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Abstract

This article investigates changes within national budget by examining actors' behavioral predilections and the institutional constraints under which they operate. The article presents three theoretical propositions about the influence of attention and institutions on all magnitudes of programmatic budget changes ranging from large cuts to massive expansions. Using quantile regression, the author is able to uncover which distinct processes bear on cuts, stasis, and expansion across spending categories within a budget. An examination of budgetary data from Denmark, Germany, the United Kingdom, and the United States from 1964 to 1999 leads to the conclusion that attention shifts lead to contractions and expansions of budgetary items, whereas preference-based explanations have marginal support. In addition, institutional costs involved in budgetary politics amplify budgetary shifts. The author closes the article by discussing the implications of the findings for partisan theories of government and institutional theories.

Keywords

comparative political economy, public policy, agenda-setting, budgets

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The global financial crisis commencing in 2007 was met with vast and swift responses by governments across industrialized democracies. Governments quickly set up rescue plans for restoring liquidity in the financial markets and for saving the housing market. They also enacted enormous stimulus packages for securing jobs and boosting the economy. These plans resulted in significant asset purchases, nationalization of major companies, and spending increases across most government agencies. For instance, part of the American government's reaction included the American Recovery and Reinvestment Act entailing spending of more that $500 billion (esp. on health care, education, and other social safety measures) as well as the Troubled Asset Relief Program allowing the purchase or insurance up to $700 billion. In Europe, the German government attempted to stabilize the financial markets via the *Finanzmarktstabilisierungsgesetz* of 2008 for around €100 billion and two stimulus packages (*Konjunkturpaket I und II*) consisting of another €100 billion.

Such swift action is challenging for rational choice institutionalist explanations that holds that, at least in the short run, self-reinforcing institutions preserve policy equilibria and generate consistent policy outcomes, such as low deficits and debt. Expeditious governmental responses also impugn path dependency arguments of historical institutionalism that typically purport that policy change occurs incrementally and is ensured by robust institutional frameworks and powerful beneficiary groups. Instead, these transformative changes in government policy hint at the twin forces of change and continuity that are depicted by punctuated equilibrium theories. Since government responses to the financial crisis entail budgetary commitment to several spending programs, this article examines the contours of past budgetary decisions across all functions of government in advanced democracies. I build on the literature investigating punctuated equilibrium logics in the context of budgetary data (Baumgartner et al., 2009; Breunig, 2006; Breunig, Koski, & Mortensen, 2009; Jones & Baumgartner, 2005a; Jones et al., 2009; True, Jones, & Baumgartner, 2007). In particular, I sustain Jones et al.'s (2009) maxim that public budgets are punctuated and probe into the mechanism of budget punctuations.

The aim of this article is to investigate changes within national budgets by examining actors' behavioral predilections and the institutional constraints under which they operate. The key argument is that policy makers' disproportionate attention to selective budget issues and the institutional constraints placed on budgetary decision making produce programmatic budget stability interspersed with extreme budget change. I develop three theoretical propositions about the impact of attention and institutions for all magnitudes of

programmatic budget changes, ranging from large cuts to massive increases. I then analyze the impact of institutional constraints and attention shifts on budgetary policies in post–World War II Denmark, Germany, the United Kingdom, and the United States. In contrast to previous quantitative studies that assess the effects of institutional, cognitive and preference-based features on the "average" budget change (often via ordinary least squares [OLS]), I employ quantile regression to examine these effects across all magnitudes of budget changes. Using quantile regression, I find that attention, the type of budget regime, and overall political constraints of the political system contribute to programmatic budgetary changes. Specifically, the analysis confirms that attention shifts and institutional costs involved in budgetary politics amplify contractions and expansions of budgetary items. I find little evidence for the impact of other behavioral and institutional factors including changes in government and partisanship.

By delineating and identifying the distinct consequences of attention and institutions on budget changes, the article makes two contributions to the literature on comparative political economy and punctuated equilibrium theory. First, I provide quantitative measures of attention shifts and institutional cost structures of budgeting. By doing so, I am able to assess punctuated equilibrium theories in a regression framework and to distinguish between institutional and attentional forces. So far, punctuated equilibrium scholars have developed only broad system-level comparisons of budget distribution within a stochastic process framework. Second, I stress that policy makers express their choices based on attention to particular problems rather than relying on preferences. A focus on attention instead of preferences enables me to reinterpret the mixed evidence for the mandate theory of political parties as well as partisan-based theories of the welfare state. Third, I highlight that institutions have a so far underappreciated dual impact on policy outcomes: They stabilize the multidimensional policy space but also serve as a barrier to efficient policy adjustments. I show that when institutional barriers are high, the limited ability to adapt to exogenous changes results in the accumulation of "policy errors" over time that later on require substantial rectifications.

The Shape of Programmatic Budget Changes

To develop theoretical propositions about the patterns of annual government budgeting across all budgetary issues (such as health care, defense, and social security), it is instructive to describe changes within budgets. In general, budget functions change, on average, very little. However, when the whole distribution of budget changes is examined, we find that some areas of the national

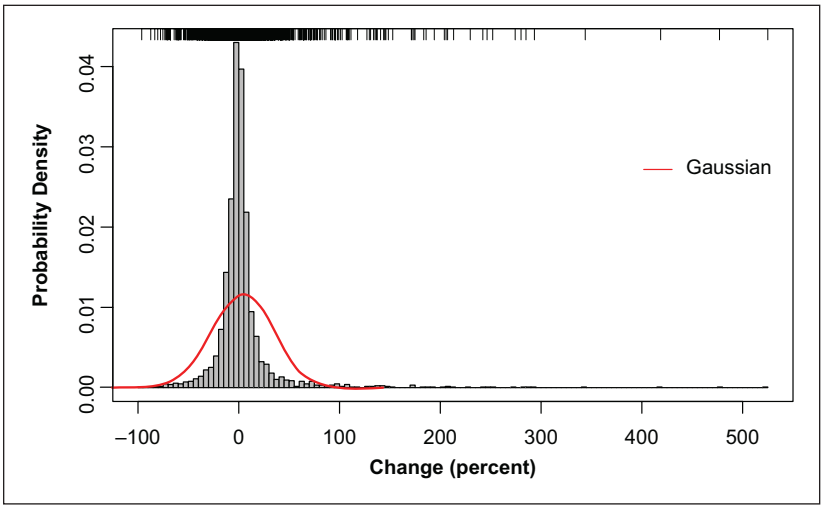

Figure 1. Histogram of the percentage changes in the shares of budget appropriations in the United Kingdom, Germany, Denmark, and the United States, 1964-1999

The solid line represents the expected Gaussian distribution based on the data's mean and variance.

budget experience little change whereas others suffer dramatic cuts or undergo massive expansions in any given fiscal year.

Figure 1 shows that both stability and large-scale change is a common feature in budgets of advanced democracies. The figures are pooled frequency distributions of annual percentage changes in the shares of government functions from 1964 to 1999 in Denmark, Germany, the United Kingdom, and the United States. It is visually apparent that budgets display high degrees of stability (indicating an immense amount of minimal budget changes) and an unusual amount of very large changes. The rug at the top of the figure eloquently shows that budget changes of more than 50% frequently occur.

To understand why political systems display such a pattern, I build on the punctuated equilibrium framework developed by Baumgartner and Jones (Jones & Baumgartner, 2005a; True et al., 2007) and inquire into whether different sets of forces generate cuts, stasis, and expansion across spending categories within a budget. Because attention and institutional costs can lead to punctuated budget changes, I argue that an important implication of punctuated equilibrium theory is that these two forces operate differently for budget cuts, stasis, and increases. In contrast, hypotheses based on theories of spatial

modeling (Bawn, 1999; Cusack, 1997; König & Troeger, 2005; Tsebelis & Chang, 2004) suppose that veto players as well as changes in the composition in government have a uniform impact on all types of budget change. The task of the next section is to distinguish between each of these two approaches in detail and develop testable hypotheses.

Attention and Institutions

The theoretical framework developed here builds on two responses to incrementalism (Wildavsky, 1964) that try to account for the occurrence of both incremental and "nonincremental" change in policy outcomes, especially in budgeting. At the micro level, scholarly work on decision making and bounded rationality (Jones, 2001; Padgett, 1980; Simon, 1985) shows that decision making is a serial process. Because of cognitive limitations, decision makers carry out an ordered search through a limited set of alternatives and sequentially assess a finite number of alternatives until they can match a "good enough" solution to the perceived problem. In aggregate, this decision-making model suggests that most change is marginal for problems that are unattended interspersed with occasional radical shifts on issues that captured attention.

At the macro level, Jones and Baumgartner (2005a) maintain that incrementalism is one element of a more comprehensive model of budgeting based on punctuated equilibrium theory. Their argument expands the micro-level logic to organizations. It suggests that organizations, such as governments, possess a limited capacity to process information and thus policy makers concentrate on and prioritize only a small set of budgetary issues. Budget issues that receive disproportionate attention change dramatically because policy makers are prone to under- and overrespond to changes in the exogenous environment. Those unattended budget items, however, remain largely unchanged because of institutional stickiness. Again, this logic expects that budgetary changes are characterized by periods of stability that are occasionally interrupted by large-scale shifts in resources. Several studies across a variety of advanced democracies and levels of government find strong empirical evidence that budgeting is predominantly incremental but periodically interrupted by very large and often consequential budgetary changes (for a summary, see Jones et al., 2009).

For budgetary politics, the key insight from punctuated equilibrium is that two distinct components—attention and institutions—contribute to the punctuated nature of public budgets. First, attention provides an individual and organizational-level logic of decision making that should be prevalent regardless of political system. Second, institutions determine country-specific decision

making and transaction costs within which policy makers operate when they cobble the annual budget together. The question is how both components affect budget cuts, stasis, and expansions of budget programs.

The first influence of programmatic budget shifts is attention. Since budgets are divided into a host of spending programs, the process of budgeting is inherently multidimensional and complex. To cope with the sheer complexity of the task, policy makers are forced to rely on operating procedures and budget routines that add additional resistance to budget change. However, when attention is focused on one particular budget dimension, the standard operating procedures give way to genuine solution searches resulting in large-scale budget change. In short, when policy makers direct their attention to a particular budget issue, that program changes. But how does attention effect different magnitudes of budget change?

Since human information processing is limited, policy makers do not continuously and proportionately respond to each problem within a specific budget function. Instead, their cognitive bounds and the limited organizational capacity under which they operate (e.g., time and resource constraints of governments and legislatures) force policy makers to prioritize certain issues over others. Prioritization means that policy makers' attention is concentrated on a small set of issues. Attention is particularly concentrated when some previously overlooked signals in the environment come into collective focus and a budgetary problem gets redefined. According to Jones and Baumgartner (2005b, pp. 38-54), the policy response to these new signals depends not only on signal strength but also on both the threshold triggering a reevaluation of a standing policy and the human tendency to overreact. Consequently, the more concentrated decision makers' attention on particular budgetary issues, the more punctuated budgetary decisions become. That means that concentration of attention amplifies the decision-making process at the tails—cuts get larger and increases are more dramatic. At the same time, attention should have no or very little impact on marginal budget adjustments.

H_A: Increasing concentration of attention leads to programmatic budget changes at the tails.

The second influence on programmatic budget shifts is decision-making, information, and transaction costs generated by political institutions. Institutions, the formal and informal rules guiding the political process, generally serve as a coordination tool and constrain behavior. Annual budgeting demands cooperation within the executive branch and between the executive and legislative branch. Negotiations extend among the finance minister, cabinet, and committees

to the assembly at large. The often rigid process of assessment, execution, and evolution (budget cycle) adds additional institutional costs to budgeting. In this environment, the necessity to cooperate among decision-making bodies accrues substantial transaction, decision-making, and information costs (Buchanan & Tullock, 1962; Coase, 1937; Jones, Sulkin, & Larsen, 2003; North, 1990). The variation in the institutional makeup of a political system delivers specific cost structures stemming from two at times overlapping sources: the separation of powers and the role of the finance minister in the government (i.e., budget regime).

Regarding the systemwide political constraints,[1] I build on Tsebelis (1995, 2002) and argue that the lower the number (and more homogenous) of the veto players, the lower the institutional decision-making costs. A lower number of veto players and higher levels of homogenous ideological preferences indicate a greater likelihood of consensus across all budget items and therefore a reduced necessity to engage in information exchange, negotiation, and bargaining. In contrast, it becomes increasingly difficult to reach a budgetary agreement as the number and ideological dispersion of actors whose agreement is necessary becomes larger. It also follows that the further away the preferences of players are from the status quo, the greater the possible departure from the status quo and the more dramatic the change. Players on the extremes exploit opportunities to change policy toward their ideal points, knowing that it is difficult to change the newly established status quo. Policy change in a diverse and "large" group of veto players is for the most part small and close to the ideological center, but ironically this immobilism forces dramatic changes on the players.

With respect to budget policy, previous governments create the status quo. A majority of budget changes should be marginal because a move away from the status quo requires the accommodation of all veto players. In systems with one or a few veto players with similar preferences, the necessity to accommodate several veto players is not prevalent. As a result, systems with one or a few homogenous veto players can more easily change budgets. Because players can more easily adjust budgets to their preferences and respond more rapidly to exogenous shocks, the necessity for dramatic change is less pronounced. In the case of a few veto players with comparable predilections, the few players operate within a rather stable policy space. Instead of stagnating, policy making fluctuates within a small range. In short, this deduction avers that budget changes at the tails of the distribution (i.e., large cuts or increases) become more severe when the number of veto players is high and the actors' preferences diverge considerably (i.e., when there are high costs of decision making).

Although veto players generate the institutional cost structure at the broader legislative level, the institutional costs produced by institutions within government concern the role of the finance ministry in the budgetary process. Literature on the role of budget institutions (Hallerberg, 2004; von Hagen, 1992) can serve as a guideline. Again, I expect that programmatic budget shifts should be more extreme in a budgetary system that requires coordination and agreement among political actors. In such a system, the role of the finance ministry in budgeting is not elevated within government or the cabinet. Instead, budgeting is conducted as a costly negotiation process within and between the executive and legislative branches. In contrast, decision-making, transaction, and information costs are considerably lower when the finance ministry controls the budget process by compiling, proposing, and legislating the budget without constraints by other political institutions. The extent to which budgetary powers are delegated to the finance minister might be indicated by the finance ministry's ability to negotiate with spending ministries on a bilateral basis, to veto cabinet-level spending decision, or to alter unilaterally the budget in grave economic circumstances. These institutional powers point to decision making where the finance ministry is able to adapt to changes in the environment or their preferences without much deliberation with other political bodies. Consequently, strong finance ministries can reverse programmatic spending decision with relative ease, resulting in smoother and less extreme budget changes.

Taking together the arguments of how the separation of power and the role of the finance minister generates institutional costs, I expect that increases in the institutional costs result in a more punctuated budget. Thus, higher institutional costs produce more severe budget cuts and more extreme budget increases.

H_1: Increases in institutional costs leads to programmatic budget changes in the tails.

It is worthwhile to distinguish the institutional cost logic from Wildavsky's understanding of budgetary institutions.[2] The institutional logic presented here argues that higher costs—articulated in more veto points, increasingly divergent preferences, and decentralized budget institutions—result in punctuated budgets. The works by Wildavsky, on the other hand, would suggest that these institutional costs would not necessarily result in delayed decision making and subsequent catch-up. Instead of suffering under the plight of multiple veto points and decentralized budgeting processes, political actors would respond by building up a more elaborate set of budgetary rules and

roles to combat the obstacles of budgeting. In short, Wildavsky's incremental budgeting model implies that institutional costs would not affect budget changes. This is an important null hypothesis.

Alternative Models

Partisanship. Partisan models of budgetary politics propose that political parties can be ordered on a left–right ideological scale (Downs, 1957, pp. 115-116), corresponding to the desired degree of state intervention into the economy. In his classic statement regarding partisan control, Hibbs (1977) argues that left and right constituents have divergent preferences on policy outcomes. Electoral competition then encourages governments to deliver policies in exchange for political support (i.e., votes) and to reward their electoral constituency by adjusting spending programs toward the public's preferences.

In context of programmatic budgeting, arguments about whether leftist and/or rightist parties are responsible for increases in particular budget items, such as welfare or defense, are long-standing in partisan theories of government and responsiveness (see, e.g., Hobolt & Klemmensen, 2008; Klingemann, Hofferbert, & Budge, 1994). Based on partisan theories (Cusack, 1997), I expect that leftist governments produce larger budget changes within an annual budget than rightist parties. There are two rationales for this expectation. First, rightist parties cater to asset-holding voters who fear inflationary pressures generated by increased spending, and consequently rightist governments attempt to limit budget growth. Second, leftist governments are inclined to increase various budget items because (a) they believe that they are able to raise the level of productivity of capital and labor through redistribution and the expansion of the public sector and (b) they can reward their constituency by delivering encompassing public goods. In short, the more leftist a government, the greater the increase in programmatic budget changes. This means that regardless of the magnitude of budget change, leftist parties have a positive impact: They alleviate cuts and expand increases.

H_{PC}: Leftist governments produce programmatic budget increases.

Change in government. A final theoretical consideration is based on literature on American lawmaking and spatial models of legislative choice. Essentially, these preference-based models aim to explain temporal variance in legislative productivity by identifying equilibrium situations in political "games." Their collective findings (esp. Krehbiel, 1998) suggest that political parties can only bring budgets in line with their preferences during the first year in power and

in the following years rely on incremental management of the new equilibrium. This logic would imply that only newly elected governments, regardless of ideological composition, alter the programmatic makeup of the budget. In doing so, newly elected governments contribute to changes in the budget in two ways. First, they increase spending on their programmatic priorities. Second, they cut back in other budget areas because of either their programmatic predications or the limited amount of public funds. In short, I expect that changes in government amplify both programmatic budget cuts and programmatic increases. Since this argument relies on the ideological placement of government, its logic applies to all situations in which the ideological composition of the government change. As such, government change and the subsequent budgetary change can be the results of electoral turnover, electoral repositioning of an existing government, or reshuffling of a governing coalition.

H_{GC}: Changes in the government produces programmatic budget change in the tails.

Data and Method

In this section, I operationalize the discussed concepts and describe each variable briefly. I start with illustrating the budget data with a quantile plot and then move on to the independent variables. The section ends with a description of how quantile regression can be used as an analytical tool for uncovering causal processes for all magnitudes of budget changes.

Data

Since it is challenging to obtain budgetary data that are backward compatible and consistent over time (Soroka, Wlezien, & McLean, 2006), I restrict my analysis to Denmark, Germany, the United Kingdom, and the United States from 1963 to 1999. The four countries represent four distinct types of democracies (minority, coalition, Westminster, and presidential) and vary in their institutional makeup at the legislative and budgetary level.

Budget change. The objective of measuring decisions politicians make in actuality requires the collection of budget data that come as close as possible to the original budget law. Although cross-country terminology varies slightly, the legal authority to incur financial obligations as express in the annual budget is called budget authority. In addition to a closer link between theoretical concept and measurement, the advantage of budget authority data is that I can exclude

considerations of cross-national variation in the implementation of budgets as well as demographic and economic changes that influence mandatory spending, such as unemployment benefits, after the budget was enacted. The data are delineated along each country's major programmatic areas (such as health care, defense, social security, transportation, administration, agriculture, and housing) and usually stem from publications provided by national finance ministries.[3]

The dependent variable of this article is the shares of programmatic budget functions. For each budget item in each country, I compute its annual change by taking the observations in a year minus the previous observation and then divide by the previous observation. This "budget change" variable goes back to classical studies of budgeting (Wildavsky, 1964) and is widely used in studies of punctuated equilibrium (e.g., Jones & Baumgartner, 2005a; Jones et al., 2003) and comparative political economy (e.g., Bawn, 1999; König & Troeger, 2005). In short, this operationalization allows me to compare the findings to previous studies and to employ them in a pooled analysis.[4]

I briefly describe the dependent variable, programmatic budget changes, to highlight some of the interesting characteristics of the data as well as introduce the notion of thinking in quantiles. The histogram (see Figure 1) and descriptive statistics (see Table 1) suggest that, on average, programmatic budget items grow incrementally. The mean is 3.4%. In addition, the interquartile range indicating the dispersion is fairly small. A statistic of roughly 13% indicates that a quarter of all budget changes is smaller than a 13% cut and a quarter of the data is larger than 13% budget increases. The remaining half of the data lies between these two values. Of the 10 largest cuts and 10 largest increases, 11 occur in the United States, 6 in Denmark, 4 in Germany, and none in the United Kingdom.

Attention. The attention measure is based on the party manifesto data (Budge, Klingemann, Volkens, Bara, & Tanenbaum, 2001). Manifestos are crucial information devices that link parties and voters and serve as a mandate for policy making. As such, they are an appropriate basis for measuring parties' attention and periodization of policies (Walgrave & Nuytemans, 2009).[5] The measure is adjusted for coalition size (weighted by each party's seat share) in the European cases and uses the same compositional rule (50% president and 25% each legislative chamber) as partisan models for the United States (Berry & Lowery, 1987).

I operationalize attention based on the Herfindahl Index, which assesses the concentration of policy issues. The Herfindahl Index is based on the share s_i of each policy issue i with N total policy issues and is computed as

Table 1. Descriptive Statistics for Variables Used in Quantile Regression

Variable	Min	*M*	*Mdn*	Max	*SD*	IQR
Budget change	−0.96	0.04	0	5.25	0.34	0.13
Attention	0.15	0.19	0.18	0.33	0.04	0.03
Budget regime	1	4.06	3.5	8	2.09	2
Political constraints	0.73	0.81	0.84	0.86	0.04	0.08
Government ideology	−46.95	6.79	27.38	53.68	32.2	60.73
Government change	0	0.27	0	1	0.45	1
Change in budget size	−0.08	0.03	0.02	0.27	0.06	0.06
Policy item	1	37.5	37.5	74	21.36	37

IQR = interquartile range. The data encompass observations from the United Kingdom, Germany, Denmark, and the United States for 1964-1999.

$H = \frac{\left(\sum_{i=1}^{n} s_i^2\right) - (1/N)}{1-(1/N)}$. The score ranges from 0 to 1 and higher scores indicate higher issue concentration; for example, a score of 1 suggests the dominance of one issue. A high concentration index would indicate that one of the nine issues is more prominently mentioned than others. This corresponds to greater attention. A low concentration index would suggest that political parties consider several issues more equally. The attention measure, as Table 1 shows, ranges from about .15 in the British manifestos of the early 1970s to .33 found in the Danish manifestos of the late 1960s and is fairly normally distributed. The measures also make intuitive sense when one considers the multiple policy challenges faced by the United Kingdom's Prime Minister Heath and his reversal on policy positions in the 1970s. In short, the attention measures track the concentration of issues across countries and time.

Institutional costs. The two institutional cost measures—budget regime and legislative constraints—are based on previous scholarly efforts. I assess the role of the finance minister (FM) in the budget-making process, specifically considering the general constraints, agenda setting and negotiation powers, and budget norms. von Hagen (1992) and Hallerberg, Strauch, and von Hagen (2001) create an index that assesses the role of the finance ministry for all stages of the budget-making process. The following categories are used to create an 8-point index of its powers:

> [N]egotiations take place bilaterally between FM and resort minister, ministers cannot ask for cabinet decisions on their bids, there are bi-lateral discussions at all, FM has special powers, 1 each per power mentioned, full cabinet does not resolve disputes, and the full cabinet cannot override FM. (Hallerberg et al., 2001, p. 66)

I reverse their 8-point index so that a higher score indicates greater institutional costs and extend their index to the United States and to the pre-1973 period for all countries. As Table 1 shows, the actual scores range from a minimum of 1, which characterizes the United Kingdom in 1979, to a maximum of 7, for the United States prior to 1974.

As a measure of institutional costs at the legislative level, I rely on a veto player measure developed by Henisz (2002, pp. 380-385). The measure identifies the number of independent branches of government (executive, lower and upper legislative chambers) with veto power over policy change. It then derives a quantitative measure of institutional hazards using a simple spatial model of political interaction. It takes into account the extent of ideological alignment and preference heterogony across branches of government using data on the party composition of the executive and legislative branches. The measure is highly correlated with the veto player provided by Tsebelis (2002). In contrast to Tsebelis's measure, it includes presidential systems such as the United States. Again, I reverse Henisz's original score so that higher values indicate greater institutional costs. Theoretically, its score ranges from 0 (suggesting no institutional constraints) to 1.

Government ideology. The government ideology measure operationalizes the partisanship of government in a single left–right scale. I utilize the measure of the center of political gravity (CPG) of government parties. Formally, the CPG weighs each government party's ideological dimension with its decimal share of seats and then sums across all government parties (Cusack, 1997). Cusack (1997) uses the left–right measure of the Comparative Manifesto Project (Budge et al., 2001) to determine the ideological position of each party. The measure of CPG ranges from −100 (far left) to +100 (far right). The United Kingdom is both the most liberal (late 1960s) and most conservative (during the 1980s) government in my data set, whereas German and Danish governments are more centrist.

Other variables and considerations. Three additional variables are employed in the following regression analysis: government change, change in total budget size, and budget program dummies. First, I employ a simple dummy variable for occurrence of government change (i.e., change in the ideological composition of government). Second, when compiling and passing a budget, political actors need to take both short- and long-run economic conditions into account. Most prominently, unemployment might reflect short-run macro fluctuation (that triggers a Keynesian fiscal policy response), whereas income or GNP might proxy long-run economic development (that triggers demands for additional infrastructure). However, at the time of the passage of a budget, policy makers can obtain only forecasts about these indicators. Thus, these economic indicators (and their providers) compete with all other information

for the attention of policy makers. Thus, it is undetermined which indicators (and from whom) policy makers consider and how they operate through the attention measure. Instead of relying on a host of economic controls, I include changes in the size of the overall budget as a tool to assess the "room" policy makers have when dividing up the budget. Third, budget programs might respond to effects that are unique to each individual budget item in each country. I control for this possibility by including a dummy variable for each policy item in each country. Finally, although I do not expect that programmatic budget changes are serially correlated, I use a test developed by Wooldridge (2002, p. 282) to examine for first order serial correlation in panel data. The null hypothesis is that there is no first order autocorrelation. For my data, the null cannot be rejected, $F(1, 34) = 1.94$ with Prob>$F = 0.17$. All of the described variables are summarized in Table 1.

Methodology—Quantile Regression

The formulation of the theoretical predictions developed above suggests that distinct processes bear on cuts, stasis, and expansion across spending categories within a budget. This means that we need a tool that allows us to assess whether attention, institutional costs, partisanship, and so on have an impact on cuts in budget categories and whether the same variables have the same or a distinct influence on budget increases. Quantile regression, introduced by Koenker and Bassett (1978), is an extension of the classical OLS estimation of conditional mean models to estimating models for conditional quantile functions (for details, see Breunig & Jones, 2011, pp. 112-113). Quantile regression employs a least absolute deviation estimator that can be used to estimate percentiles of the conditional distribution. Hence, quantile regression detects distinct causal relationships for various points on the budget change distribution. Koenker and Hallock (2001) provide introductions and overviews of quantile regression. In short, the advantage of quantile regression is that it provides estimates of each covariates across the conditional distribution of budget changes. In contrast, traditional OLS regression delivers only one estimate (for the conditional mean budget change).

To assess the robustness of the results, I estimate two models of response variables, first concentrating on the attention and institutional measures and then the full model, at the range from the 4th to 96th percentile of budget changes (i.e., $.04 \leq \tau \leq .96$) in two percentile steps. The estimated results of Equation 1 are labeled as the full model. At the τth quantile for each programmatic budget change y_{kit} in budget category k, country i, and year t, I specify an equation regressing y_{kit} on A_{it} is attention in country i in year t, BR_{it} is the budget regime, PC_{it} are the political constraints, GI_{it} is the government

ideology, GC_{it} is the change in government, DBT_{it} is the change in the budget total, and PI_{kit} are the K^*I dummies for policy items in each country. The full estimation can be summarized as

$$y_{kit} = \beta_{0\tau} + \beta_{1\tau}A_{it} + \beta_{2\tau}BR_{it} + \beta_{3\tau}PC_{it} + \beta_{4\tau}Gl_{it} + \beta_{5\tau}GC_{it} + \beta_{6\tau}DBT_{it} + \sum_{p=1}^{K^*1}\gamma_{p\tau}PI_{pt} + u_{kit\tau}. \quad (1)$$

The simplest way to present these results is plotting 47 distinct quantile regression estimates for τs ranging from .04 to .96 as the solid curve. For each of these coefficients, the point estimates can be interpreted as the impact of a one-unit change of the covariate on budget change holding other covariates fixed. Hence, each of the plots displays the quantile τ on the horizontal axis and the vertical scale indicates the covariate's effect. The blue shaded area illustrates a 90% pointwise confidence band for the quantile regression. When the confidence band is not "touching" the x-axis, we can say that the variable is statically different from zero with a 90% confidence. The results are based on 10,000 bootstrap samples that generate the confidence bands.

Findings

This section presents the findings of the quantile regressions by discussing the empirical results of each set of hypotheses stated above. I rely on the visual summary of all quantile regression results (see Figures 2 and 3). In the visual display of the results, I do not show the dummy variables for each policy item in each country that is included in the estimation. In an online appendix (available at http://individual.utoronto.ca/cbreunig/research.html), I list the detailed regression results for τs = .05, .5, and .95 as well as the OLS estimates for comparison. After going through the general findings of the quantile regression results, I assess the predicted impacts of all variables at these three "magnitudes" in detail.

Figure 2 displays the results of the baseline model and considers the impact of attention and general political and budgetary institutions' costs. The figure shows that attention has a negative and statistically significant effect for low quantiles (i.e., large to moderate budget cuts) and a positive and statistically significant effect on programmatic budget change at high quantiles (i.e., large budget increases). For the percentiles roughly between the 20th and the 87th, attention is not statistically significant. In addition, the impact of attention is much greater (up to 3 times as strong) at the positive tail of the budget change distribution (e.g., for quantiles higher than 0.9) than at the negative tail. In other words, for both large cuts and large increases, the influence of attention exaggerates budget

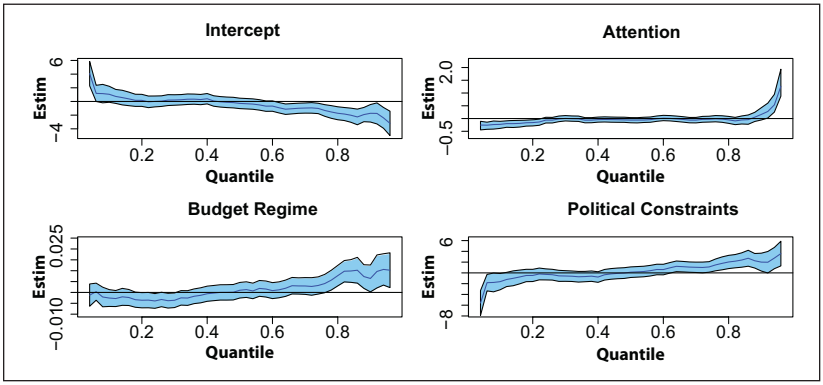

Figure 2. Quantile regression base model
The x-axis represents the quantile of each estimate, and the y-axis indicates the estimate of the variable stated in the title of each plot. The solid line is each point estimate, and the band is the 90% confidence band. The regression is based on annual programmatic changes in budgets for the United Kingdom, Germany, Denmark, and the United States, 1964-1999.

cutbacks, whereas for the upper quantiles (most prominently 85th to 98th), attention makes programmatic budget increases even larger.

For the institutional costs induced by the general legislative constraints, I find statistically significant results for large cuts (i.e., the 13th and below quantile). For example, an one unit increase in political constraints leads to a decrease in a budget item by about 4 percentage points at the 10th percentile. This suggests that budget cutbacks are more dramatic when the institutional costs for budget change increase. Likewise, for budget increases (i.e., slightly above the 60th percentile and higher), increases in institutional costs lead to increases in budget changes. This means that in cases where policy makers agree on an increase in a budget item, these increases are more dramatic in political systems with high institutional costs. For the budgetary institution measure, the evidence is a bit more mixed. Although the point estimates at the lower tails (i.e., in the low quantiles) are negative as expected, they are not statistically significant. For budget increases (above the 75th percentile), an increase in the costs produced by the budget regime leads to an increase in a budget item. The estimates for $\tau > .8$ are statistically significant. Taken together, the quantile regression results of Figure 2 suggest that increasing institutional costs and heightened attention amplify programmatic budget changes. In short, institutional costs and attention make budget change more extreme.

Figure 3 presents the quantile regression results for the full model. In addition to institutional costs and attention (and the policy issue dummies),

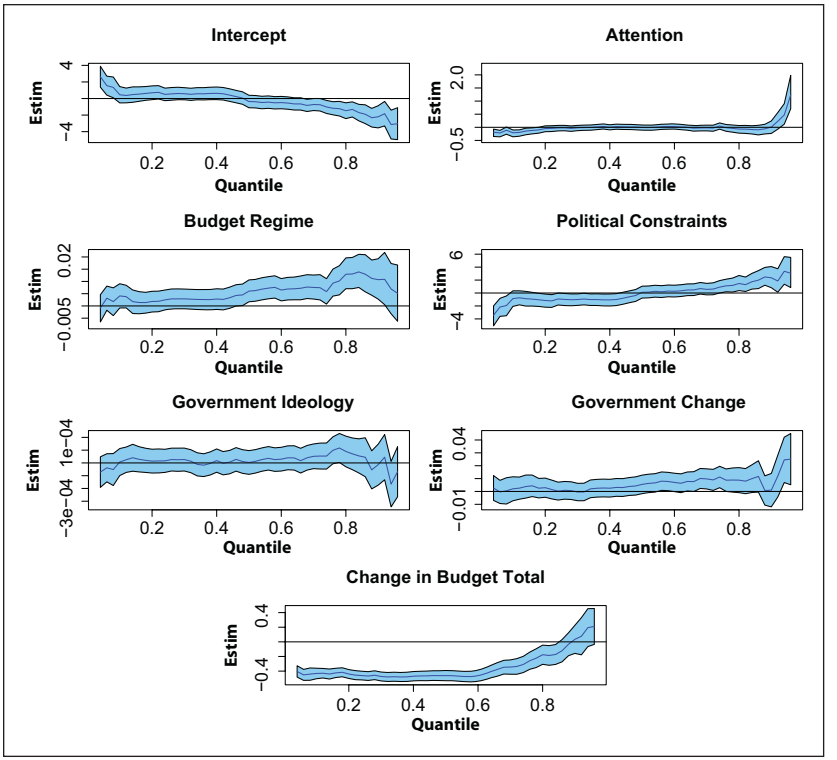

Figure 3. Quantile regression full model
The x-axis represents the quantile of each estimate, and the y-axis indicates the estimate. The solid line is each point estimate, and the band is the 90% confidence band. The regression is based on annual programmatic changes in budgets for the United Kingdom, Germany, Denmark, and the United States, 1964-1999.

I consider the effects of government change, partisanship of the government, and changes in the size of the total budget. The findings for the attention and institutional cost variables are nearly identical. The estimated effects of the attention variable are essentially the same in the base and in the full model. The results even seem to improve (in terms of magnitude and statistical significance) for two institutional costs variables. In Figure 3, the political constraints variable is negative (though at some places just barely) and statistically significant for all types of budget cuts (small ones close to the 50th percentile and large ones further below). Again, this indicates that increasing the political constraints makes budget cuts more severe. For budget increases (i.e., quantiles greater than 0.5), both institutional cost measures—budget

regime and political constraints—have a positive impact. They are also statistically significant for moderate increases and above. In other words, institutional costs amplify budget increases. Overall, the confirmation of the initial findings suggests its robustness.

Regarding government composition, I expect that leftist governments would increase budget items. For the quantile regression plot, this would mean that the point estimates are negative, that is, the solid line is below zero. This is clearly not the case. Instead, the solid line hovers around the x-axis and is always covered by the confidence band. In short, I do not find evidence for the impact of partisanship on programmatic budget change. For the government change dummy variable, I find that changes in government have a positive impact for budget increases. For moderate increases (around the 60th to 70th percentiles) and for very large increases (above the 90th percentile), these results are statistically significant. This indicates that changes in government produce more pronounced spending increases.

Finally, there is strong evidence that changes in the total size of the budget influence programmatic budget change for large cuts to moderate increases (i.e., up to about the 90th percentile). Curiously, this effect is negative, indicating that increases in the total budget lead to harsher cuts for budgets that already suffer. This effect might at least partly be explained by the fact that some of the policy item dummies have large, positive, and statistically significant effect. Several items in the United States, including Medicare and social security spending, as well as German R&D investments and social security and Danish appropriations for interior and administrative affairs have their budget cuts alleviated by 20 percentage points or more. Alternatively, this finding might also indicate that even in situations where policy makers increase the overall budget, they still might slash specific policy items to make room for large increases on some other budget item. At the very least, the finding indicates that policy makers do not treat all budget items uniformly in good or bad times.

Since it is fairly challenging to assess the exact magnitude of each variable's impact, I employ the regression results presented in the figures above and appraise their estimated effect under the counterfactual that a specific covariate changes by the size of its interquartile range (IQR). Using the IQR for each variable makes the response to each explanatory variable nicely comparable. I employ the quantile regression results of the full model at three points of the quantile distribution: $\tau = .05$ assesses the impact of the variable on large cuts, $\tau = .5$ on budget stasis, and $\tau = .95$ on large increases. The IQR for each variable and the expected change in the response variable are displayed in Table 2.

Table 2. Estimated Programmatic Budget Changes

	Counterfactual	Expected budget change for		
Variable	IQR	$\tau = .05$	$\tau = .5$	$\tau = .95$
Attention	0.035	–0.010	–0.002	0.034
Budget regime	2	0.002	0.015	0.016
Political constraints	0.076	–0.223	0.034	0.337
Government ideology	60	–0.002	0.000	–0.006
Government change	1	0.000	0.006	0.025
Change in budget size	0.062	–0.028	–0.029	0.013

IQR = interquartile range. The table shows the expected programmatic budget change under a change in the counterfactual listed on the left. Each row represents a different counterfactual and each column a different type of budget change (cut, stasis, and expansion). The counterfactual is based on a change of the regressor by its interquartile range.

Table 2 shows the following results regarding the expected programmatic budget changes for the key behavioral and institutional variables. For large budget cuts ($\tau = .05$), increasing attention by the size of the IQR leads to an on average additional 1 percentage point budget cut. For stasis, the attention variable has only a very small negative effect. Increasing attention by the size of the IQR leads to an additional 3.4 percentage point increase in a programmatic budget item ceteris paribus at the upper tail ($\tau = .95$). This is a considerable number when one takes into account that the change scores are based on budget shares. The different predicted impacts for budget cuts and budget increases also suggest that, in cases where policy makers consider positive budget changes, their magnitude is about 3 times larger than in cases where budget cuts are considered. In other words, the impact of attention makes budget increases more abrupt than program cuts.

To assess the predicted impact of the budget regime, I use the IQR of 2. This roughly corresponds to a switch from the decision-making and transaction costs incurred by the British budgetary regime to the German system in the late 1990s. For large cuts, the predicted impact of this switch is small (only about 0.2 percentage point) and also not statistically significant (as the figures above show). For marginal budget adjustments and large increases, increasing the institutional costs of the budget regime by the size of the IQR leads to increases in a programmatic budget item by 1.5 and 1.6 percentage points, respectively. If one were able to change the roles in budget making between the British chancellor of the exchequer and his American counterpart,

the predicted effect would triple. This would mean that programmatic budget shifts generated solely by the budget regime's costs add an additional 4.8% to a large increase.

The second institutional cost variable measures the constraints placed on policy makers when making a budget. For this variable, the IQR of about 0.08 roughly corresponds to moving from the decision-making and transactions costs generated by the Social Democratic–led government in Denmark in the mid-1990s to the divided government in the United States at the same time. Such a move would lead to a further 22.3 percentage point cut for large budget decrease (i.e., $\tau = .05$). For large budget increase ($\tau = .95$), the IQR move would add an extra 33.7 percentage points to a programmatic budget change. Clearly, the political constraints placed on decision makers push budget changes to the extremes. The predicted impact of the system-level institutional costs vividly points to its contribution to the punctuated nature of budgeting.

When compared to three key theoretical variables, the remaining variables' predicted impact is not quite as strong in magnitude. A change in government ideology by the IQR, which corresponds roughly to the difference between the Social Democratic Brandt government in the late 1960s in Germany to Thatcher's Conservative government in the late 1970s in the United Kingdom, has only a minimal impact (at best, a change of 0.6 percentage points) for any type of budget change. In addition, the variable is not statistically significant. This suggests that government ideology has no real influence on programmatic budget changes when we control for the influence of attention. For government change, a change in the magnitude of the IQR means a switch in government. As the table shows, a change in government has no statistically significant effect and is only small in size for budget cuts and budget stasis. For large budget changes ($\tau = .95$), changing the government leads to an additional 2.5 percentage point increase in programmatic budget change when holding all other variables constant. This finding indicates that incoming governments avoid making programmatic budget cuts more severe but indulge in injecting more monies in already growing programs. Finally, a 6.2 percentage point increase in the total budget leads, on average, to an additional cut of nearly 3 percentage points for programmatic budget cuts ($\tau = .05$) and stability ($\tau = .5$). For large programmatic budget increases ($\tau = .95$), it adds an additional 1.3 percentage points. As discussed above, this somewhat paradoxical finding might be the result of the large, positive estimated effects of some individual policy dummies, or it might suggest that even when the total budget increases, some programs will not be spared from being cut.

To evaluate the predictive power of the quantile regression model of Equation 1, I employ cross-validation. A simple way to assess the model fit is to repeatedly sample some observations out of the tails of the total sample and then compare the actual versus predicted values for the quantile regression and for the OLS regression at both tails of the budget distribution. The details of the cross-validation are illustrated in an online appendix. The cross-validation concentrates on the evaluation of the model for large budget cuts ($\tau = .05$) and large budget increases ($\tau = .95$) because I am most interested in the effects of attention and institutional costs in these situations. For the quantile regressions, the cross-validations at both tails match the estimation results of the full sample fairly well. Predictions around the actual value of the τs are close to the actual budget change. The models predict changes that are closer to the center of the distribution as more severe than the observed values. Extreme changes, on the other hand, are predicted to be less severe than they are in actuality. The cross-validation confirms the poor performance of an OLS estimation. OLS estimation mostly predicts small changes in budget items, regardless of whether the actual budget item is a large cut or massive increase. This indicates that using quantile regression greatly improves our ability to identify budgetary changes.

Discussion and Conclusion

This article examines policy makers' choice mechanisms and the institutional rules under which spending decisions for budget programs are made. Based on a punctuated equilibrium model, I argue that the impact of attention and institutions varies across the different magnitudes of budget change. I utilize quantile regressions for analyzing the effects of institutional, cognitive and preference-based theories of budgeting on data from the United Kingdom, Germany, Denmark, and the United States between 1963 and 1999. This method uncovers which distinct processes bear on cuts, stasis, and expansion across spending categories within a budget. In contrast to more common estimation techniques such as OLS regression, the quantile regressions indicate that the covariates of budget changes are not constant across the conditional distribution of the independent variables. The influence of institutions and attention is heightened when large cuts or expansions are scrutinized.

This article provides a first assessment of these distinct patterns. I find that attention shifts as well as the institutional costs generated by budgetary and broader political institutions magnify contractions and expansions of budgetary items. These findings suggest that policy makers express their choices based on attention to particular problems rather than on individual

preferences and that institutions do not just provide stability but are also a source of dramatic change. Five specific findings stand out from our analysis: (a) the effects of key variables depend on whether budget cuts or increases are analyzed; (b) when governmental actors concentrate their attention on programmatic budget items, they amplify the direction of the change (cuts are more severe and increases more massive); (c) political costs generated by the wider political system (i.e., veto players and their preferences) reinforce budget changes; (d) budget regimes that produce high institutional costs magnify programmatic budget decisions; and (e) there is not much evidence of the effect of partisanship on programmatic budget changes. Two of these findings deserve closer scrutiny.

First, consistent with theoretical expectations, heightened attention produces programmatic budget changes. More specifically, when policy makers attend to a budget item, they reinforce budget cuts and/or intensify budget increases. Both influences lend further support to attention-driven theories of public policy making (e.g., Jones & Baumgartner, 2005b). The distributional study of budgeting in the "punctuated equilibrium" framework show that programmatic budget changes are distributed in Paretian fashion (Breunig & Koski, 2006; Jones et al., 2009). Most of the probability mass is at incremental changes, but fat tails indicate very large change. The attention variable is partially responsible for this behavior because heightened attention (a) accelerates large cuts and (b) magnifies large programmatic increases. Attention thereby pushes the probability mass away from budgetary stability.

The detection of the importance of attention as a source of programmatic budget changes needs to be contrasted with the lack of evidence for the ideological measure. The regression results indicate that the ideological direction of government does not effect changes in budget programs across all types of budget change when I control for attention. This finding can be placed in the comparative politics literature in two ways. First, the "mandate" theory of political parties (most prominently, Klingemann et al., 1994) suggests that parties legislate their policy promises once in power. Empirically, they find that only for some countries and some budget items this congruence exists. Reinterpreting these findings based on an attentional model makes their mixed evidence less surprising. Only one or a few policy issues emerge on the policy agenda at a time (i.e., policy makers collectively attend to it). Although policy makers formulate and legislative collective choices on these few issues, the remaining ones are unattended and do not change. In short, parties only translate policy issues they prioritize into legislative outcomes. Second, the welfare state literature might be reinterpreted in a similar fashion. Although earlier works (e.g., Castles, 1999; Hicks & Swank, 1992; Wilensky, 1975)

stress the impact on leftist parties on welfare spending, recent scholarly efforts highlight institutional sources (e.g., veto points [Pierson, 1996] and constitutional rules [Persson & Tabellini, 2003, pp. 169-179]). In fact, Huber and Stephens (2001) trace this exact movement from the importance of left regimes during the early postwar period to the importance of veto points in the 1990s. A "punctuated equilibrium" interpretation of this trajectory would suggest that it was not leftist parties per se but political parties' focus on the government's welfare effort that led to the initial increases in spending. Once this focus resided, institutional features stabilized government's welfare efforts. Overall, the missing impact of partisanship on programmatic budget changes calls into question the logic of purely partisan theories of government.

It is important to point out that the article's theoretical framework and empirical findings stress the influence of attention-driven choice over preference-based explanations of political phenomena. Although the partisanship of government essentially has no effect on programmatic changes, the size of the attention estimates are considerable. Attention becomes all the more important when one considers the propensity to alter any of the independent variables. In contrast to the marginally and slowly changing institutional cost structure produced by the political system's veto points and budget regime, variation of attention can fluctuate substantially from one budget cycle to the next. Political actors and organizations in advanced democracies are well aware of this condition: To obtain a budget that is close to their own preferences, they predominantly invest their time, resources, and energy toward gaining access and producing information and not so much in the reconfiguration of the institutional setting.

If attention and not ideological preferences influences programmatic budget changes and public policy more broadly, a major question for future research should be the cause of attention.[6] The argument outlined in this articles suggests that political parties and information processing play a central role. By connecting political parties and how they prioritize issues, future research might be able to conceive political parties as shrewd electoral strategists as well as perspicacious respondents to changes in the environment. In circumstances where political parties are reacting to signals from the environment, they need to process and prioritize incoming information, search through and evaluate different problem–solutions sets, and choose among these alternatives. The financial crisis starting in 2007 exemplifies this task and highlights the importance of attention over preferences. Across advanced democracies, governing parties and coalitions of various ideological stripes responded in a similar and swift fashion. This article would suggest that political parties responded to the crisis because the crisis forced parties to attend to and prioritize the problem.

The common cross-national response seems to be much more the result of the priority to act and engage in a solution search than the result of common preferences on government spending and debt. This example, of course, raises several research questions, such as what kind of event trigger partisan attention, how ideological predispositions filter incoming information and relate to attention, and, more broadly, how much parties compete on ideological stances versus political issues. One fruitful tool for addressing some of these inquiries is the study of government speeches and parliamentary activities (e.g., Green-Pedersen & Mortensen, 2010; Walgrave & Nuytemans, 2009), and linking these activities to partisan manifestos, which represent more stable ideological commitments.

Second, attention is not solely responsible for programmatic changes. I find additional evidence that institutions at the policy level (budget regime) and the system level (political constraints) amplify budget choices. The argument of this article is that institutional costs do not just stabilize the multidimensional policy space; they are also the source of deviation from efficient budgetary adjustments. Because policy makers can more easily adjust budgets to their preferences and respond more rapidly to exogenous shocks when the institutional costs are low (i.e., only a few and ideologically homogenous veto players exist), the necessity for dramatic change is less pronounced. When institutional barriers are high, the challenge of adapting to new environments causes budgetary "errors" to accumulate over time, requiring substantial rectifications (Larkey, 1979). As a consequence, political institutions also magnify collective choices. The quantile regression suggests that this is especially true for the influence of decision-making, information, and transaction costs generated at the system-level. Large budget increases become extreme under more "costly" political systems, for example, the U.S. programmatic budget change is especially disjointed and episodic.

This new insight for comparative political economy concerning the effects of institutions raises the question as to why the veto player literature (König & Troeger, 2005; Tsebelis, 2002; Tsebelis & Chang, 2004) considers only the stabilizing role of institutions but misses their amplifying effect on budgetary change. There are two theoretical reasons why the veto player model underestimates the political system's ability to effect budgetary change. First, in the realm of budgetary politics, the veto player literature has a problem of "identification." Constitutional rules and the sheer necessity to keep the government running forces political actors to pass a budget. This reduces the power and effectiveness of veto players. Instead of the absolutist view about the role of veto players, it might be more appropriate to conceive their ability to block changes in probabilistic terms. This probabilistic view

is entailed in the conceptualization of the veto players as the source of institutional costs. Instead of simply denying budgetary change, veto players more likely demand more intense and prolonged negotiation over the composition of the budget. Consequently, the ability to change policy is greater than the pure veto player model purports. At the minimum, this probabilistic conception of veto players suggests that future research on veto players might examine how higher order (such as constitutional requirements) or competing (such as supranational entities) institutional structures interact or even stymie veto powers.

Second, extremely strong assumptions about preferences constrain the room for policy change in the veto player model. Three aspects are important here. First, in its strongest form veto player theory assumes that players care equally about each policy dimension and that their preferences are separable. This might not be the case as, for example, parties' preference for welfare spending might influence their spending preference on education. Second, the number of policy dimension might be unstable. From time to time, new issues can emerge into a stable (and often low-dimensional) policy-making space. When this is the case, a hitherto stable equilibrium can be transformed into a higher-dimensional policy arena. This disruption opens up the potential for larger policy change. Third, the argument that veto players induce policy stability is largely dependent on the players' ideological distance to each other. In situations where all potential veto players agree, policy change can take place. This aspect elucidates that once researchers move away from exogenous fixed preferences toward models of bounded rationality and cognitive decision making, the nearly insurmountable policy stability introduced by the power of veto players gives way to a more fluid understanding of institutional barriers.

Clearly, at this point, the identified relationships between institutions (understood as veto players) and decision making are rather speculative. Future work can probe more deeply into how cognition and preferences interact with institutions. Since the 1980s, political scientists learned a great deal about how institutions stabilize and reinforce political outcomes, but we still know fairly little about the specific dynamics of overcoming institutional barriers and legislating sweeping policy change. As a starting point, this article advances the notion that institutions do more than stabilize; they erect a threshold. Once this threshold is overcome, policies change. Crucially, policy change is more dramatic in situations where the institutional barriers are particularly high. An apparent future task is to establish and test specific mechanisms that permit political actors to overcome institutional thresholds.

In addition to the general political constraints, it is also necessary to consider briefly the impact of budget-specific institutions. Although I only find

evidence for the impact of the budget regime on budget increases, it is at the budget-making level where political actors attempt to make budgeting more adaptive to changes in the environment. Indeed, Hallerberg (2004) suggests that governments attempt to move away from a fragmented budgetary process to one that centralizes budgeting within the finance ministry. Among my cases, Denmark since the 1990s and the legislative activism in formalizing the budget process in the United States since the 1970s are evidence of this trajectory. These evolutions fit very nicely with the institutional cost argument developed by punctuated equilibrium theory. Just as Jones (2001) argues in the case of the development of the congressional committee system in the United States, policy makers consciously employ the finance ministry as a tool for compensating their own limits of attention, expertise, and time. This results in the establishment of the finance ministry as the center of budgetary politics and its being equipped with more powers and resources over time. The aim of delegating budgeting to the finance ministry thus is a reduction in the decision making, transaction, and information costs in the budget process.

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Notes

1. Jones et al. (2009) develop an alternative conception of institutional friction relying on executive strength, partisan dominance, bicameralism, and decentralization.
2. I thank an anonymous reviewer for bringing this idea to my attention.
3. In contrast to other series, budget items do not match the topical coding of the Comparative Agendas Project.
4. It also guards against categorizing large changes in small items as punctuations and, compared to changes in actual amounts, thereby is a more conservative measure of budget change.

5. An alternative measure would be annual executive speeches. However these data are not available for all countries at this time. Cases where both types of data are available indicate that they share a similar double exponential form. There is ongoing debate regarding the validity of the manifesto data. See Klingemann and Volkens (2007, chaps. 4-6) versus Mikhaylov, Laver, and Benoit (2010).
6. I thank an anonymous reviewer for pointing out this inquiry.

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Bio

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