons only. In such cases, the postponed enactment is not due to a budget stalemate, but *days_late* records a zero, rather than a negative value. Thus, the variation in *days_late* that is within the negative domain may just reflect unimportant, idiosyncratic noise.

In order to deal with this issue, we left-censor our dependent variables at zero in this section. By censoring the data we can view budget negotiations as a process that either leads to a timely budget or a delay of some (stochastic) duration. Zero or negative values of *days_late* then indicate a corner solution outcome, while strictly positive observations reflect interior solution outcomes. In Table 4 we use the Tobit model as well as the Honore (1992) semi-parametric panel Tobit estimator with fixed effects on the left-censored version, *days_late_cens*, of our dependent variable.

on *unempl_increase* is equal to minus one times the coefficient on *unempl_drop* (the restriction imposed in column (1)) is now only rejected at the 10% level in column (5).

<**Table 4 about here.** Censored outcomes, 1988-2007>

The results broadly confirm our previous findings. Starting with the Tobit estimates in columns (1) and (2), the estimated effect of an increase in the unemployment rate has the usual positive sign and is significant at a 5% level. As in the linear regressions, the coefficient on *unempl_drop* is negative, but numerically small and statistically insignificant. As usual, the coefficient estimate on *divided_gov* is positive and highly significant. The results for the time-invariant variables also resemble the results in the previous sections: Legislative session deadlines reduce the expected duration of budget delays, and so do "shut down" provisions and higher levels of social capital, as proxied by the Census response rate. As usual, the coefficient on *full_time_legislature* is positive but insignificant when *population* is included, but it becomes significant at a 10% level when *population* is omitted, as shown in column (2). The coefficient estimates produced by the Tobit fixed effect estimator in column (3) have the same sign as the Tobit estimates, but they generally lack precision. The p-value for *unempl_increase* is 0.15.[31]

5.4 Fiscal institutions and economic fluctuations

If fluctuations in economic activity cause delays in the adoption of state budgets, then we should expect fiscal institutions that influence policymakers' ability to smooth such fluctuations to affect the relationship between economic conditions and the occurrence of delays. In this section we examine the interaction between two such institutions, balanced budget rules and budget stabillization funds, and the change in the state unemployment rate. Recall the intuition from our model: A change in the amount of available resources relative to the baseline, whether positive or negative, increases the stakes in budget negotiations and produces longer delays. Following this logic, we should expect budget stabilization funds that ease smoothing by forcing extra saving in good years while providing back-up resources in bad years to alleviate the impact of economic fluctuations.

The case of balanced rules is slightly more complicated. On the one hand, balanced budget rules may hinder smoothing in bad times and could therefore exacerbate the effect of fiscal deteriorations. On the other hand, strict rules may promote fiscal discipline in good years and therefore dampen the effect of rising revenues. All states except Vermont have some kind of balanced budget requirement, but the strictness of these requirements varies considerably. Below we consider two variables that have been used in the literature to characterize the

[31] The estimated coefficient on *divided_gov* is insignificant in column (3). However, if we distinguish split-branch governments from split-legislature governments - an issue that we address further in the next section - we find a significant effect of split legislatures, and a considerably smaller and statistically insignificant effect of split-branch governments.

strictness of balanced budget rules: Whether the state is allowed to carry over a deficit into the next fiscal year, and whether the governor has line-item veto power over the budget. [32]

In columns (1) and (2) of Table 5 we split our sample between "carry-over" states and "no carry-over" states and estimate the probability of having a late budget using the FE logit estimator. A rising unemployment rate has a significant effect on the probability of late budget in states that have a "No carry-over" provision in place, whereas there is no such effect in states that allow deficits to be carried over. In column (3) we use *days_late* as the dependent variable. Rather than splitting the sample, we instead interact a dummy for "no carry-over" with the unemployment variables *unempl_increase* and *unempl_drop*. The results from this approach do not provide support for the results in columns (1) and (2), since the coefficients on the interaction terms are insignificant and have the wrong signs. In conclusion, we find only weak evidence that a "no carry-over" provision exacerbates the effect of fiscal deteriorations. In column (4) we interact the unemployment variables with a dummy for governor line-item veto power. This produces a large and significant coefficient on *unemp_fall*, but a significant and even larger negative coefficient on the associated interaction term. Our interpretation of these results is that the influx of revenue that follows a drop in unemployment intensifies the conflict over the budget, as our model predicts, but that governors equipped with line-item veto power can curb the spending pressure that the extra revenue generates, thereby neutralizing its effect on the conflict level and the length of the budget negotiations.

Columns (5) through (7) in Table 5 focus on the impact of budget stabilization funds. $stab\_fund_{i,t}$ is a dummy variable that takes the value 1 if the state had a stabilization fund in year t. In column (5) we interact this variable with *unempl_increase* and *unempl_drop*. The results suggest a remarkable effect of budget stabilization funds. In the absence of a stabilization fund, a drop in the unemployment rate has a strong positive impact on the expected duration of a late budget. When present, budget stabilization funds appear to neutralize this effect. On the other hand, the results in column (5) do not suggest that the introduction of stabilization funds has done anything to alleviate the impact of rising unemployment rates on the length of budget negotiations.

Columns (6) and (7) investigate how the impact of a stabilization fund depends on the specific rules that govern deposits into- and withdrawals from the fund. Wagner and Elder (2005) characterize the strictness of deposit and withdrawal rules on a 1 to 4 scale, where higher values correspond to less discretion and stricter rules. For both deposit and withdrawal rules, we create dummy variables for each of the four steps on the scale. We then interact our unemployment variables with $stab\_fund_{i,t}$ and with each of these dummies. Column (6) focuses on deposit rules, while column (7) does the same for withdrawal rules. The results show that the negative coefficient on the interaction between *unempl_drop* and $stab\_fund_{i,t}$

[32] See for example Alt and Lowry (1994), Bohn and Inman (1996) or Fatás and Mihov (2006).

found in column (5) is mainly driven by states in the upper categories on Wagner and Elder's scale. In particular, stabilization funds are effective in states where deposits into the fund are required in the event of a budget surplus ($depos\_rule2 = 1$) or given by a mathematical formula ($depos\_rule4 = 1$), and where withdrawals from the fund are only allowed in the event of a budget deficit ($withdraw\_rule2 = 1$) or a supermajority legislative approval ($withdraw\_rule3 = 1$). Budget stabilization funds appear to be least effective at preventing budget delays in states where deposits and withdrawals are made by legislative appropriation ($depos\_rule1 = 1$ and $withdraw\_rule1 = 1$).

<**Table 5 about here.** [Economic conditions and fiscal rules, 1988-2007]>

5.5 Alternative indicators of fiscal conditions and divided government

Table 6 investigates our main results in greater depth. First, we use the revenue shock variable constructed by Poterba (1994) and Poterba and Rueben (2001) as an alternative indicator of changes in state fiscal conditions. Poterba and Rueben measure revenue shocks as the percentage deviation of actual general fund revenues from original projections, with a correction for the impact of tax changes enacted during the fiscal year. Their variable thus captures any unforeseen developments in general fund revenue collections since the enactment of the previous budget. Following our usual strategy, we let positive shocks and negative shocks (measured in absolute values) enter separately. The results broadly confirm our previous findings: Negative revenue shocks raise the probability of a late budget significantly, judging from the probit estimates in column (1). The fixed effects regression in column (2) produces a positive but marginally insignificant coefficient on negative revenue shocks (p-value of 0.107). For positive shocks, we get a positive and weakly significant coefficient in the probit estimation in column (1), but an insignificant coefficient in the other columns.

Second, columns (5)-(8) take a closer look at our divided government variable. Here we distinguish situations in which the governor faces a united legislature controlled by the opposite party (*split branch*) from situations in which the two chambers in the legislature are controlled by different parties (*split legislature*). Across all columns, we find an economically and statistically strong effect of split legislatures. In comparison, the estimated effect of split branch governments is smaller across all columns and statistically significant in only two out of four columns. [33]These results suggest that partisan conflicts within state legislatures play a more prominent role in the explanation of budget stalemates than do conflicts between different branches of state government.

[33]We also tried interacting the divided government variables with a measure of political polarization, but none of the interaction terms came out significant and were therefore omitted.

<**Table 6 about here.** [Robustness of economic indicators and divided government, 1988-2007]>

6 Concluding remarks

The government budget is the legal basis for government spending and a prime venue for political conflict. Occasionally, this leads to prolonged budget negotiations, beyond both state specific deadlines and the beginning of the fiscal year. We have collected and systematized data on budget negotiation durations for US state governments for the period 1988-2007. We use this data to test a war-of-attrition model of bargaining between politicians from different branches of government; the politicians are loss averse with respect to deviations from budgetary baselines as references points, and the model generates a number of testable hypotheses that we take to the budget negotiation data.

Our main empirical conclusions support the hypotheses of the model: increasing unemployment leads to a longer budget negotiation process, it increases the risk of exceeding budget deadlines and it prolongs periods with no budget in place. Falling unemployment also weakly increases the risk of seeing a late budget, in accordance with our model's predictions, but in contrast to widely held beliefs that more funds automatically make agreeing on a budget easier. Divided government makes late budgets more likely in all cases. In addition, higher political costs, present in election years, decrease the duration of late budgets, while higher personal costs, for non-professional legislators, decrease both the risk of late budgets as well as their duration. Soft or hard deadlines that require the legislature to end its regular session before the end of the fiscal year limit the occurence of late budgets.

While the effects of balanced budget institutions are somewhat weak, gubernatorial line-item veto powers limit negotiations during good times as do stabilization funds with strict deposit rules. The results for withdrawals from stabilization funds in times of increasing unemployment are less clear cut, possibly owing to our lack of controlling for whether funds are actually present to be withdrawn; in the most recent episode of late budgets, several states entered hard times with very low levels of rainy-day savings. Finally, using late budgets as a measure of good governance, higher social capital does seem to be associated with better governance, confirming the findings of Putnam (1993) and Knack (2002).

Finally, why do some states never experience late budgets? Our results suggest that government shutdown provisions and the use of soft or hard deadlines that limit the length of the regular session are important determinants of the presences of late budgets. In contrast, super-majority requirements, often mentioned as a contributing factor to the late budgets of California, do not show up significantly in our results. However, California have no soft or hard deadlines for ending the regular session of the legislature and no government shutdown provisions, which suggests that there are many institutional possibilities available to reformers of the California budget process and across governments.[34]

References

[1] Alesina, Alberto and Allan Drazen. 1991. “Why are Stabilizations Delayed?” *American Economic Review* 81:1170-88.

[2] Alesina, Alberto, Silvia Ardagna, and Francesco Trebbi. 2006. “Who Adjusts and When? On the Political Economy of Reforms.” *IMF Staff Papers* 53(September):1-29.

[3] Alt, James E. and Robert C. Lowry. 1994. “Divided Government, Fiscal Institutions, and Budget Deficits: Evidence from the States.” *American Political Science Review* 88:811-28.

[4] Alt, James E. and Robert C. Lowry. 2000. “A Dynamic Model of State Budget Outcomes under Divided Partisan Government.” *Journal of Politics* 62:1035-69.

[5] Andersen, Asger Lau, David Dreyer Lassen and , Lasse Holboell W. Nielsen. 2010. “ The Economic and Electoral Consequences of Late Budgets - Evidence from U.S. States.” Manuscript, University of Copenhagen.

[6] Binder, Sarah. 1999. “The Dynamics of Legislative Gridlock, 1947-96.” *American Political Science Review* 93, 519-33.

[7] Bloom, Howard S. and H. Douglas Price. 1975. “Voter Response to Short-Run Economic Conditions: The Asymmetric Effect of Prosperity and Recession.” *American Political Science Review* 69:1240-54.

[8] Bohn, Henning and Robert P. Inman. 1996. “Balanced-budget rules and public deficits: evidence from the U.S. states.” *Carnegie-Rochester Conference Series on Public Policy* 45 13-76.

[9] Chiou, Fang-Yi and Lawrence S. Rothenberg. 2007. “Comparing Legislators and Legislatures: The Dynamics of Legislative Gridlock Reconsidered.” *Political Analysis.*

[10] Crain, W. Mark. and Nicole V. Crain. 1998. “Fiscal consequences of budget baselines.” *Journal of Public Economics* 67:421-36.

[11] Diermeier, Daniel, Hulya Eraslan, and Antonio Merlo. 2003. “A Structural Model of Government Formation.” *Econometrica* 71:27-70.

[34] Interestingly, the Californian experience with having to issue IOUs in 2009 in many ways resembled a government shutdown and, indeed, led to a faster resolve that predicted by a simple ARMA forecasting model for the California budget process.

[12] Fatás, Antonio and Ilian Mihov. 2006. "The macroeconomic effects of fiscal rules in the US states". *Journal of Public Economics* 90: 101-117.

[13] Fiorina, Morris P. 1996. *Divided Government.* 2nd ed. N.Y.: Allyn and Bacon.

[14] Fudenberg, Drew and Jean Tirole. *Game Theory.* Cambridge: MIT Press.

[15] Grossman, Gene M. and Elhanan Helpman. 2008. "Separation of powers and the budget process." *Journal of Public Economics* 92:407-25.

[16] Honore, Bo E. 1992. "Trimmed LAD and Least Squares Estimation of Truncated and Censored Regression Models with Fixed Effects." *Econometrica* 60:533-65.

[17] Hsieh, Chang-Tai. 2000. "Bargaining over Reform." *European Economic Review* 44:1659-76.

[18] Kernell, Samuel. 1977. "Presidential Popularity and Negative Voting: An Alternative Explanation of the Midterm Congressional Decline of the President's Party." *American Political Science Review* 71:44-66.

[19] Knack, Stephen. 2002. "Social Capital and the Quality of Government: Evidence from the States." *American Journal of Political Science* 46:772-85.

[20] Lowry, Robert C. and James E. Alt. "A Visible Hand? Bond Markets, Political Parties, Balanced Budgets Laws, and State Government Debt." *Economics and Politics* vol.13, No.1: 49-72.

[21] Mayhew, David R. 1991. *Divided We Govern: Party control, lawmaking, and investigations, 1946-1990.* Yale University Press.

[22] Merlo, Antonio. 1997. "Bargaining over Governments in a Stochastic Environment." *Journal of Political Economy* 105:101-31.

[23] Merlo, Antonio and Charles Wilson. 1995. "A Stochastic Model of Sequential Bargaining with Complete Information." *Econometrica* 63:371-99.

[24] Meyers, Roy T. 1996. *Strategic Budgeting.* Michigan: University of Michigan Press.

[25] Meyers, Roy T. 1997. "Late Appropriations and Government Shutdowns: Frequency, Causes, Consequences, and Remedies." *Public Budgeting and Finance* 17:25-38.

[26] Nannestad, Peter and Martin Paldam. 1997. "The Grievance Asymmetry Revisited. A micro study of economic voting in Denmark, 1986-92" *European Jounal of Political Economy* 13, 81-99.

[27] Poterba, James M. 1994. "State Responses to Fiscal Crises: The Effects of Budgetary Institutions and Politics." *Journal of Political Economy* 102:799-821.

[28] Poterba, James M. and Kim S. Reuben. 2001. "Fiscal News, State Budget Rules, and Tax-Exempt Bond Yields". *Journal of Urban Economics* 50: 537-562.

[29] Poterba, James M. and Jürgen von Hagen (eds.). 1999. *Fiscal institutions and fiscal performance.* Chicago: University of Chicago Press.

[30] Putnam, Robert D. 1993. *Making Democracy Work: Civic Traditions in Modern Italy.* Princeton: Princeton University Press

[31] Quattrone, George A. and Amos Tversky. 1988. "Contrasting Rational and Psychological Analyses of Political Choice." *American Political Science Review* 82:719-36.

[32] Romer, Thomas and Howard Rosenthal. 1978. "Political Resource Allocation, Controlled Agendas, and the Status Quo." *Public Choice* 33:27-44.

[33] Samuelson, William and Richard Zeckhauser. 1988. "Status quo bias in decision making." *Journal of Risk and Uncertainty* 1:7-59.

[34] Scheppach, Raymond C. 2009. "The State Fiscal Outlook: The New Normal". National Governors Association. Presented at the 2009 Caplin Conference on the World Economy, University of Virginia.

[35] Schick, Allen. 1980. *Congress and Money - Budgeting, Spending, and Taxing.* Washington, D.C.: The Urban Institute.

[36] Schick, Allen. 2007. *The Federal Budget: Politics, Policy, Process.* 3rd ed. Washington, D.C.: Brookings Institutions Press.

[37] Soroka, Stuart N. 2006. "Good News and Bad News: Asymmetric Responses to Economic Information." *Journal of Politics* 68:372-85.

[38] Tsebelis, George. *Veto Players: How Political Institutions Work.* NY: Russell Sage.

[39] Tversky, Amos and Daniel Kahneman. 1991. "Loss Aversion in Riskless Choice: A Reference-Dependent Model." *Quarterly Journal of Economics* 106:1039-61.

[40] Wagner, Gary A. and Erick M. Elder. 2005. "The Role of Budget Stabilization Funds in Smoothing Government Expenditures over the Business Cycle." *Public Finance Review* 33: 439-465.

[41] Wildavsky, A. 1964. *The Politics of the Budgetary Process.* Boston: Little, Brown and Company.

7 Appendix

7.1 The symmetric Nash Equilibrium

This part of the appendix shows that there exists a unique symmetric Nash equilibrium in the war of attrition model studied in the main text. We continue in two steps.

The first step is to realize that in any symmetric equilibrium, the players' chosen concession times must be a strictly decreasing function of their respective marginal costs of delay.

Lemma 1 *Let $(T(\delta_A), T(\delta_B))$ be a symmetric Bayesian Nash equilibrium in the war of attrition game studied in section 2, where $T : (\underline{\delta}; \overline{\delta}] \to [0; \infty)$ is a differentiable function. T must then satisfy $T'(\delta_i) < 0$.*

Proof. [35]Let $EU(T_i, \delta_i)$ denote the expected utility for a player with marginal cost δ_i who chooses concession time T_i. Further, let $T(\delta_i')$ and $T(\delta_i'')$ denote the chosen concession times of players with marginal costs δ_i' and δ_i'', respectively. Equilibrium then requires that

$$EU(T(\delta_i'), \delta_i') \geq EU(T(\delta_i''), \delta_i')$$

and

$$EU(T(\delta_i''), \delta_i'') \geq EU(T(\delta_i'), \delta_i'')$$

Adding these two inequalities and rearranging yields

$$EU(T(\delta_i'), \delta_i') - EU(T(\delta_i'), \delta_i'') \geq EU(T(\delta_i''), \delta_i') - EU(T(\delta_i''), \delta_i'') \tag{A1}$$

By equations 3, 4 and 6, $EU(T_i, \delta_i)$ is given by

$$EU(T_i, \delta_i) = (1 - H(T_i))(u^L - \delta_i T_i) + H(T_i)u^W - \int_0^{T_i} t \cdot h(t)dt$$

Substituting this into the inequality in A1 then gives, after some rearranging,

$$(\delta_i'' - \delta_i') \left[G(T(\delta_i')) - G(T(\delta_i'')) \right] \geq 0 \tag{A2}$$

where

$$G(x) \equiv (1 - H(x))x + \int_0^{x} t \cdot h(t)dt$$

[35] This proof draws heavily on Example 6.3 in Fudenberg and Tirole (1991).

Notice now that $G'(x) = -h(x)x + 1 - H(x) + xh(x) = 1 - H(x) \geq 0$. Combined with the inequality in A2, this means that if $\delta_i' < \delta_i''$, then we must have $T(\delta_i') \geq T(\delta_i'')$, so $T'(\delta_i) \leq 0$.

To see that equilibrium concession times must be *strictly* decreasing in the marginal cost of delay, consider the following argument: If T were not strictly decreasing, there would exist some closed interval $X \subseteq (\underline{\delta}; \overline{\delta}]$ and some $t \geq 0$, such that $T(\delta_j) = t$ for all $\delta_j \in X$. This would then imply that $prob(T(\delta_j) = t) > 0$. Consider now a player i with $\delta_i \in X$: Symmetry would require this player to set $T_i = T(\delta_i) = t$. However, given that $prob(T(\delta_j) = t) > 0$, player i would never choose $T_i = t$. She would do better setting T_i just above t, because this would increase the probability of winning "discontinuously", while only increasing the cost from delay infinitesimally. Hence, $T(\delta_i)$ would not be a best response to itself, so $(T(\delta_A), T(\delta_B))$ could not be a symmetric Nash equilibrium. ■

The next step uses Lemma 1 to prove existence and uniqueness of a symmetric Bayesian Nash equilibrium.

Proposition 2 *Let $T : (\underline{\delta}; \overline{\delta}] \to [0; \infty)$ be a differentiable function. $(T(\delta_A), T(\delta_B))$ is a symmetric Bayesian Nash equilibrium if and only if $T(\delta_i)$ satisfies*

$$T'(\delta_i) = -\left[u^W - u^L\right] \delta_i (\delta_i - \underline{\delta})^{-1} \quad for\ all\ \delta_i \in (\underline{\delta}; \overline{\delta}] \tag{A3}$$

and

$$T(\overline{\delta}) = 0 \tag{A4}$$

Proof. We show the "only if" part of the proof first, since the "if" part then follows straightforwardly afterwards.

"*Only if*":

If $(T_A, T_B) = (T(\delta_A), T(\delta_B))$ is a Nash equilibrium, it must satisfy for $i, j = A, B$, $i \neq j$:

$$EU(T(\delta_i), \delta_i) \geq EU(\tilde{T}, \delta_i) \ for\ all\ \tilde{T} \geq 0\ and\ for\ all\ \delta_i \in (\underline{\delta}; \overline{\delta}],\ given\ T_j = T(\delta_j)$$

Any *interior* solution to the utility maximazation problem must satisfy the first-order condition $\frac{dEU(T(\delta_i))}{dT_i} = 0$. That is, *if* $T(\delta_i) > 0$, the derivative of expected utility with respect to T_i must be zero at $T_i = T(\delta_i)$.

Now recall that

$$\frac{dEU(T_i, \delta_i)}{dT_i} = (u^W - u^L)h(T_i) - (1 - H(T_i))\delta_i \tag{A5}$$

where H is the cdf of T_j, the opponent's concession time, and h is the associated density function. Let $T^{-1}(T_i)$ be the inverse to T , so that $T^{-1}(T(\delta_i)) = \delta_i$. T^{-1} is then defined on the interval $[T(\overline{\delta}); \lim_{\delta \to \underline{\delta}} T(\delta))$. Use that $T_j = T(\delta_j)$. For $T_i \in [T(\overline{\delta}); \lim_{\delta \to \underline{\delta}} T(\delta))$ we can then write $H(T_i)$ as

$$H(T_i) = prob(T(\delta_j) < T_i) = prob(\delta_j > T^{-1}(T_i)) = 1 - \frac{T^{-1}(T_i) - \underline{\delta}}{\overline{\delta} - \underline{\delta}} \tag{A6}$$

while $H(T_i) = 0$ for $T_i < T(\overline{\delta})$ and $H(T_i) = 1$ for $T_i \geq \lim_{\delta \to \underline{\delta}} T(\delta)$. In this derivation of $H(T_i)$, we have used that $T'(\delta) < 0$, and the fact that δ_j is uniformly distributed on $(\underline{\delta}; \overline{\delta}]$. Differentiating with respect to T_i then gives us that for $T_i \in [T(\overline{\delta}); \lim_{\delta \to \underline{\delta}} T(\delta))$:

$$h(T_i) = -\frac{1}{\overline{\delta} - \underline{\delta}} \frac{1}{T'(T^{-1}(T_i))} \tag{A7}$$

while $h(T_i) = 0$ for all other T_i. Inserting (A6) and (A7) into (A5) and evaluating at $T_i = T(\delta_i)$ then gives

$$\begin{aligned} \frac{dEU(T(\delta_i))}{dT_i} &= -(u^W - u^L)\frac{1}{\overline{\delta} - \underline{\delta}} \frac{1}{T'(\delta_i)} - \frac{\delta_i - \underline{\delta}}{\overline{\delta} - \underline{\delta}}\delta_i = 0 \Leftrightarrow \\ T'(\delta_i) &= -(u^W - u^L)(\delta_i(\delta_i - \underline{\delta}))^{-1} \end{aligned} \tag{A8}$$

To summarize, we have now established that if $(T(\delta_A), T(\delta_B))$ is a Nash equilibrium, it must be the case for all $\delta_i \in (\underline{\delta}; \overline{\delta}]$ that $T(\delta_i) > 0 \Rightarrow T'(\delta_i) = -(u^W - u^L)(\delta_i(\delta_i - \underline{\delta}))^{-1}$. Note now that we must have $T(\delta_i) > 0$ for all $\delta_i \in (\underline{\delta}; \overline{\delta})$: This follows from $T'(\delta_i) < 0$ and and the requirement $T(\delta_i) \geq 0$ for all $\delta_i \in (\underline{\delta}; \overline{\delta}]$. Combined with the result above, this implies that $T(\delta_i)$ must satisfy equation (A3).

The last step is now to prove the boundary condition $T(\overline{\delta}) = 0$. To do this, let $T_0(\delta_i)$ denote the function that satisfies equation (A3) and $T_0(\overline{\delta}) = 0$. Consider then another function $T_1(\delta_i)$ that satisfies (A3) with $T_1(\overline{\delta}) > 0$. We can then write this function as $T_1(\delta_i) = T_0(\delta_i) + T_1(\overline{\delta})$. Assume that the opponent plays according to $T_j = T_1(\delta_j)$, and imagine now the choice problem facing a player i with $\delta_i = \overline{\delta}$: If he plays according to $T_i = T_1(\delta_i)$, it means that he will be waiting $T_1(\overline{\delta})$ time units before conceding. Since there is zero probability that the opponent will concede in this time interval, this implies a certain utility loss of $\delta_i T_1(\overline{\delta})$, with no chance of winning the battle over the budget. Clearly, it would then be better for player i to concede immediately and avoid the costs of the delay. Thus, $T_1(\delta_i)$ is not a best reply to itself for all possible values of δ_i, and so it cannot be a Nash equilibrium.

"*If*":

Assume that player j chooses $T_j = T(\delta_j)$, where T satisfies (A3) and (A4). Integrating equation (A3) over δ_i and using (A4) to solve for the additive constant then gives

$$T(\delta_i) = [u^W - u^L]\frac{1}{\underline{\delta}}\left(\ln\left(\frac{\delta_i}{\delta_i - \underline{\delta}}\right) - \ln\left(\frac{\overline{\delta}}{\overline{\delta} - \underline{\delta}}\right)\right)$$

from which it is clear that $T(\overline{\delta}) = 0$ and $\lim_{\delta \to \underline{\delta}} T(\delta) = \infty$. The inverse function $T^{-1}(T_i)$ is therefore defined for all $T_i \geq 0$, so from (A6) and (A7) we get that for all $T_i \geq 0$:

$$H(T_i) = 1 - \frac{T^{-1}(T_i) - \underline{\delta}}{\overline{\delta} - \underline{\delta}}\ , \quad h(T_i) = -\frac{1}{\overline{\delta} - \underline{\delta}}\frac{1}{T'(T^{-1}(T_i))}$$

Now use that $T'(T^{-1}(T_i))^{-1} = -[u^W - u^L]^{-1}(T^{-1}(T_i)(T^{-1}(T_i) - \underline{\delta}))^{-1}$ to get

$$h(T_i) = \frac{1}{\overline{\delta} - \underline{\delta}}\frac{T^{-1}(T_i)(T^{-1}(T_i) - \underline{\delta})}{[u^W - u^L]}$$

The first-order condition for player i then becomes

$$\begin{aligned}
\frac{1}{\overline{\delta} - \underline{\delta}}T^{-1}(T_i)(T^{-1}(T_i) - \underline{\delta}) &= \frac{T^{-1}(T_i) - \underline{\delta}}{\overline{\delta} - \underline{\delta}}\delta_i \Leftrightarrow \\
T^{-1}(T_i) &= \delta_i \Longleftrightarrow \\
T_i &= T(\delta_i)
\end{aligned}$$

To find the second-order derivative, note that

$$\begin{aligned}
h'(T_i) &= \frac{1}{\overline{\delta} - \underline{\delta}}\frac{(2T^{-1}(T_i) - \underline{\delta})}{[u^W - u^L]}\frac{1}{T'(T^{-1}(T_i))} \\
&= -\frac{(2T^{-1}(T_i) - \underline{\delta})}{[u^W - u^L]}h(T_i)
\end{aligned}$$

so the second-order derivative is

$$\begin{aligned}
\frac{d^2 EU_i(T_i)}{dT_i^2} &= [u^W - u^L]h'(T_i) + h(T_i)\delta_i \\
&= (-2T^{-1}(T_i) + \underline{\delta} + \delta_i)h(T_i)
\end{aligned}$$

Now use the result from the first-order condition that $T^{-1}(T_i) = \delta_i$ to get:

$$\frac{d^2 EU_i(T_i)}{dT_i^2}|_{T_i = T(\delta_i)} = -(\delta_i - \underline{\delta})h(T_i) < 0$$

Hence, marginal utility is zero at $T_i = T(\delta_i)$, and the second-order derivative is negative at this point. This shows that $T_i = T(\delta_i)$ is a local utility maximum point. Further, since there are no other extremum points, $dEU(T_i)/dT_i$ must be positive for all $T_i < T(\delta_i)$ and negative for all $T_i > T(\delta_i)$. It then follows that $T_i = T(\delta_i)$ is also a global maximum point. Hence, $T(\delta)$ is a best response to itself, so $(T_A, T_B) = (T(\delta_A), T(\delta_B))$ is indeed a Nash equilibrium. ■

7.2 Proof of equation 12

Let $A(t)$ be the cumulative distribution function for T^{agree}. We can then derive $A(t)$ by noting that

$$\begin{aligned} A(t) &= prob(T^{agree} < t) = 1 - prob(T(\delta_A) > t) \cdot prob(T(\delta_B) > t) \\ &= 1 - prob(\delta_A < T^{-1}(t)) \cdot prob(\delta_B < T^{-1}(t)) \\ &= 1 - \left[\frac{T^{-1}(t) - \underline{\delta}}{\overline{\delta} - \underline{\delta}}\right]^2 \end{aligned}$$

where we have used that δ_A and δ_B are independent and both uniformly distributed on $(\underline{\delta}; \overline{\delta}]$. Let $a(t)$ denote the associated density function of T^{agree}. We then get that the expected time of budget agreement is

$$\begin{aligned} ET^{agree} &= \int_{T(\overline{\delta})}^{\lim_{\delta\to\underline{\delta}} T(\delta)} t \cdot a(t)dt \\ &= \int_{T(\overline{\delta})}^{\lim_{\delta\to\underline{\delta}} T(\delta)} -2t \cdot (T^{-1}(t) - \underline{\delta}) \cdot (\overline{\delta} - \underline{\delta})^{-2} \left[T'(T^{-1}(t))\right]^{-1} dt \\ &= \int_{\underline{\delta}}^{\overline{\delta}} 2T(\delta) \cdot (\delta - \underline{\delta})(\overline{\delta} - \underline{\delta})^{-2} d\delta \\ &= \frac{[u^W - u^L]}{\underline{\delta}(\overline{\delta} - \underline{\delta})^2} \int_{\underline{\delta}}^{\overline{\delta}} 2\ln\left(\frac{\delta(\overline{\delta} - \underline{\delta})}{\overline{\delta}(\delta - \underline{\delta})}\right)(\delta - \underline{\delta})d\delta \\ &= \frac{[u^W - u^L]}{\underline{\delta}(\overline{\delta} - \underline{\delta})^2} \left[(\delta^2 - 2\delta\underline{\delta})\ln(\delta(\overline{\delta} - \underline{\delta})) - (\delta - \underline{\delta})^2 \ln(\overline{\delta}(\delta - \underline{\delta})) + \delta\underline{\delta}\right]_{\underline{\delta}}^{\overline{\delta}} \\ &= [u^W - u^L]\left(\frac{\overline{\delta} - \underline{\delta} - \left[\ln(\overline{\delta}) - \ln(\underline{\delta})\right]\underline{\delta}}{\left(\overline{\delta} - \underline{\delta}\right)^2}\right) \end{aligned}$$

where we have used the substitution $t = T(\delta)$ to change variables in the integration.[36] Substituting in for $[u^W - u^L]$ from equation (5) then gives equation (12).

[36] For the last equation, we have used l'Hôpital's rule by noting that $(\delta - \underline{\delta})^2 \ln(\overline{\delta}(\delta - \underline{\delta})) = \ln(\overline{\delta}(\delta - \underline{\delta}))/((\delta - \underline{\delta})^{-2})$, so

$$\lim_{\delta \to \underline{\delta}} \left[(\delta - \underline{\delta})^2 \ln(\overline{\delta}(\delta - \underline{\delta}))\right] = \lim_{\delta \to \underline{\delta}} \left[\overline{\delta}(\delta - \underline{\delta})^{-1}/(-2(\delta - \underline{\delta})^{-3})\right] = \lim_{\delta \to \underline{\delta}} \left[-\frac{\overline{\delta}}{2}(\delta - \underline{\delta})^2\right] = 0$$

7.3 Figures and tables

Figure 1: No. of days from end of fiscal year to final budget enactment, 1988-2007

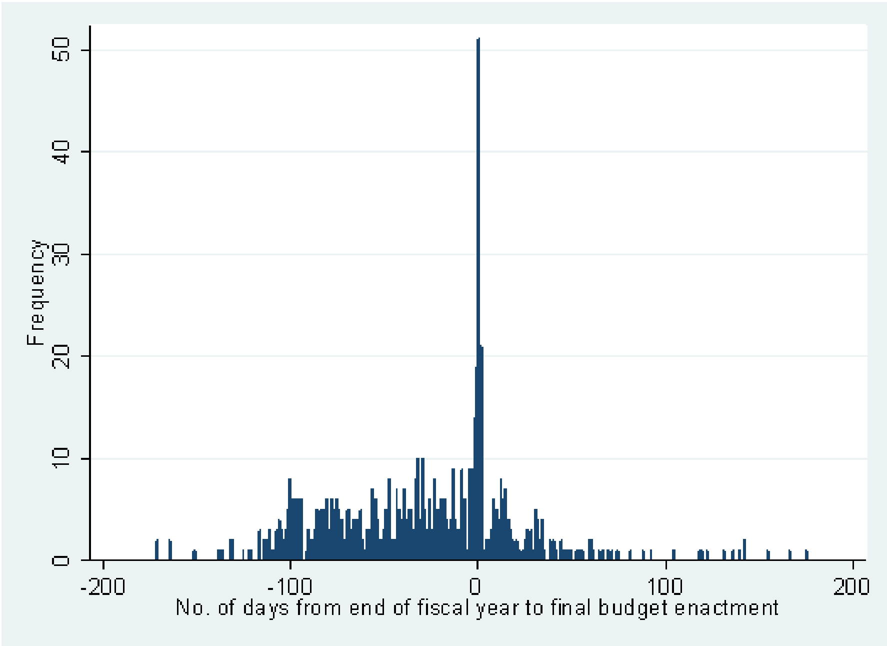

Figure 2: The number of late budgets over time, 48 states

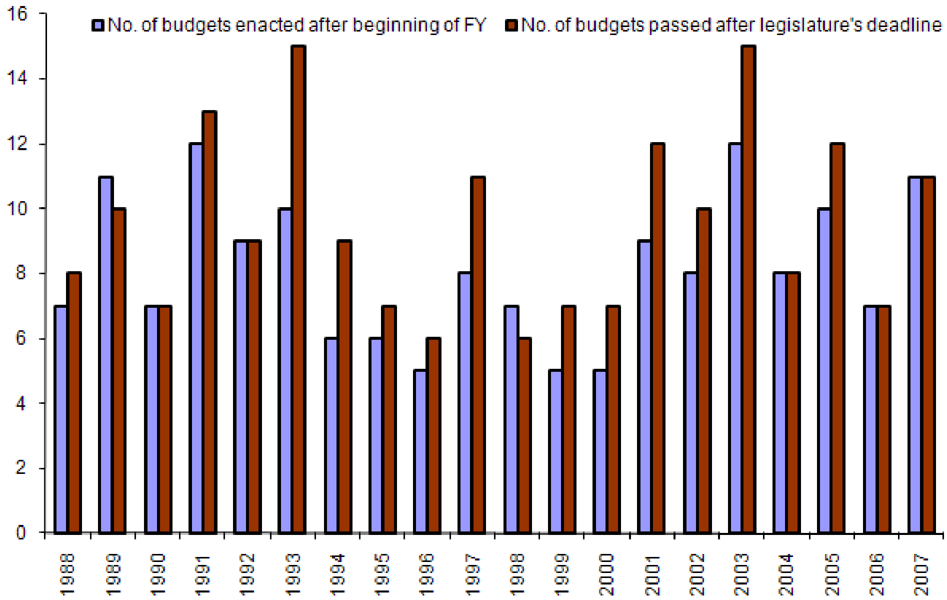

Figure 3: No. of budgets enacted after beginning of fiscal year relative to total no. of enacted budgets, 1988-2007

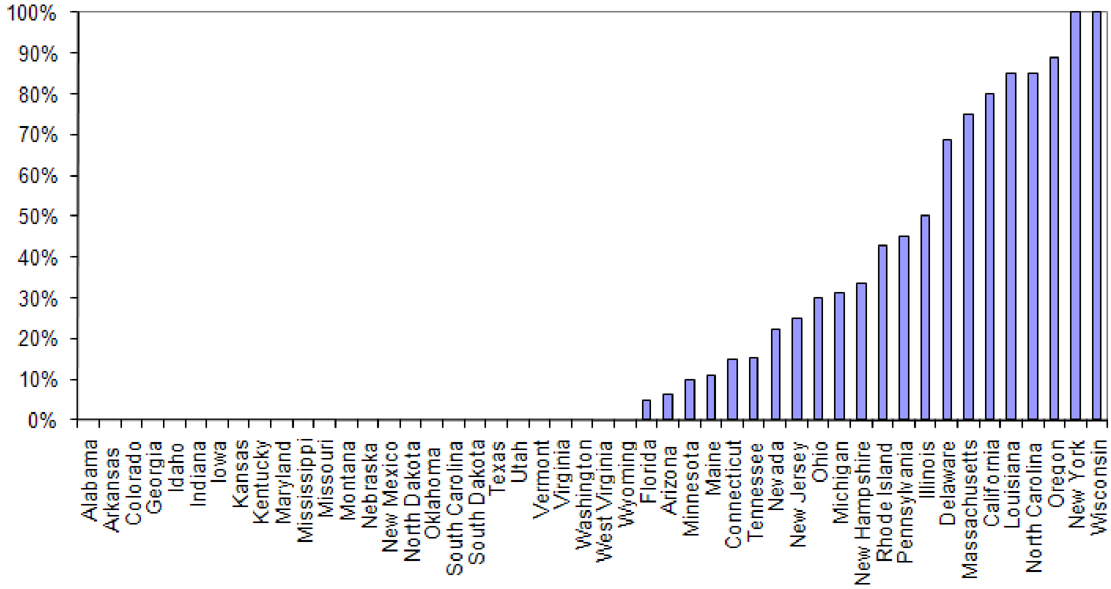

Figure 4: No. of budgets passed after legislature's deadline relative to total no. of enacted budgets 1988-2007

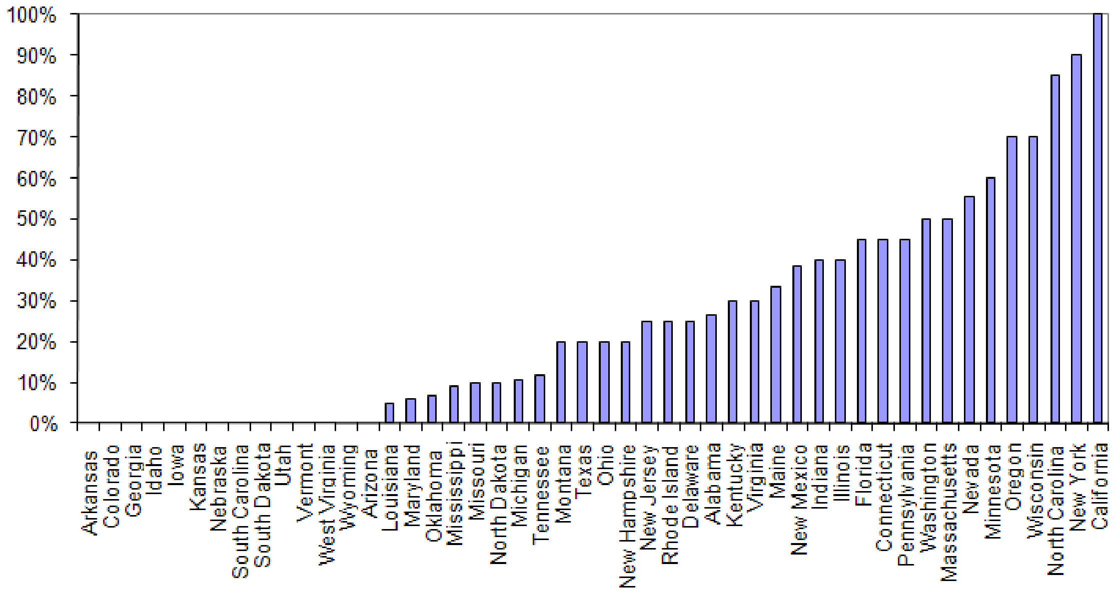

Table 1. Summary statistics[1]

Variable	Obs[2]	Mean	Std. Dev.	Min	Max
late_budget	736	0.23	0.42	0	1
days_late	734	-29.86	49.99	-172	176
days_late_cens	734	6.92	21.45	0	176
delayed_budget	720	0.26	0.44	0	1
days_delayed	720	-9.97	43.19	-115	175
days_delayed_cens	720	9.63	24.18	0	175
delayed_budget_FY	720	0.17	0.37	0	1
days_delayed_FY	720	-42.60	52.07	-178	175
days_delayed_cens_FY	720	5.26	19.14	0	175

Notes:

(1) The total number of observations may vary betwen the different forms of the dependent variable. This is due to a few cases where we know that the budget was signed into law after the beginning of the new fiscal year, but where we do not know the exact date on which this happened.

(2) The total number of enacted budgets in the period 1988 to 2007 is 808.

Table 2. Binary response models, 1988-2007

	Budget signed into law after end of fiscal year						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$Unempl\_change_{i,t}$	0.117 (0.090)	0.335* (0.181)					
$Unempl\_increase_{i,t}$			0.560*** (0.140)	0.963*** (0.323)	0.494** (0.218)	0.487** (0.220)	0.901** (0.403)
$Unempl\_drop_{i,t}$			0.446** (0.187)	0.558 (0.430)	0.334** (0.162)	0.333** (0.163)	0.770 (0.519)
$Divided\_gov_{i,t}$	0.656*** (0.184)	0.957*** (0.332)	0.685*** (0.178)	1.026*** (0.334)	0.635*** (0.188)	0.616*** (0.190)	0.846** (0.369)
$Elex_{i,t}$					-0.121 (0.178)	-0.116 (0.177)	0.031 (0.397)
$Population_{i,t}$					0.011 (0.029)		-0.339 (0.327)
$Full\_time\_legislature_i$					0.130 (0.170)	0.175* (0.092)	
$Shut\_down_i$					-1.185*** (0.287)	-1.174*** (0.299)	
$Census\_response\_rate_i$					-0.079** (0.036)	-0.081** (0.036)	
$Deadline\_soft_i$					-2.829*** (0.678)	-2.768*** (0.628)	
$Deadline\_hard_{i,t}$					-1.756*** (0.285)	-1.755*** (0.291)	
Estimator	Pooled probit	FE logit	Pooled probit	FE logit	Pooled probit	Pooled probit	FE logit
Time dummies	No	No	No	No	5-Year	5-Year	5-Year
Control variables	No	No	No	No	Yes	Yes	Yes
P[y=1|div. gov.] - P[y=1|uni. gov.] (5), (8)	18.6%	Na	14.8%	Na	24.5%	23.9%	Na
Marginal effect of ΔUNR > 0 (6), (8)	2.4%	Na	7.8%	Na	19.6%	19.3%	Na
Marginal effect of ΔUNR < 0 (7), (8)	-2.4%	Na	6.2%	Na	13.2%	13.1%	Na
Observations	732	320	732	320	732	732	320

Notes:

(1) Std. errors in parantheses. Cluster std. errors are used in the pooled probit estimations

*(2) ***,**,* denote significance on the 1%,5% and 10% levels, respectively.*

(3) A constant is included in all estimations.

(4) Also included in columns (5), (6) and (7) are: endbalance, kids and aged as well as dem_gov, term_limited, new_gov and gov_experience. Columns (5) and (6) also includes the following time-invariant variables: No_carry, supermajority, proportion_black and proportion_college.

(5) Reports the increase in the probability of a late budget when there is divided government instead of unified government

(6) Reports the impact on the probability of a late budget of a marginal increase in the state unemployment rate

(7) Reports the impact on the probability of a late budget of a marginal drop in the state unemployment rate

(8) All marginal effects on P[y=1] are evaluated at a unified government and a zero change in the unemployment rate. The additional controls in columns (5), (6) and (7) are evaluated at their averages except for the dummies for election, democratic gov., lame duck, new governor, No_carry, super majority rule, shut down provision and deadlines, which are set to zero.

Table 3. Linear regression models, 1988-2007

	No. of days from end of fiscal year to signed into law				
	(1)	(2)	(3)	(4)	(5)
$Unempl\_change_{i,t}$	5.152*** (1.695)				
$Unempl\_increase_{i,t}$		6.932*** (2.454)	10.818*** (3.244)	10.629*** (3.247)	8.763*** (2.544)
$Unempl\_drop_{i,t}$		-2.898 (3.575)	-1.606 (3.856)	-2.41 (3.812)	-0.264 (3.251)
$Divided\_gov_{i,t}$	12.791*** (3.347)	12.857*** (3.331)	24.452*** (4.099)	22.594*** (4.014)	13.511*** (3.600)
$Elex_{i,t}$			-13.050*** (3.126)	-12.807*** (3.166)	-8.532*** (2.726)
$New\_gov_{i,t}$			8.444** (4.016)	7.757* (4.040)	5.157 (3.779)
$Population_{i,t}$			1.292* (0.749)		0.826 (1.515)
$Full\_time\_legislature_{i}$			0.485 (4.047)	4.713* (2.711)	
$Shut\_down_{i}$			-18.650** (7.638)	-17.798** (7.879)	
$Census\_response\_rate_{i}$			-1.079 (0.908)	-1.247 (0.897)	
$Deadline\_soft_{i}$			-39.090*** (12.884)	-35.899*** (13.357)	
$Deadline\_hard_{i,t}$			-44.441*** (9.173)	-43.819*** (9.614)	
Estimator	FE	FE	OLS	OLS	FE
Time dummies	No	No	5-Year	5-Year	5-Year
Control variables	No	No	Yes	Yes	Yes
Observations	730	730	730	730	730

Notes:

(1) Robust std. errors in parantheses. Cluster std. errors are used in the OLS estimations

*(2) ***,**,* denote significance on the 1%,5% and 10% levels, respectively.*

(3) A constant is included in all estimations.

(4) Also included in columns (3), (4) and (5) are: endbalance, kids and aged as well as dem_gov, term_limited and gov_experience. Columns (3) and (4) also includes the following time-invariant variables: No_carry, supermajority, proportion_black and proportion_college.

Table 4. Censored outcomes, 1988-2007

	Censored no. of days from end of fiscal year to signed into law		
	(1)	(2)	(3)
$Unempl\_increase_{i,t}$	13.446**	13.472**	10.629
	(5.703)	(5.706)	(7.404)
$Unempl\_drop_{i,t}$	-3.232	-3.255	-24.578
	(6.563)	(6.565)	(22.818)
$Divided\_Gov_{i,t}$	18.654***	18.415***	23.922
	(6.028)	(5.986)	(19.068)
$Elex_{i,t}$	-9.276	-9.21	-19.943**
	(6.083)	(6.084)	(7.956)
$Population_{i,t}$	0.348		-2.831
	(1.139)		(3.396)
$Full\_time\_legislature_i$	7.671	9.119*	
	(6.831)	(5.006)	
$Shut\_down_i$	-42.661***	-42.630***	
	(13.101)	(13.217)	
$Census\_response\_rate_i$	-2.405*	-2.506**	
	(1.266)	(1.236)	
$Deadline\_soft_i$	-83.084***	-81.843***	
	(21.197)	(20.810)	
$Deadline\_hard_{i,t}$	-51.559***	-51.456***	
	(11.236)	(11.283)	
Estimator	Tobit	Tobit	Panel Tobit
Time dummies	5-year	5-year	5-year
Controls variables	Yes	Yes	Yes
Observations	730	730	730

Notes:

(1) Std. errors in paranthesis.

*(2) ***,**,* denote significance on the 1%,5% and 10% levels, respectively.*

(3) A constant is included in all estimations.

(4) Also included are: endbalance, kids and aged as well as dem_gov, term_limited, new_gov and gov_experience. Columns (1) and (2) also includes the following time-invariant variables: No_carry, supermajority, proportion_black and proportion_college.

Table 5. Economic Fluctuations and Fiscal Rules, 1988-2007

	Budget signed into law after end of fiscal year		No. of days from end of fiscal year to signed into law				
	(1)	(2)	(3)	(4)	(5)	(6)[4]	(7)[5]
$Unempl\_increase_{i,t}$	0.788	1.422*	8.786**	11.312**	11.108	10.612	10.828
	(0.596)	(0.735)	(3.896)	(5.258)	(10.004)	(9.729)	(9.808)
$Unempl\_drop_{i,t}$	1.002	0.451	-4.845	13.336**	17.631**	17.664**	18.462**
	(0.698)	(0.961)	(6.258)	(6.480)	(7.309)	(6.985)	(6.891)
$Divided\_gov_{i,t}$	0.926*	0.891	13.425***	13.642***	13.652***	13.542***	13.815***
	(0.488)	(0.722)	(3.634)	(3.616)	(3.530)	(3.524)	(3.538)
$Unempl\_increase_{i,t} \times no\_carry_i$			-0.064				
			(4.689)				
$Unempl\_drop_{i,t} \times no\_carry_i$			9.174				
			(7.405)				
$Unempl\_increase_{i,t} \times line\_item\_veto_i$				-3.021			
				(5.626)			
$Unempl\_increase_{i,t} \times line\_item\_veto_i$				-15.356**			
				(7.540)			
$Stab\_fund_{i,t}$					7.778	8.089	7.964
					(8.395)	(7.940)	(7.914)
$Unempl\_increase_{i,t} \times stab\_fund_{i,t}$					-3.071		
					(11.068)		
$Unempl\_drop_{i,t} \times stab\_fund_{i,t}$					-21.491**		
					(9.070)		
$Unempl\_increase_{i,t} \times J\_rule1$						-4.314	0.615
						(10.811)	(11.771)
$Unempl\_increase_{i,t} \times J\_rule2$						0.061	-9.115
						(11.359)	(10.508)
$Unempl\_increase_{i,t} \times J\_rule3$						-4.039	-0.286
						(11.424)	(14.419)
$Unempl\_increase_{i,t} \times J\_rule4$						-9.588	0.794
						(12.631)	(10.476)
$Unempl\_drop_{i,t} \times J\_rule1$						-12.412	-17.061*
						(7.890)	(9.143)
$Unempl\_drop_{i,t} \times J\_rule2$						-22.599**	-22.426**
						(10.020)	(9.056)
$Unempl\_drop_{i,t} \times J\_rule3$						-11.182	-40.662***
						(9.578)	(11.412)
$Unempl\_drop_{i,t} \times J\_rule4$						-34.356**	-32.203
						(14.706)	(21.866)
Estimator	FE logit	FE logit	FE	FE	FE	FE	FE
Time dummies	5-year	5-year	5-year	5-year	5-year	5-year	5-year
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Carry-over states	No carry-over states	Full	Full	Full	Full	Full
Observations	173	147	730	730	730	730	730
Number of States	11	9	48	48	48	48	48

Notes:

(1) Std. errors in paranthesis. Robust std. errors are used in columns (3) - (7)

*(2) ***,**,* denote significance on the 1%,5% and 10% level, respectively.*

(3) A constant is included in all estimations.

(4) Same control variables included as in standard fixed effect specification

(5) J=Deposit

(6) J=Withdraw

Table 6. Alternative indicators of fiscal conditions and divided government, 1988-2007

	Late_budget	Days_late	Days_late_cens		Late_budget	Days_late	Days_late_cens	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Rev\_shock\_neg_{i,t}$	0.180***	0.616	1.306*	0.956				
	(0.058)	(0.375)	(0.672)	(0.865)				
$Rev\_shock\_pos_{i,t}$	0.053*	-0.078	0.471	0.452				
	(0.030)	(0.134)	(0.381)	(0.489)				
$Unemp\_increase_{i,t}$					0.887**	8.523***	12.614**	9.931
					(0.398)	(2.655)	(5.683)	(6.998)
$Unemp\_drop_{i,t}$					0.783	-0.421	-4.116	-25.469
					(0.526)	(3.180)	(6.565)	(23.044)
$Divided\_gov_{i,t}$	0.783**	13.529***	18.535***	23.946				
	(0.377)	(3.579)	(6.110)	(20.255)				
$Split\_branch_{i,t}$					0.66	12.190***	11.891*	12.133
					(0.428)	(4.253)	(6.945)	(21.413)
$Split\_legislature_{i,t}$					1.204***	14.251***	22.923***	27.864*
					(0.448)	(3.797)	(6.987)	(15.455)
Estimator	FE logit	FE	Tobit	Panel Tobit	FE logit	FE	Tobit	Panel Tobit
Time dummies	5-year	5-year	5-year	5-year	5-year	5-year	5-year	5-year
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	319	727	727	727	320	730	730	730

Notes:

(1) Std. errors in parantheses. Robust Std. errors in column (2) and (6)

*(2) ***,**,* denote significance on the 1%,5% and 10% levels, respectively.*

(3) A constant is included in all estimations.

(4) Same control variables as in standard specification included in all columns.

Table A1. Late budgets data by state

	Information on late budget available for [1]	Responded to survey	Number of late budgets observed
Alabama	1989, 1991-2007	No	0
Alaska	-	-	-
Arizona	*1988-90* , **1991-2007**	Yes	1
Arkansas	1988-2007	No	0
California	**1988-2007**	Yes	16
Colorado	1988-89, 1991, 1993-2007	No	0
Connecticut	**1988-2007**	Yes	3
Delaware	1992-2007	No	11
Florida	**1988-2007**	Yes	1
Georgia	**1988-92**, *1993* , **1994-2007**	Yes	0
Hawaii	-	-	-
Idaho	*1988-97* , **1998-2007**	Yes	0
Illinois	**1988-2007**	Yes	10
Indiana	1988-2007	No	0
Iowa	1992-2007	No	0
Kansas	1989-91, 1993, 1997-2007	No	0
Kentucky	1988-2007	No	0
Louisiana	1988-2007	No	17
Maine	**1991-2007**	Yes	1
Maryland	1991-2007	No	0
Massachusetts	**1988-2007**	Yes	15
Michigan	1988-98, 1991, 1995-2007	No	5
Minnesota	1988-2007	No	1
Mississippi	**1997-2007**	Yes	0
Missouri	1988-2007	No	0
Montana	1999-2007	No	0
Nebraska	1997-2007	No	0
Nevada	1991-2007	No	2
New Hampshire	1991-2007	No	3
New Jersey	1988-2007	No	5
New Mexico	*1988-94* , **1995-2007**	Yes	0
New York	1988-2007	No	20
North Carolina	1988-2007	No	17
North Dakota	**1988-2007**	Yes	0
Ohio	1988-2007	No	3
Oklahoma	1993-2007	No	0
Oregon	1988-90, 1992-2007	No	8
Pennsylvania	**1988-2007**	Yes	9
Rhode Island	*1988-2000* , **2001-2007**	Yes	7
South Carolina	**1988-2007**	Yes	0
South Dakota	1996-2007	No	0
Tennessee	1995-2007	No	0
Texas	1988-2007	No	0
Utah	1989-2007	No	0
Vermont	1988-2007	No	0
Virginia	**1988-2007**	Yes	0
Washington	**1988-2007**	Yes	0
West Virginia	*1988-92* , **1993-2007**	Yes	0
Wisconsin	**1988-2007**	Yes	10
Wyoming	1998-2007	No	0

Notes:
(1) Normal font indicates that authors' own data collection is the only source of information. Italics indicate that the survey sent to state budget offices is the only source of information. Bold indicates that information is available from both sources.

Table A2. Variable definitions and sources

Variable	Description	Source
days_late $_{i,t}$	Number of days from end of fiscal year to budget signed into law	Own data collection, survey sent to state budget offices
days_delayed $_{i,t}$	Number of days from legislative deadline to legislative budget passage	Own data collection, survey sent to state budget offices
days_delayed_FY $_{i,t}$	Number of days from end of fiscal year to legislative budget passage	Own data collection, survey sent to state budget offices
late_budget $_{i,t}$	Dummy variable equal to 1 if budget was signed into law after end of fiscal year	Own data collection, survey sent to state budget offices
delayed_budget $_{i,t}$	Dummy variable equal to 1 if budget was passed by legislature after legislative deadline	Own data collection, survey sent to state budget offices
delayed_FY_budget $_{i,t}$	Dummy variable equal to 1 if budget was passed by legislature after end of fiscal year	Own data collection, survey sent to state budget offices
days_late_cens $_{i,t}$	= *days_late* $_{i,t}$ if *days_late* $_{i,t}$ > 0, otherwise zero	Own data collection, survey sent to state budget offices
days_delayed_cens $_{i,t}$	= *days_delayed* $_{i,t}$ if *days_delayed* $_{i,t}$ > 0, otherwise zero	Own data collection, survey sent to state budget offices
days_delayed_FY_cens $_{i,t}$	= *days_delayed_FY* $_{i,t}$ if *days_delayed_FY* $_{i,t}$ > 0, otherwise zero	Own data collection, survey sent to state budget offices
Unempl_change $_{i,t}$	Change in unemployment rate since previous year	Bureau of Labor Statistics
Unempl_increase $_{i,t}$	= *Unempl_change* $_{i,t}$ if *Unempl_change* $_{i,t}$ > 0, otherwise zero	Bureau of Labor Statistics
Unempl_fall $_{i,t}$	= -1 x *Unempl_change* $_{i,t}$ if *Unempl_change* $_{i,t}$ < 0, otherwise zero	Bureau of Labor Statistics
Divided_gov $_{i,t}$	Dummy variable equal to 1 if either *i)* both legislative chambers controlled by other party than governor's, or *ii)* two chambers controlled by different parties	http://www.ipsr.ku.edu/SPPQ/journal_datasets/klarner.shtml
Elex $_{i,t}$	Dummy variable equal to 1 in years with a gubernatorial election	Book of the States, various editions.
Population $_{i,t}$	State population (in millions of people)	U.S. Census Bureau
Full_time_legislature $_{i}$	1 to 5 scale for full- vs. part-time legislatures, where 1 corresponds to a part-time "citizen" legislature, and 5 corresponds to a full-time professional legislature	National Conference of State Legislatures
Shut_down $_{i}$	Dummy variable equal to 1 if the state law dictates a shutdown of state government activities in the event of a late budget	National Conference of State Legislatures
Census_response_rate $_{i}$	Response rate in the 1990 U.S. Census	U.S. Census Bureau
Deadline_soft $_{i}$	Dummy variable equal to 1 if 1) the legislature is mandated by constitution or statute to end its regular session at a date prior to the end of the fiscal year, and 2) the deadline is *either* not clearly specified in calendar terms *or* the legislature has leeway to extend it.	State legislatures' websites

Table A2. Variable definitions and sources (continued)

Deadline_hard $_{i}$	Dummy variable equal to 1 if 1) the legislature is mandated by constitution or statute to end its regular session at a date prior to the end of the fiscal year, and 2) the deadline is clearly specified in calendar terms *and* the legislature has no leeway to extend it.	State legislatures' websites
Endbalance $_{i,t}$	End-of-year balances in the general fund and stabilization fund, as projected in executive budget proposal. Measured in percent of proposed general fund expenditure	National Association of State Budget Officers: *The Fiscal Survey of States* , various editions
Kids $_{i,t}$	Percentage of population aged 5 to 17	U.S. Census Bureau
Aged $_{i,t}$	Percentage of population aged 65 or older	U.S. Census Bureau
Dem_gov $_{i,t}$	Dummy variable equal to 1 if the governor is a Democrat	http://www.ipsr.ku.edu/SPPQ/journal_datasets/klarner.shtml
Gov_experience $_{i,t}$	Number of years since the incumbent governor took office	Authors' own calculations based on information from the National Governors Association
New_gov $_{i,t}$	Dummy variable equal to 1 if the the current budget adoption process is the first to be led by the incumbent governor	Authors' own calculations based on information from the c
Term_limited $_{i,t}$	Dummy variable equal to 1 if the governor is subject to a binding term limit	National Governors Association
No_carry $_{i}$	Dummy variable equal to 1 if the state law does not allow a budget deficit to be carried over to the next fiscal year	Bohn and Inman (1996)
Line_item_veto $_{i}$	Dummy variable equal to 1 if the the governor has line item veto powers	Bohn and Inman (1996)
Supermajority $_{i}$	Dummy variable equal to 1 if a supermajority vote is required to pass each budget	National Conference of State Legislatures
Proportion_black $_{i}$	Average proportion of black people in the population in the period 1978 to 1997	U.S. Census Bureau
Proportion_college $_{i}$	Average proportion of college graduates in the population in the period 1990 to 1999	U.S. Census Bureau
Rev_shock $_{i,t}$	Percentage deviation of actual general fund revenue from original projections, net of the effect of within-year tax changes	Data provided by Kim Rueben. See Poterba and Rueben (2001)
Rev_shock_neg $_{i,t}$	= -1 x *Rev_shock* $_{i,t}$ if *Rev_shock* $_{i,t}$ < 0, otherwise zero	Poterba and Rueben (2001)
Rev_shock_neg $_{i,t}$	= *Rev_shock* $_{i,t}$ if *Rev_shock* $_{i,t}$ > 0, otherwise zero	Poterba and Rueben (2001)
Split_branch $_{i,t}$	Dummy variable equal to 1 if both legislative chambers are controlled by another party than the governor's	http://www.ipsr.ku.edu/SPPQ/journal_datasets/klarner.shtml
Split_legislature $_{i,t}$	Dummy variable equal to 1 if the two legislative chambers are controlled by different parties	http://www.ipsr.ku.edu/SPPQ/journal_datasets/klarner.shtml
Stab_fund $_{i,t}$	Dummy variable equal to 1 if the state has a budget stabilization fund in year *t*	Wagner and Elder (2005), Fatás and Mihov (2006)
Deposit_rule1 $_{i,t}$	Dummy variable equal to 1 if deposits into stabilization fund are made by legislative appropriation	Wagner and Elder (2005), Fatás and Mihov (2006)

Table A2. Variable definitions and sources (continued)

Deposit_rule2 $_{i,t}$	Dummy variable equal to 1 if deposits into stabilization fund are required in the event of a budget surplus	Wagner and Elder (2005), Fatás and Mihov (2006)
Deposit_rule3 $_{i,t}$	Dummy variable equal to 1 if deposits into stabilization fund are required when revenue growth is positive	Wagner and Elder (2005), Fatás and Mihov (2006)
Deposit_rule4 $_{i,t}$	Dummy variable equal to 1 if deposits into stabilization fund follow a mathematical formula	Wagner and Elder (2005), Fatás and Mihov (2006)
Withdraw_rule1 $_{i,t}$	Dummy variable equal to 1 if withdrawals from stabilization fund are made by legislative appropriation	Wagner and Elder (2005), Fatás and Mihov (2006)
Withdraw_rule2 $_{i,t}$	Dummy variable equal to 1 if withdrawals from stabilization fund are allowed in the event of a budget deficit	Wagner and Elder (2005), Fatás and Mihov (2006)
Withdraw_rule3 $_{i,t}$	Dummy variable equal to 1 if withdrawals from stabilization fund require a supermajority legislative approval	Wagner and Elder (2005), Fatás and Mihov (2006)
Withdraw_rule4 $_{i,t}$	Dummy variable equal to 1 if withdrawals from stabilization fund follow a mathematical formula	Wagner and Elder (2005), Fatás and Mihov (2006)

Table A3. Alternative late budget definitions, 1988-2007

	delayed_ budget	days_delayed	days_delayed_cens		delayed_ budget_FY	days_delayed _FY	days_delayed_cens_FY	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Unempl\_increase_{i,t}$	0.612*	10.794***	16.454**	22.235***	0.453	10.255***	13.468*	9.557
	(0.338)	(2.528)	(6.563)	(7.102)	(0.398)	(2.597)	(7.212)	(10.698)
$Unempl\_drop_{i,t}$	0.307	1.562	-1.009	-13.414	0.903**	0.941	0.299	-48.421**
	(0.396)	(2.642)	(8.419)	(13.034)	(0.450)	(3.446)	(8.806)	(22.390)
$Divided\_Gov_{i,t}$	1.214***	13.471***	36.980***	43.227***	1.258***	14.379***	29.846***	58.990***
	(0.290)	(3.385)	(6.338)	(12.823)	(0.404)	(3.341)	(7.769)	(17.815)
Estimator	FE logit	FE	Tobit	Panel Tobit	FE logit	FE	Tobit	Panel Tobit
Time dummies	5-year	5-year	5-year	5-year	5-year	5-year	5-year	5-year
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	488	716	716	716	328	716	716	716

Notes:

(1) Std. errors in parantheses. Robust Std. errors in column (2) and (6)

*(2) ***,**,* denote significance on the 1%,5% and 10% levels, respectively.*

(3) A constant is included in all estimations.

(4) Same control variables as in standard specification included in all columns.