VETO PLAYERS, PUNCTUATED EQUILIBRIA, AND BUDGETARY DYNAMICS: A COMPARATIVE ANALYSIS OF THE UNITED STATES, UNITED KINGDOM, AND DENMARK

By

Kyle B. Vierthaler-Patterson

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Chairperson Dr. Robert Rohrschneider

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Dr. Donald Haider-Markel

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Dr. Jiso Yoon

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The Thesis Committee for Kyle B. Vierthaler-Patterson

certifies that this is the approved version of the following thesis:

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Abstract

Punctuated equilibrium and veto player theories are both well-established political science models. Punctuated equilibrium theory is a model of the public policy process which holds that policy changes typically occur in an incremental fashion, but this equilibrium incremental change is subject to periods of significant and sudden punctuated change. Veto player theory holds that when more individuals and groups in political systems must give their consent for policy change to occur (i.e., they possess "veto powers"), change will be slower and less dramatic. This analysis borrows from the punctuated equilibrium model developed by Baumgartner and Jones and the veto player model developed by Tsebelis to analyze the history of budgetary changes in the United States, United Kingdom, and Denmark. The results suggest that veto players play an important role in Denmark, though due to unique partisan and institutional characteristics of the Danish political system, the relationship is the opposite of the hypothesized one. More veto players appear to actually make budgets *more* volatile, rather than increasing stability as the veto player-punctuated equilibrium hybrid model developed in this paper would predict. Overall, however, the results do not line up particularly well with the main hypothesis.

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Part I

Introduction

What factors contribute to or impede change in the structure of a country's public finances over time? This question is of fundamental importance to the discipline of political science, because it is inseparably linked to so many other phenomena that interest scholars of politics. Shifting resources within a limited pool of government funds from one program or function to another has real-world consequences for innumerable areas of public policy. Understanding the dynamics of budgetary change (whether that means expansion, contraction, or a shifting of resources) is thus foundational to a deeper understanding of what drives changes in government policies. As money is allocated and reallocated, so is the vigor with which the various programs vying for that money are executed. One interesting prospect that could explain differences in how often and how significantly budget structures change is a country's institutional design; that is, whether its political system is unitary or federal, parliamentary or presidential, bicameral or unicameral, dominated by two parties or a plethora of smaller parties, etc. These institutional characteristics play a very consequential role in determining how and by whom policy change is initiated within a given state. Three countries which have fairly different political systems, the United States, Denmark, and the United Kingdom, thus make perfect candidates for exploring the question of how a state's institutional design affects the frequency and depth of changes in its budgetary structure.

As alluded to above, the political systems of the three states are quite different. The United States, with a presidential system marked by high inter-branch policy barriers meant to "check and balance" the concentration of power in any one sector of government, faces numerous institutional impediments that governments in the United Kingdom and Denmark do not (Posner & Park, 2007, 4; Young, 2006, 2). The country's bicameral legislative system is a

further complication for the enactment of sweeping policy change, especially in times of divided government. On balance this is likely to mean that, at least theoretically, budgetary volatility will be lessened in the US. Denmark's fractious political system also likely makes enacting rapid and significant policy changes more difficult. Since 1973, the country has been ruled by various hodgepodge coalitions and, frequently, by minority governments that found themselves constantly navigating dangerous partisan tides in an effort to cobble together voting majorities on an issue-by-issue basis. This governance-by-minority is possible thanks to an oddity in the Danish political system which stipulates that "a Government need not be supported by a majority—as long as it is not outvoted by a majority" (Danish Institute for Parties and Democracy, 2011, 10). In practice, this history of deeply divided government has meant that Danish political parties have had to rely heavily upon a consensus-building style of governance to run the country effectively. This model of governing should lead the country to have a high degree of stability in its budget structure over time. In the UK's parliamentary system, policy control rests in the hands of a single House of Parliament where majority (and sometimes coalition) governments wield the power of the pen *and* the sword. Prime Ministers in the United Kingdom form cabinet governments with broad latitude in determining policies of all kinds, including tax and expenditure plans (Young, 2006, 2). In theory, the greater ease with which British lawmakers can determine such priorities should allow them to more easily enact changes in the nation's budget. This, in turn, should mean that the UK's budget structure will exhibit a heightened level of volatility over time.

1.1 Definitions of Frequently Used Terms

Before we tread too deeply into the theoretical and empirical analyses in this paper, however, I will first take a moment to define a number of key terms that will frequently appear in

the coming pages. First are a set of terms that describe the fiscal processes that are of interest for this research. *Budget structure* refers to the distribution of fiscal resources between and across budget function categories. *Budget function categories* are subsets of the overall budget that correspond to specific types of spending (i.e., defense spending, health spending, macroeconomic stability spending, etc.) Budget structures can change on a yearly basis as new budget resolutions and appropriations bills are adopted by governments, so the variable of interest for this analysis is the *degree* of change in the budget structure over time.

The degree of change in budget structures will be described with a number of additional terms and will be measured as annual percentage changes in appropriations/expenditures for all budget function categories. *Budgetary volatility* occurs in periods with more frequent and substantial budgetary percentage changes within and across function categories. Volatility can occur within a single function category or across a number of function categories simultaneously. Further, it can occur either through deliberate policy changes or because of exogenous shocks like natural disasters and economic crises. *Budgetary stability* is the opposite of budgetary volatility and occurs in periods with limited budgetary percentage changes within and across function categories. Stability is rarely consistent, however, and can often be interrupted by a *budget punctuation*. Punctuated budgets display "a pattern of different *magnitudes* of changes, rather than the occurrence of one extreme change" (Breunig & Koski, 2009, 1119). Punctuations and volatility are therefore interrelated concepts, but volatility describes a more general pattern of significant change whereas punctuations are merely single instances thereof. These concepts will be empirically measured with a number of statistical techniques that will be further described in the following sections.

Two other important terms describe the overall political system and how it affects the likelihood of significant policy changes. *Veto player structure* is defined as the ideological and institutional arrangement of power brokers within a political system. This arrangement affects the policymaking process by setting the boundaries within which negotiations and politicking can occur. Veto player structures can be upended and changed by elections or, specifically in parliamentary systems, by a coalition shuffle or a vote-of-no-confidence which in turns leads to new elections. *Institutional friction* is a consequence of the veto player structure and is defined as the degree of resistance to policy change that exists within a political system. It is determined by partisan and institutional structures in part, as these affect the ways by which compromise can be reached and policy changes subsequently enacted. High institutional friction can be overcome by a sufficiently intense exogenous shock which kicks the political system into action or, perhaps, by shrewd political maneuvering by parties and individuals typically at ideological loggerheads.

As I will more clearly outline in the following sections, these terms are all significantly intertwined within the context of this paper. Budget structures will be analyzed to determine the degree of overall stability or volatility and, more particularly, where specific budget punctuations have occurred in each country's political history. I believe that the patterns of stability and volatility will, at least in part, be influenced by the veto player structures each country has had over time and the varying degrees of institutional friction that have existed as a result. In order to help us better understand how these three countries' different political systems and institutional designs affect the stability of their budgets over time, the next section will offer a short introductory guide to show how annual spending plans are produced in each of them.

1.2 Budgetary Procedures

Fiscal policy is enacted in different ways and under very different partisan and institutional circumstances in each country. The United States has a multi-tiered budgetary process that involves input from a variety of institutional actors. Denmark's often fractious party system acts in a similar way, ensuring that budgets must achieve the consent of numerous coalition partners before passage. The United Kingdom, on the other hand, has a similar design for setting fiscal policy to Denmark, but its political system has demonstrated a tendency to produce single-party majority governments which facilitate a relatively smooth budgeting process. A brief overview of each country's budget process follows in the paragraphs below, and it provides strong preliminary evidence that the United States and Denmark have many more potential veto players than the United Kingdom.

1.2.1 Public Budgeting in the United States

Budgets in the United States must pass through numerous institutional barriers along their route to final approval. First, the President is required by law "to submit to Congress a proposed budget by the first Monday in February" (Saturno, 2004, 2). This initial document outlines various executive priorities for each fiscal year and provides a detailed overview of governmental expenditures and revenues. After it is submitted to Congress, various committees in both houses are required "within six weeks… to submit their "views and estimates" of spending and revenues within their respective jurisdictions to the House and Senate Budget Committees" (Saturno, 2004, 2). The committees' "views and estimates" are then incorporated into a broader framework containing other informational sources which are used by the House and Senate Budget Committees to produce each chamber's spending plan for the fiscal year (Saturno, 2004, 2). Assuming that each Budget Committee's recommendation passes through its respective chamber with majority support, the House and Senate then enter a "Conference

Committee" to reconcile any differences between their budgets (Saturno, 2004, 3). The outcome of the Conference Committee's negotiations produce a "budget resolution". This "represents an agreement between the House and Senate concerning the overall size of the federal budget, and the general composition of the budget in terms of functional categories" (Saturno, 2004, 3).

Though this resolution lacks the force of law, it significantly affects the boundaries within which federal spending may be allocated. The parameters set by the budget resolution allocate monies to each congressional committee responsible for various spending priorities. In some instances, a process called "reconciliation" is also initiated by the budget resolution. A reconciliation provision gives instructions to various committees with allocative authority that require them to "submit recommended legislative language to the Budget Committee in their respective chamber" (Saturno, 2004, 3). This process is initiated when the budget resolution contains significant revisions to revenue or spending policies. After receiving the various committees' recommendations, the Budget Committee then "packages the recommended language as an omnibus measure" that is then forwarded to the full House and Senate for passage (Saturno, 2004, 3).

After this lengthy process of negotiation and vote-trading, the appropriations process finally begins. This mechanism "provides funding for discretionary programs through 13 regular appropriations bills" (Saturno, 2004, 3). The appropriations process is the final step in the arduous journey through the federal budget process. Appropriations bills are drafted by 13 different subcommittees working under the auspices of the House and Senate Appropriations Committees, with each subcommittee responsible for setting spending levels for programs in their respective policy jurisdictions (Saturno, 2004, 4). After each subcommittee drafts its bill, the 13 pieces of legislation are considered separately by both chambers for passage. Assuming

that an appropriations bill passes through both houses successfully, it is then sent to the President for either a signature or a veto. These 13 bills, however, only account for discretionary spending and not for mandatory spending—meaning money allocated in laws other than appropriations bills, like Social Security, Medicare, and other similar programs. (Saturno, 2004, 2). Therefore, even after all of the extensive negotiation surrounding the passage of a budget, large portions of federal spending are still outside of Congress' normal budgetary purview.

1.2.1 Public Budgeting in Denmark

Denmark's budgeting process differs significantly from that of the United States, largely due to structural differences in their political systems. The months-long process begins each year in January as the Finance Minister presents a "Budget Priorities Memorandum" to the government's Cabinet Economic Committee. This Memorandum is, in essence, a blueprint for the coming year's lengthy budgetary agenda, including "the major politically sensitive expenditure issues… the objectives of the government's negotiations with the local and regional governments… and [proposals for] specific expenditure programmes [requiring] special analysis" (Ruffner & Blöndal, 2004, 56). It also specifies total aggregate expenditure levels and, often, marks out spending ceilings for each government ministry (Ruffer & Blöndal, 2004, 56). After the Cabinet Economic Committee and, eventually, the full cabinet, discuss and debate the Memorandum, it is approved and formal letters are sent by the Finance Minister to each cabinet minister outlining the resources allocated to their respective ministries for the coming year.

In line with these letters, each government ministry then conducts an analysis of its own budgetary needs and responds with a budget submission to the Ministry of Finance. In the following weeks, the Ministry of Finance negotiates with the various ministries "at all levels with budget analysts, deputy permanent secretaries, permanent secretaries, and ministers taking successively higher level decisions" (Ruffner & Blöndal, 2004, 58). Negotiations between the

central government and local and regional governments also play a part in this stage of the process, a very important step given that approximately two-thirds of total government spending in Denmark takes place at these lower levels of government (Ruffner & Blöndal, 2004, 54). Eventually, after all of these complex negotiations are resolved, the Minister of Finance returns to the Cabinet Economic Committee to deliver the agreed upon budget proposal. After the budget proposal is initially presented to the Folketing (the Danish parliament), the body's Finance Committee then undertakes a "technical review" of the proposal and scrutinizes it thoroughly. Following the Finance Committee's review, the budget is then presented to the wider parliament.

This proposal then enters perhaps the most contentious and difficult phase of the Danish budgetary process: negotiation between the various political parties represented in the Folketing. The difficulty of this step in the process arises due to the fact that there "are no restrictions on parliament's ability to modify the budget… [and in practice] the Danish parliament plays a greater role in the budget process than in most countries with a parliamentary form of government" (Ruffner & Blöndal, 2004, 61) At this stage, the Minister of Finance, government ministers from the various cabinet-level departments, "the senior representative of each political party in the Finance Committee," and the "senior member of each political party in each sectoral committee of parliament" all meet on a rotating basis to hammer out the specifics of the final budget (Ruffner & Blöndal, 2004, 67). These negotiations result in a list of amendments that are attached to the final budget proposal and the Queen, in her formal role as Head of State, signs it into law for final passage. This complex multi-step process involving so many different voices naturally requires consensus and, in theory at least, acts to restrain rapid and significant changes in Denmark's budget structure.

1.2.3 Public Budgeting in the United Kingdom

The United Kingdom's budgeting process is similar—at least in design if not in execution—to Denmark's. As opposed to the United States' lumbering and institutionally dense budgetary procedures, the United Kingdom's method for setting spending priorities is astonishingly efficient. In the British Parliament, there are "no ways and means committees, no budget committees, [and] no appropriations committees" (Young, 2006, 3). Rather than dozens of actors influencing fiscal policy like in the U.S., the U.K. has, for all intents and purposes, only one. The Chancellor of the Exchequer is a figure with unparalleled policy latitude in the U.K., and no comparable analog to this position exists in the U.S or Denmark. The person occupying this position is considered by many to be second only to the Prime Minister in importance and power (Young, 2006, 4).

The annual budget process in the United Kingdom begins each year with the presentation by the Chancellor to Parliament of what is termed a "Budget Statement". This document outlines "not only tax rates, but also the total amount of money that will be spent on all government activities" (Young, 2006, 3). Responsibility for crafting the Budget Statement's content ultimately falls upon the Chancellor, whom has final discretion in setting both revenue rates and total spending levels. The Budget may also be used to place caps on aggregate government spending, as well as more specific limits on either discretionary or mandatory expenditures (Young, 2006, 8). Further demonstrating the power of this position in setting fiscal policy is the fact that the Chancellor can unilaterally raise or lower taxes at his or her whim, though this prerogative is not used without justification (Young, 2006, 3). Because they are often too politically contentious, however, Chancellors have historically refrained from making major changes in tax policies (especially income tax rates) (Young, 2006, 9).

Following the Chancellor's delivery of the Budget Statement to Parliament, the second phase of the U.K. budgetary process begins. "Spending Reviews", as they are known, are similar to the appropriations process in the U.S. As with appropriations procedures in the U.S., Spending Reviews "allocate the Departmental Expenditure Limit (DEL)—the British equivalent of discretionary spending—among the various government departments" (Young, 2006, 12). Unlike in the U.S., however, Spending Reviews are streamlined and do not involve substantive input from the legislature. First, Cabinet Ministers submit funding requests for their departments and agencies to the Treasury (which the Chancellor of the Exchequer heads) (Young, 2006, 13). Her Majesty's Treasury then processes these requests and submits them to the Chief Secretary of the Treasury, whom is effectively the Chancellor's second-in-command. Armed with Treasury's estimates and reports, the Chief Secretary then "engages in bilateral face to face negotiations with the [cabinet] ministers" (Young, 2006, 13). The outcomes of these meetings are forwarded to the entire Cabinet to be approved and then, finally, are sent to the Parliament for a floor vote (Young, 2006, 13).

While the House of Commons does have the ability to reject the Spending Reviews presented to it, this is never done given the nature of the British parliamentary system. Strong majorities are a rarity, so MPs can afford little daylight between themselves and their party leaders. If even a fraction of the party were to reject their leadership's spending plans, it could initiate the collapse of its majority (Posner & Park, 2007, 4). Ministers of Parliament are thus under immense pressure to toe the party line and, as a result, the House of Commons often plays no role beyond that of a rubber stamp.

1.3 Budgets, Veto Players, and Punctuated Equilibria

The manifold differences between the budgetary processes of the United States, Denmark, and the United Kingdom are significant and the number of potential veto players involved in each is highly variable. The sheer number of potential veto players in the U.S. and Denmark vastly complicates the manner in which budgets are constructed. In the U.S. case, the need for negotiations between the dozens of lawmakers who have a role in the process mean that compromise is much more of a necessity there than in the U.K.'s aerodynamic two-step process. Similarly, the often weak coalition and/or minority governments in Denmark must de facto rely on the consent of parties with widely divergent ideological leanings and policy priorities, meaning that dramatic fiscal changes are substantially less likely.

How do these differences in political systems and budget-adoption procedures affect the frequency and depth of change in each nation's budget structure? A helpful lens through which to view this question is provided by two theories: *veto players* and *punctuated equilibrium*. Each of these theories offers a model for how to study different aspects of this question in a comparative context. Veto players theory holds that "the fundamental political differences between countries are generated by the number of veto players (individual or collective actors whose agreement is necessary for a change of the status quo)" (Tsebelis, 1999, 591). Punctuated equilibrium theory maintains that "public policies tend to maintain a general pattern of stability, characterized by incremental- or *status quo*- oriented policy decisions… [but] this general pattern of stability and equilibrium is occasionally *punctuated* by disruptive policy changes" (Citi, 2013, 1161).

Thus, synthesizing the two theories would yield a model that predicts greater budgetary "volatility" (i.e., more frequent and dramatic changes in year-to-year budgetary allocations

within and across categories of programmatic spending) in a system with fewer veto players. So, can veto players theory explain any differences between the budgetary patterns of the US, Denmark, and the UK? Stated more formally as a research question: How does the number of veto players in political systems affect the pattern of changes in budget structures over time?

One would assume that, generally speaking, the United Kingdom would be more likely to see moderate and semi-erratic changes in fiscal appropriations from year-to-year, as this type of policy change is much easier to enact given the facility with which the UK produces government budgets. In the United States and Denmark, on the other hand, one would naturally expect to see greater stability in budgetary allocation levels over time because it is more difficult to enact policy change through their political systems. This stability is not itself stable, however, as the "institutional friction" which creates it can lead to moments of intense energy release as the "bottleneck" of inter-cameral, inter-branch, and inter-partisan gridlock finally gives way to produce significant "punctuations" in the policy "equilibrium" that bring about large changes in budgetary allocations. This is what the proposed synthesis of the veto players and punctuated equilibrium theories would predict.

To explore this question, budget data for all three countries will be gathered from the Policy Agendas Project begun by Baumgartner and Jones. The United States, Denmark, and the United Kingdom were chosen because, unfortunately, they were the only states featured in the Policy Agendas Project and Comparative Agendas Project databases with budget datasets available. Despite this limitation, the three countries provide solid cases with which to perform a comparative analysis given the obvious differences in their political systems. To map the constellation of "veto players" within the US, Denmark, and UK political systems over time, I will use datasets constructed by Detlef Jahn and colleagues. These data are adapted from

Tsebelis' original veto player data and his theoretical model but provide greater analytical flexibility and more complete sets of data.

Taken together, these methods should allow us to gain a better understanding of how each nation's political system affects changes in its budget structures. Before I discuss the data and methodology that will be used, however, literature reviews for both the veto players and punctuated equilibrium theories will immediately follow this introductory section. Following the literature reviews and the data/methodology sections, I will then present and analyze my results, discussing their implications for the theories themselves and the discipline of political science as a whole. In the end, I hope to uncover how institutional design affects the aggregate changes of budget structures for the US, Denmark, and the UK and, perhaps more ambitiously, gain a better understanding of the dynamics that impede or facilitate policy change.

Part II

Literature Reviews

2.1 Veto Player Theory

An idea inextricably linked to Baumgartner's and Jones' punctuated equilibrium theory is their notion of "friction", a force that "generally operates to reinforce the status quo… but with disjoint change occasionally—when the forces overcoming the friction are strong enough" (Jones & Baumgartner, 2005, 88). This effectively describes the obstacles to policy change posed by institutional arrangements that require the consent of multiple actors. This definition of "friction" dovetails nicely with Tsebelis' veto player theory. This body of work has shown that the number of "veto players"—that is, the amount of groups/individuals within a political system whose consent is required for policy change to occur—affects how budgets change over time and how budget deficits grow.

2.1.1 Tsebelis' Original Formulation

An incredibly useful point of departure in any discussion of veto player theory is provided by Tsebelis (1995). In this article, he addresses the effects of veto players on "policy stability" (that is, the maintenance of a status quo policy agenda, devoid of significant changes). Tsebelis asserts that three characteristics of veto players directly affect the degree of a government's policy stability: the number of veto players, "congruence" (how close various veto players are ideologically), and the "internal cohesion" of each veto player (how closely constituent parts within a collective veto player are ideologically) (Tsebelis, 1995, 293). A higher number of veto players and a greater degree of distance between them is likely to beget greater policy stability and suffocate meaningful chances for significant policy change. Relatedly, if collective players (namely parties) are ideologically cohesive and share policy preferences, then the chances of policy change increase.

Tsebelis also differentiates between two main types of veto players: partisan and institutional. Partisan veto players are "the parties that are members of a government coalition" (Tsebelis, 1995, 302). Such parties act as veto players because they can refuse support for legislation favored by partner parties and, if they are dissatisfied, take a number of measures up to and including resignation from the cabinet or calling for a vote-of-no-confidence, leading to the dissolution of the government and the possibility of new elections. Institutional veto players are those actors who have a constitutionally-defined role in the legislative process that requires their consent for policy passage. Institutional veto players tend to be confined to countries with bicameral legislatures and presidential systems, as the inter-cameral and inter-branch diffusion of policymaking authority necessitates negotiation between these actors for policy change to occur. Partisan veto players, in contrast, tend to be concentrated in unicameral, parliamentary systems with multiple parties wherein governmental majorities can rule without inter-branch consultation.

This bipartite distinction is important because each category of "veto player" is uniquely relevant to the three cases analyzed in this paper. In the United States, the bicameral legislature and separate executive branch (each a hypothetical "institutional veto player") ensures a relative degree of policy stability as it mandates the consent of a variety of different political actors and institutions. In the United Kingdom, the unicameral, (quasi-)multiparty parliamentary system is likely to pose fewer obstacles to policy change. The smaller number of veto players in many parliamentary systems means that governments face less resistance in pushing forward their agendas. One exception to this rule for parliamentary systems is when coalition or minority governments are in power, as has often been the case in Denmark. According to Tsebelis, "In the absence of a generalized shift in public opinion, a large coalition (large [ideological] range) is a

sufficient condition for the absence of significant legislation" (Tsebelis, 1999, 596). Therefore, we could preliminarily expect that the UK, a country that has consistently had majority governments, is likely to generally have fewer veto players than the US with its stiff institutional impediments or Denmark and its frequent minority and coalition governments.

The procedure for counting veto players within a given political system is not as simple as the dichotomous distinction between partisan and institutional veto players may at first make it seem. The number of partisan veto players varies across time as different governments come to power. In single-party majority governments, there is generally only one veto player if the ruling party is ideologically cohesive (Tsebelis, 1995, 309). In the case of coalition governments, however, "different parties should be counted as different veto players", as discussed above (Tsebelis, 1995, 309).

Institutional veto players also vary according to the partisan composition of each chamber and/or branch of government. Tsebelis describes what he terms the "absorption rule", referring to the effects of ideological congruence (typically defined by unified government across branches and chambers), which decreases the number of institutional veto players because consensus for policy change is much easier to achieve. As an illustration of these counting rules, Tsebelis describes the difference between the United States and United Kingdom saying, "The United States has in general three veto players [(the House of Representatives, the Senate, and the President)]… while the United Kingdom has only one veto player [(specifically when a single-party majority controls the House of Commons and forms a government)]" (Tsebelis, 1995, 316). These general patterns will vary when the United Kingdom is ruled by a coalition government or when the United States has an ideologically-cohesive unified government.

Since Tsebelis introduced this concept, it has received loads of attention from other scholars. Some have focused upon the role played by veto players in affecting the structure of government budgets and tax codes, specifically analyzing whether the presence of more veto players results in fewer and less dramatic changes. For instance, Hallerberg and Basinger (1998) utilize veto players theory to explore differences in tax policy adjustments across many OECD countries from 1986 to 1990, following in the wake of the 1986 Tax Reform Act in the United States. They analyze two factors specific to each country they study—economic openness and the number of veto players—to determine which, if either, can explain why some countries followed in the United States' footsteps by reducing taxes in order to remain economically competitive and discourage capital and labor flight while others did not (or did, but to a significantly lesser degree). Their findings show that a "move to two or more veto players from one veto player reduces the change in corporate [tax] rates by 18.4 points and reduces the change in the top marginal income tax rate by 20.3 points" (Hallerberg & Basinger, 1998, 345). This clearly represents a significant result and provides strong evidence that veto players can stand in the way of large tax policy changes.

2.1.2 Veto Player Theory and Budgetary Studies

Kathleen Bawn (1999) applies veto players theory to analyze how various coalitional compositions affected spending priorities in the Federal Republic of Germany from 1961 to 1989. She assesses different levels of "federal budget allocations in particular categories" during this timeframe, asserting that different coalitions that existed throughout this period placed emphasis on different policy domains (Bawn, 1999, p 712). In the 28-year period Bawn studies, there were four different coalitions: a CDU-FDP coalition from 1961 to 1965, a CDU-SPD grand coalition from 1966 to 1968, a SPD-FDP coalition from 1969 to 1981, and a CDU-FDP coalition from 1982 to the end of the period in 1989 (Bawn, 1999, 719). Her findings corroborate

predictions made by veto player theory that parties' spending priorities will be reflected in budgetary compositions when they enter a governing coalition. After her empirical analysis, Bawn notes that the "effects of partisan change are significant when *and only when* the VPM [(veto players model)] predicts they should be" (Bawn, 1999, 726). Here again is clear evidence that the introduction of new veto players into a parliamentary coalition government affects the structure of a nation's budget.

Tsebelis and Chang (2004) apply the counting rules outlined by Tsebelis to study how likely the "structure" of budgets is to change when parties-in-government are at different ideological distances from one another and when new governments replace old governments ("alternation"). They define "budget structure" as the "percentage composition [of specific policy domains], and the change in composition over time" (Tsebelis & Chang, 2004, 449). They focus upon how these "percentage compositions" change when new governments come to power, analyzing 19 OECD member countries from 1973 to 1995 (Tsebelis & Chang, 2004, 450). Their findings are largely in line with their hypotheses, indicating that veto players theory is an accurate model for predicting the likelihood of policy stability. After controlling for the effects of automatic changes induced by exogenous shocks like economic downturns, their analysis shows that the factors of ideological distance and divergence from the previous government reliably predict the presence and size of shifts in "budget structure". Specifically, they uncover that "a government coalition will be associated with more significant change in the budget if the members of this government are less ideologically diverse or of its ideological position is more divergent from the previous government" (Tsebelis and Chang, 2004, 469-470).

Conley and Bekafigo (2010) examine the effects of veto players on the overall production of legislation in the Republic of Ireland from 1949 to 2000. They distinguish explicitly between

multiple types of governments: “single-party majority, coalition, minority” and party-specific “Fianna-Fail-Independent governments” and examine “parties’ ideology, electoral variables, and the broader economic context as a means of uncovering the basis of differences in legislative output over time” (Conley & Bekafigo, 2010, 94-95). Their findings are largely inconsistent with the theoretical expectations of veto players theory. Specifically, they uncover that single-party majority governments are actually *less* legislatively productive than coalition governments—except in cases in which the ideological distance between coalition parts is most extreme (Conley & Bekafigo, 2010, 103-105). Minority governments, however, are shown to be significantly more prone to gridlock than coalition governments and are also, on average, slightly less productive than single-party majority governments (Conley & Bekafigo, 2010, 107). On the whole, their findings seem to indicate that a higher number of veto players in the Irish Republic has not historically resulted in decreased legislative productivity—results which are the very opposite of what veto players theory would expect.

2.2 Literature Review: Punctuated Equilibrium Theory

Since Baumgartner and Jones first introduced punctuated equilibrium theory, mounds of studies with corroborating results have reinforced their finding that the policy process is most frequently defined by an auto-progressive, status quo reinforcing dynamic of incremental policy change that is occasionally interrupted by massive shifts in attention that cause a major reorientation of government priorities. Much of the more fruitful research in this theoretical area has been done with the use of budget data to track shifts in “attention” under the assumption that changes in budget authority reflect shifting priorities for those in power. This is a logical assumption because, as I argued in the introduction, budgets are a fundamentally important piece of the political science puzzle. More or less money for certain programs implies that more or less

attention will be paid to the issues those programs address, so budgets are clearly an essential tool to use for understanding the dynamics of policy and agenda change. Therefore, the voluminous literature that has sprung from the budget analysis perspective of punctuated equilibrium theory provides a treasure trove of useful findings.

Jones, Baumgartner, and True (1998) apply the idea of budget punctuations to examine the US budget over a 48-year period from 1947–1995. Looking across this span of time, they plot the "medians and intersextile ranges of annual percentage changes in domestic budget authority" (Jones, Baugartner, & True, 1998, 8). This allows them to capture the "typical" subfunction of federal spending (as categorized by the Office of Management and Budget) because, by their reasoning, the median will capture a fairer snapshot of the overall level of change within the budget. When analyzing their time series, the authors realize that they have isolated three "epochs" divided by two "punctuations" in the US budget, revealing what they believe are shifts in general attitudes about the capacity of government to solve problems.

From 1947 to 1956 they document a period of "experimentation" in which the government made attempts to reconfigure the economy from a wartime to peacetime footing, showing mostly shuffling of resources between functions and programs (Jones, Baugartner, & True, 1998, 8-9). After 1956 and the end of the Korean War, the country experienced a "peace dividend" that allowed more money to be shifted towards domestic programs and infrastructure. The "median subfunction" saw an average annual growth of nearly seven percent from 1956 to 1975 (Jones, Baugartner, & True, 1998, 9). This trend toward government program growth was interrupted in 1974 by the Congressional Budget and Impoundment Control Act, which altered the budgetary process and gave greater control to Congress. Since this time (from 1976 to 1995), the average annual growth of the median subfunction was a humble one percent, reflecting a sea-

change in the nature of government program growth (Jones, Baugartner, & True, 1998, 12). The punctuations discovered by these authors clearly show that the US budget is subject to punctuations that have very real effects on the country's future budget trends.

Breunig and Jones (2011), in a piece that outlines various statistical models that can be useful in analyzing punctuated equilibrium theory, adopt a quantile regression model to estimate the effects of "House ideology" and "economic growth" on three sets of U.S. spending data including "total outlays," "domestic outlays," and "defense outlays." Quantile regression allows the authors to observe the effects of their two independent variables on various "quantiles" of budgetary change on the assumption that "the cause of extreme changes may be different from those that maintain a steady state" (Breunig & Jones, 2011, 112). Their findings illustrate that the more conservative the House is, the more extreme changes (including both budget increases and cuts) will be for "total outlays" and "defense outlays." They also find that economic growth has a "U-shaped relationship" to the total outlays and defense outlay growth rates, indicating that better economic conditions tend to generate larger budget increases (Breunig & Jones, 2011, 114).

Baumgartner, Foucault, and François (2006) examine French budgets across a wide swath of time, from 1820 to the present. This large timespan allows them to more fully capture the general nature of the French budget process that smaller, more isolated time series simply cannot provide. They find, not surprisingly, that the French distribution is "leptokurtic", meaning cases are concentrated disproportionately in the center and extreme tails of the distribution. The authors conclude that "French state budget growth has been highly punctuated over time… [with] more cases in the peak, fewer in the 'shoulders' and many more outliers" (Baumgartner, Foucault, & François, 2006, 1098). This shows that a "high proportion of total changes [were] in

the range of -10 to +10 percent", with many additional cases approaching the level of +/- 50 percent change (Baumgartner, Foucault, & François, 2006, 1098). The authors believe that, since their expansive time series data covers numerous constitutional orders within the French state since 1820, "institutional friction" alone cannot explain the neat fit of the punctuated equilibrium model to the country's budget. Instead, they point to "the architecture of human cognition" (meaning the inherent human difficulty with juggling multiple input streams vying for attention) which causes a status quo bias—reflected in the large peak of the distribution—that is occasionally punctuated by large changes in budget structure (Baumgartner, Foucault, & François, 2006, 1098).

In an effort to understand how divided government (implying higher institutional friction) affects the production of "major laws", Baumgartner, Brouard, et al. (2014) comparatively analyze the United States and France. They first establish that divided government of various forms has been the norm in both France and the US (Baumgartner, Brouard, et al., 2014, 3-8). They then hypothesize that divided government "should lead to as many minor adjustments as in unified government, but to fewer major pieces of legislation" (Baumgartner, Brouard, et al., 2014, 14). For both the US and France, they find that divided government does impede the production of important laws. However, they also show that "cohesiveness" of the legislative majority, unless "operationalized as a divided executive", has "no significant effect" on the passage of major legislation (Baumgartner, Brouard, et al., 2014, 23). This contradicts veto players theory, for which "internal cohesiveness" of various veto players is a major factor affecting policy change.

John and Margetts (2003) examine the aggregate and function-category specific punctuatedness of budgets in the United Kingdom for the period 1951 to 1996. Their results

clearly show punctuations in the United Kingdom, including for the overall budget distribution and for specific function-categories of spending. At the function-category level, the most obviously leptokurtic distributions are seen for the defense, law and public order, and transportation categories (John and Margetts, 2003, 424). However, all other categories including education, agriculture, health, housing, industry and economic affairs, and social security are found to be non-leptokurtic, indicating that changes in these categories are more evenly distributed (John and Margetts, 2003, 424-426). The variation in kurtosis levels across the function-categories perhaps suggests sector-specific causes for punctuations in the UK budget, though the authors' analysis does not pursue this question in any detail.

Moving away from the concrete cases of the United States, United Kingdom, and France toward a more general comparative context, Jones, Baumgartner, et al. (2009) attempt to develop a "general empirical law of public budgets" by analyzing multiple Western democracies' budgets over time (Jones, Baumgartner, et al., 2009, 855). They construct frequency distributions that map the "year-to-year inflation-adjusted percentage changes in Total" for the United States and France, for both of which they have more complete and uninterrupted time series data, and "pool across budget categories… again using annual percentage changes" for a number of other countries for which they have smaller and more scattered time series data (Jones, Baumgartner, et al., 2009, 859). Their frequency distributions and other figures reveal that most states exhibit a "leptokurtic distribution", representing many examples of small changes in budget figures accompanied by a large number of significant changes as well (Jones, Baumgartner, et al., 2009, 857). They also identify differences in patterns of change between countries with different levels of "institutional friction", showing that "[w]here the number of decision-making bodies is

greater… so too is there a greater degree of punctuatedness in budgetary policy" (Jones, Baumgartner, et al., 2009, 869).

Citi (2006) steps out of the cross-national comparative paradigm and looks at the supranational level, analyzing whether the EU budget follows a model of incrementalism or punctuated equilibrium. The European Union offers a unique angle of analysis because, as the author notes, "[T]he EU case is particularly interesting to study because of the hyper-consensual nature of its budgetary process, which introduces an interesting variation on the side of [institutional frictions]" (Citi, 2006, 1162). He looks at six major EU expenditure categories from 1984-2007 to see how the institution's priorities have shifted over time. In line with his expectations, Citi finds that the frequency distribution of annual percentage change across budget categories is leptokurtic (Citi, 2006, 1168). The distribution is more normal than many others seen in the literature, but this may be an artefact of the smaller number of functional categories that Citi can find budget data for at the EU-level. The distribution is also more heavily skewed to the positive side, indicating that increasing expenditures dramatically "tend[s] to occur in bursts, whereas cuts to existing programmes tend to face much more resistance and are hence more gradual" (Citi, 2006, 1167).

Breunig and Koski (2006, 2009) analyze punctuated equilibria in budgets at the sub-national level in the US in two separate studies. The institutional variation that this offers the authors is a major strength of this research. The first study (2006) analyzes the budget distributions for all 50 states over an 18-year period to gain a general understanding of budgetary dynamics at the state-level. Their findings largely comport with the standard assumptions of punctuated equilibrium theory, showing that when all of the state-level budget data is pooled there is a clear pattern of leptokurtosis. Further, in analyses of individual states they find that "all

state budgets are punctuated," but there is significant variation in the degree of punctuation such that "Massachusetts, New Jersey, and Kentucky are among states with the least punctuated budgets… whereas New York, Alabama, and Texas are among the most punctuated" (Breunig & Koski, 2006, 373).

Breunig and Koski's second piece (2009) explores how gubernatorial strength and agenda-setting powers, divided governments, and institutional budgetary rules affect the punctuation of US state budgets. Their findings indicate that strong governors with significant agenda-setting power like "the combined institutional ability to set budgets and veto unwanted legislative budgetary change is the most powerful factor in determining the extent to which a state budget is punctuated" (Breunig & Koski, 2009, 1133). However, their results also show that divided governments and stringent institutional budget-adoption procedures do not explain budget punctuations, which could be interpreted to be in line with my assumption that more institutional friction creates more budgetary volatility.

Breunig (2006) inspects budgets in the US, UK, Germany, and Denmark from 1963 to 1989 in an effort to understand the effects of "partisan control of government" and "partisan distance of the assembly" on budget punctuations. He assumes that when left-leaning governments are in power (the partisan control explanation), they will "produce larger shifts within an annual budget than Rightist parties" (Breunig, 2006, 1073). The partisan distance variable is included to test the idea that "the greater the number of veto players and the more divergent the preferences, the more punctuated the budget" will be (Breuning, 2006, 1074). His findings for the European countries, and especially the UK, shows that partisan distance is the better predictor of budget punctuations (Breunig, 2006, 1079). In the US, on the other hand, partisan control is more closely correlated with the occurrence of budget punctuations. That is to

say, during times when Democrats are in power, budgets remain more static in some areas while more significant changes (i.e., punctuations) occur in other areas of the budget (Breunig, 2006, 1081). In the UK, changes are more frequent when distance between parties is greater while, in the US, electoral turnover that places Democrats in power is a stronger predictor of budgetary volatility.

2.3 Combining Veto Player and Punctuated Equilibrium Theories

As the above literature review has clearly shown, the veto players and punctuated equilibrium theories are strongly established models of the nature of policy change. Marrying the two theoretical frameworks is not an entirely novel approach, as many authors have used veto players theory at least tangentially to understand what causes variation in levels of budgetary volatility. Nonetheless, few studies explicitly adopt the veto player model of institutional analysis for exploring punctuations in budget equilibria. I will do so directly, examining how the number of veto players in the American, Danish, and British political systems has affected the patterns of change in their budget structures over time.

My initial belief is that the US's presidential system and bicameral legislature will cause greater stability in its budgetary structure. However, I also expect that the US will be likely to see this stability occasionally interrupted by massive shifts in budgetary resources (i.e., budget punctuations). I believe the same will be true for Denmark given its history of frequent minority and coalition governments, which are very likely to significantly impede rapid and dramatic shifts in budgetary resources. The UK's lower number of veto players (a consequence of its unitary system with centralized power held by the prime minister and cabinet government) will, inversely, see greater volatility in its budgetary structure.

Part III

History of Budget Structures in the United States, United Kingdom, and Denmark: Budget Frequency Distributions

In order to understand how "volatile" the budgets of the US, Denmark, and the UK have been in the periods under study, I will follow a familiar path used by Baumgartner and Jones in many of their analyses of budget punctuations. This approach typically "conceptualizes budget changes in terms of probability densities" and defines "budget punctuations as the distribution of yearly percentage changes across all governmental budget functions" (Breunig, 2006, 1071). I am not interested in individual punctuations per se, but rather the overall change of budget structures as they relate to the number of veto players in each country's political system at a given time. In this study, the independent variable is obviously the number of veto players. The dependent variables in the various methodological sections below will be the overall volatility within each country's budget structure. How I will test the relationship of these variables is detailed below.

3.1 Data and Methods

To begin, I will generate frequency distributions for all three countries displaying total annual percentage changes for all programmatic functions. This will give a more general sense of the overall stability and/or volatility in the United States', Denmark's, and United Kingdom's budget structures without plotting them against specific years. From the datasets used to plot these distributions, I will also calculate three measures of how the data are distributed, including: 1) a *kurtosis score*, (2) *l-kurtosis score*, and (3) a *skewness* measure. These statistics (further described in the following paragraphs) will be included in the frequency distributions to be presented later. Each of the three provides a slightly different view of how data are distributed.

According to the National Institute of Standards and Technology, “Kurtosis is a measure of whether the data are peaked or flat relative to a normal distribution… [and] data sets with high kurtosis tend to have a distinct peak near the mean, decline rather rapidly, and have heavy tails” (NIST Engineering Statistics Handbook, itl.nist.gov). A standard, normally distributed dataset has a kurtosis value of 3.0, so any value above this can be considered at least mildly “leptokurtic”. (NIST Engineering Statistics Handbook, itl.nist.gov) A higher kurtosis value indicates that a distribution is more leptokurtic. If the distribution for one country is significantly more leptokurtic than the distribution for the other country—that is, if its kurtosis value is significantly higher—it will be a strong indicator that the former’s budget structure is more stable but also has significant and extreme punctuations.

L-kurtosis is a slightly modified version of the above-described kurtosis score. It provides an added advantage that standard kurtosis scores do not because it is “less sensitive to extreme values and reliably computed for a relatively small number of cases” (Breunig and Jones, 2011, 107). L-kurtosis scores are calculated from the fourth L-moment of a distribution and can range from 0 to 1, with higher numbers representing increased leptokurtosis (Breunig and Jones, 2011, 107). A normal distribution will have an l-kurtosis value of 0.123, so anything above that value is indicative of at some degree of leptokurtosis. Including this measure, in keeping with the practice of many scholars that adopt the punctuated equilibrium model of policy analysis, provides a specific advantage for this study as well. Given the limited sample sizes that were available for analysis through the Policy Agendas Project, calculating l-kurtosis in addition to the standard kurtosis score allows us to gain an even more reliable picture of how leptokurtic the distributions of annual budget category changes are for the United States, the United Kingdom, and Denmark.

Skewness, the third and final statistic, reveals how symmetrically or asymmetrically data are distributed (NIST Engineering Statistics Handbook, itl.nist.gov). The skewness value of a dataset that is perfectly symmetrical is zero, with any value other than that indicating some level of asymmetry. A skewness value of less than zero indicates left skewness (meaning that "the left tail is long relative to the right tail") and a skewness value greater than zero indicates right skewness (meaning that "the right tail is long relative to the left tail") (NIST Engineering Statistics Handbook, itl.nist.gov). This measure gives us an understanding of the overall structure of a country's budget history over time, specifically revealing whether it has tended to expand or contract. My expectation is that all three countries will exhibit positive skewness values, as government budgets have historically tended to naturally expand over time.

Budget data for all three countries' budget frequency distributions was obtained through internet archives or in e-mail correspondence with scholars involved in the Policy Agendas Project and Comparative Agendas Project. Consistency with budget data across time and space is a difficult thing to achieve, which complicates many efforts to comparatively analyze budget institutions and fiscal outcomes across different countries. Fortunately, the datasets for the US, Denmark, and the UK are inflation-adjusted and rescaled at certain points to reflect changes in budgetary procedures that have occurred in each country over time.

The US dataset that the analysis below employs covers a total of 59 years (1949 to 2008) across 16 function categories of federal spending, for a sum total of 944 category-year observations. The 16 categories of spending in the US dataset (with corresponding Policy Agendas Project function/subfunction codes) include: (50) national defense; (150) international affairs; (250) science, space, and technology; (270) energy; (300) natural resources; (350) agriculture; (370) commerce and housing credit; (400) transportation; (450) community and

regional development; (500) education; (550) health; (600) income security; (651) Social Security; (700) veterans' benefits and services; (750) justice administration; and, (800) general government.

The Denmark dataset used in the analysis contains 15 function categories of national-level spending and covers 32 years (1971 to 2003) for a sum total of 480 category-year observations. To arrive at these 15 categories, I had to make some adjustments to the original dataset as it was classified according to Eurostat's "Classifications of the Functions of Government" or "COFOG" category schemes. In order to bring the data for Denmark in line with the data for the US and UK, I recoded the budget categories for Denmark to correspond with the Comparative Agendas Project Master Codebook provided on the Comparative Agendas Project website. The details of this recoding process are contained in the data appendix at the end of this paper. The 15 recoded categories (with corresponding Comparative Agendas Project function codes) include: (1) macroeconomics; (3) health; (4) agriculture; (6) education; (8) energy; (10) transportation; (12) law, crime, and family issues; (13) social welfare; (14) community development and housing issues; (15) banking, finance, and domestic commerce; (16) defense; (19) international affairs and foreign aid; (20) government operations; (21) public lands, water management, and territorial issues; and (23) cultural policy issues.

The United Kingdom's dataset covers 56 years (1951 to 2007) and includes seven function categories of spending for a sum total of 392 category-year observations. The seven spending categories for the UK (with corresponding CAP function code) include: (1) macroeconomics; (3) health; (6) education; (12) law, crime, and family issues; (13) social welfare; (14) community development, planning, and housing issues; and, (16) defense. Though this limited number of categories does constrain the extent to which we can observe budget

volatility for the United Kingdom, this sample still represents a significant portion of the country's annual expenditures. For most of the 1951 to 2007 timespan, these seven categories account for 80 percent or more of total reported government spending in the UK.

3.2 Hypotheses, Results, and Discussions

We now turn to the first empirical section to explore the question of whether, in fact, the number of veto players affects the frequency and depth of budgetary volatility that a country experiences. We will examine the frequency distributions of percentage change scores for each country. The three histograms all have minimum and maximum x-axis values of -100 and 150 in order to ensure that the displays are interpretable. Any percentage change values below or above these values are stacked on the boundaries of the x-axis. I have formulated three hypotheses that we can test with these distributions and their kurtosis and l-kurtosis values:

> **H_1:** The United Kingdom will see greater volatility in its budget structure over time than either the United States or Denmark because, due to its history of single-party majority rule, it has a very low number of veto players.
>
> **H_2:** The United States will see less budgetary volatility than the United Kingdom but more than Denmark because it (typically) has more veto players in its political system than the UK but fewer than Denmark.
>
> **H_3:** Denmark will see greater stability in its budget structure than either the United Kingdom or United States over time because of its (typically) higher number of veto players.

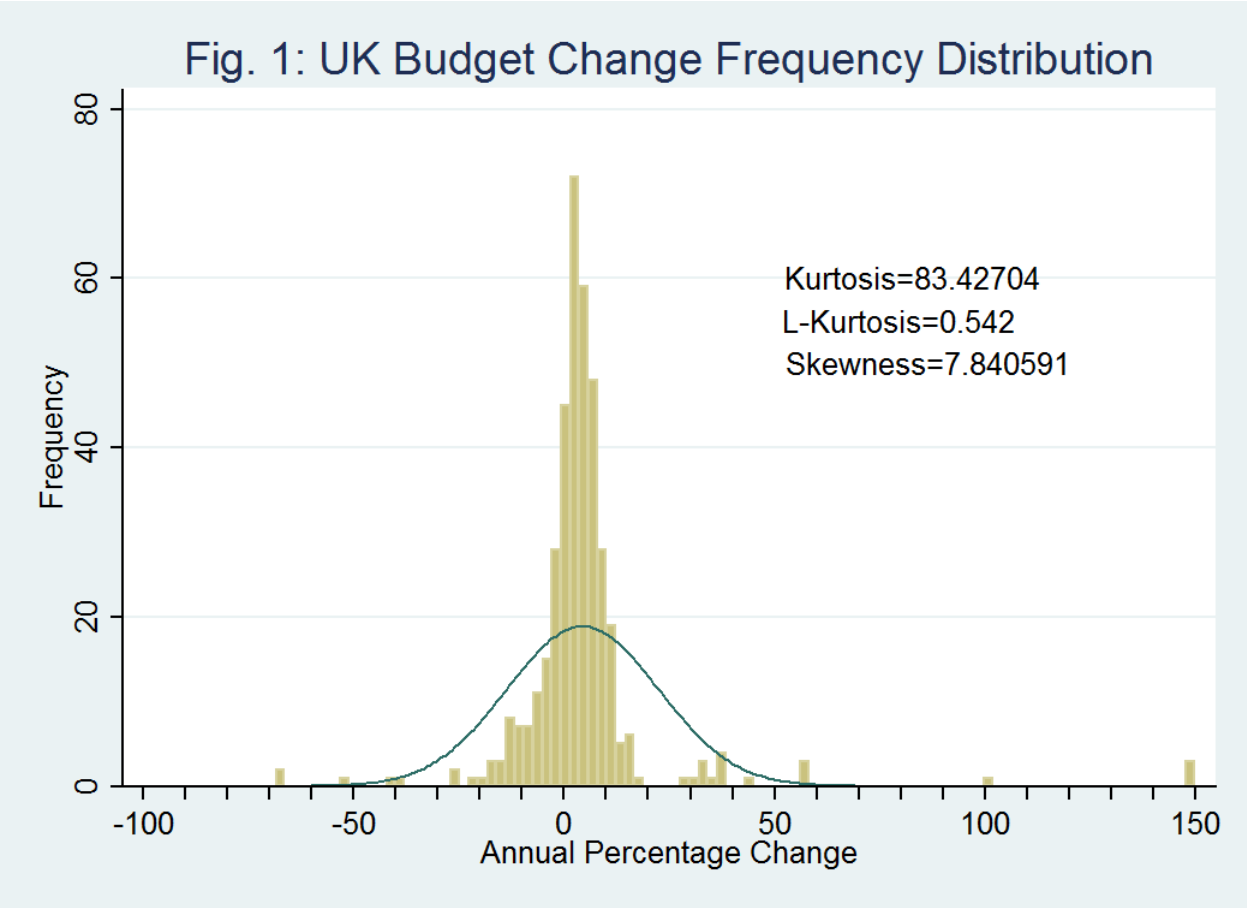

Figure 1: United Kingdom Budget Change Frequency Distribution

The data used here was originally collected as part of the U.K. Policy Agendas Project (www.policyagendas.org.uk). For further details see Shaun Bevan and Will Jennings. (2014). 'Representation, Agendas and Institutions.' European Journal of Political Research 53(1): 37-56; Peter John, Anthony Bertelli, Will Jennings and Shaun Bevan. (2013). Policy Agendas in British Politics. Basingstoke: Palgrave Macmillan.

Figure 1 is the frequency distribution for the United Kingdom. Perhaps the most obvious feature is its characteristic leptokurtosis, the shape that is to be expected when a country's budget history exhibits a high degree of stability. The vast majority of the category-year annual percentage changes are concentrated around the -25 to +25 percent range, with the frequency bars climbing significantly higher as the x-axis approaches 0 percent. There is a slight skew of this mass of observations toward the positive side, indicating that the seven categories in the UK dataset were more likely to see small percentage increases than decreases (consistent with the idea that budgets grow as time progresses). There is also a noticeable cluster of annual

percentage changes between +30 and +50 percent, some around 60+ percent, and a few above 100+ and 150+ percent. Again, this is consistent with the theory that there would be volatility within the UK's budget history, as these levels of change indicate substantial shifts in spending authority.

The kurtosis score for the UK's frequency distribution is 83.42704, evincing a dramatically higher degree of "peakedness" than a standard normal distribution's score of 3.0. The l-kurtosis score for the UK's frequency distribution is 0.542, also significantly higher than the value for a standard normal distribution of 0.123. Finally, the skewness value for the UK 7.840591, well above the value of 0 present in a perfectly symmetrical distribution. This is in line with the above-mentioned expectation that budgets will tend to expand rather than contract over time. The distribution's shape and kurtosis score, when taken together, reveal that from 1951 to 2007, the seven categories in the UK dataset saw a large degree of between-year and across-time stability—but stability that was interrupted intermittently by massive shifts in resources.

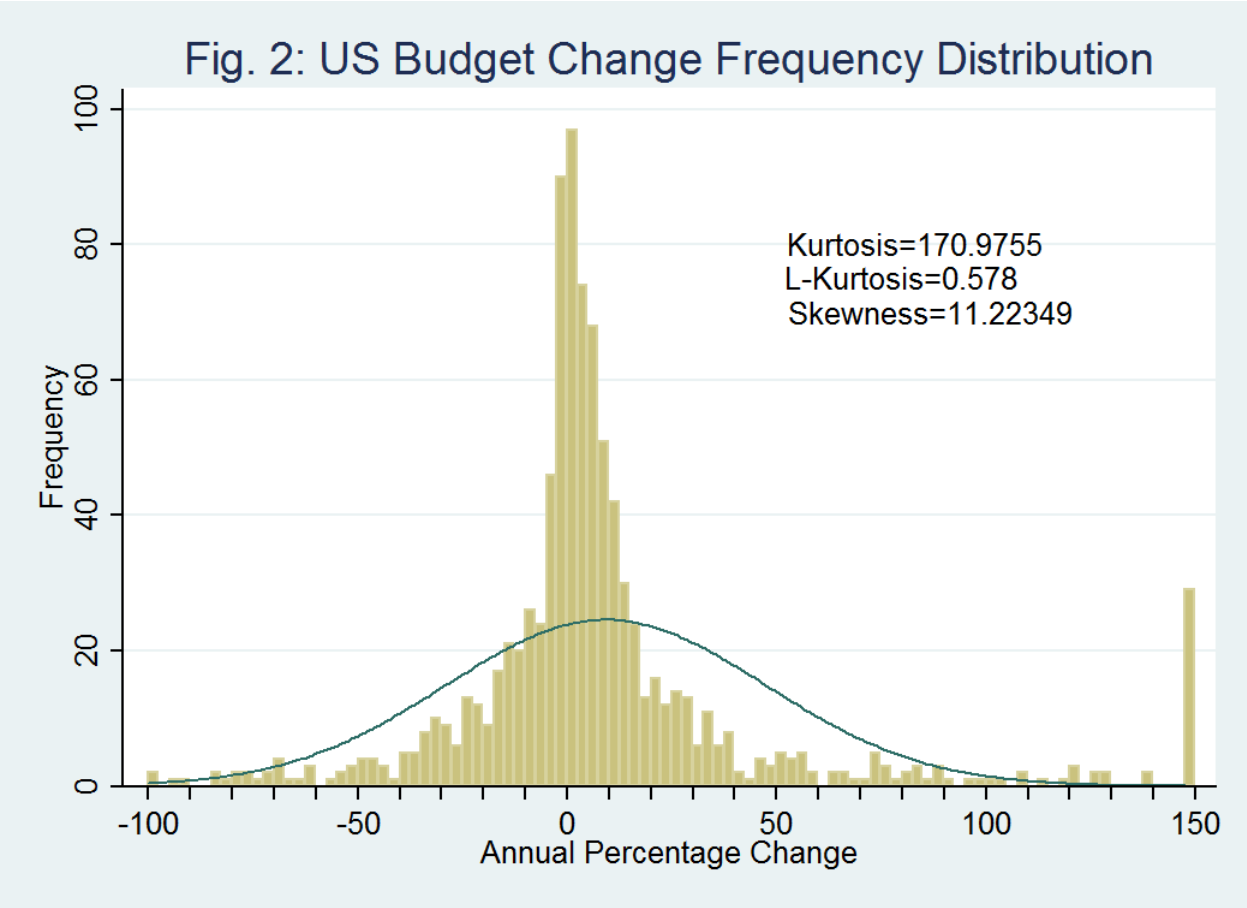

Figure 2: United States Budget Change Frequency Distribution

The data used here were originally collected by Frank R. Baumgartner and Bryan D. Jones, with the support of National Science Foundation grant numbers SBR 9320922 and 0111611, and were distributed through the Department of Government at the University of Texas at Austin. Neither NSF nor the original collectors of the data bear any responsibility for the analysis reported here.

Figure 2 is the frequency distribution of annual percentage changes for the United States. Much like Figure 1, the shape of this frequency distribution is obviously highly leptokurtic. The vast majority of category-year annual percentage changes are concentrated in the -25 to +40 percent range, with the frequency bars climbing significantly higher as the x-axis approaches 0 percent. Similar to the UK's case, more of the category-year annual percentage changes are concentrated on the positive side of the distribution, indicating a general pattern of spending growth in the 1949 to 2008 period. In contrast to Figure 1, however, Figure 2 features a more

even distribution of annual percentage changes across the range of the x-axis, though this difference between the two is largely attributable to the discrepancy in the number of observations available in each dataset. The US also appears to have seen a higher number of moderate to large year-to-year spending reductions than the UK, with a cluster of changes concentrated in the -10 to -50 percent range. Importantly, there are also around 40 instances in which a spending category saw a 150% or greater increase in funding from one year to the next.

The kurtosis score for the US frequency distribution is a staggering 170.9755. This is astronomically higher than the standard normal distribution's kurtosis score of 3.0, but it is also more than twice the kurtosis score for the UK. The l-kurtosis score for the United States is 0.578, again well above the value for a standard normal distribution. The greater parity between the US's and UK's l-kurtosis scores than their standard kurtosis scores is attributable to the larger number of outlier values in the US distribution, which inflates its standard kurtosis score. The skewness value of 11.22349 can be interpreted to mean that the US's distribution reveals an even greater degree of over-time spending growth than the UK's distribution shows. The US's higher kurtosis and l-kurtosis values matches the hypothesized relationship between the number of veto players and overall budgetary stability. The United States consistently had more veto players than the United Kingdom in the two timespans under observation here, so finding a higher level of overall stability in the US's budget history lines up well with my theoretical expectations (though the US's budget stability was, like the UK's, interrupted by a significant number of punctuations).

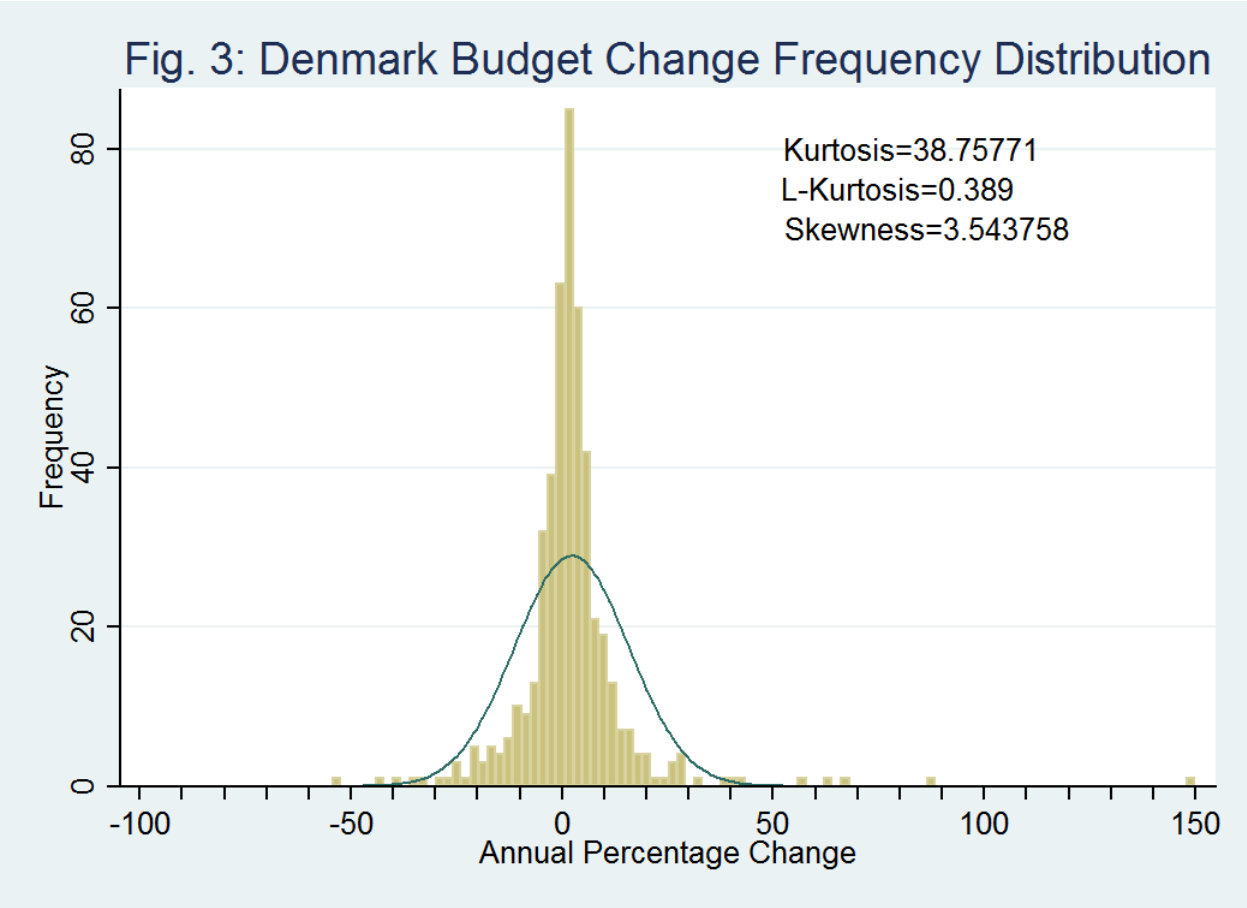

Figure 3: Denmark Budget Change Frequency Distribution

The data used here are from the Danish Policy Agenda Project and have been collected by Christoffer Green-Pedersen and Peter Bjerre Mortensen with support from the Danish Social Science Research Council and the Research Foundation at Aarhus University. For further details see www.agendasetting.dk.

Figure 3 is the frequency distribution for annual percentage changes of Denmark's 15 recoded budget-functions. For a third time we see the characteristic leptokurtosis that we expect to find in budget distributions. The vast majority of observations are located within the -20 to +20 percent range with the peaks rising higher and higher as the values approach 0 percent, seemingly indicating a high degree of stability in the Danish government's budgets over the 1971 to 2003 period. Outside of this range on the positive side of the distribution we can see a number of observations in the +25 to +75 percent range, one near +90 percent and another at the +150 percent boundary. On the negative side of the distribution there are a few cases contained within

-30 to -60 percent range. On the whole, however, an overwhelming majority of the observations are located at and around the 0 percent range, an outcome that matches well with my initial expectations.

The statistical scores for the Danish budget distribution, however, do not neatly match my theoretical expectations. The kurtosis score for the Danish budget distribution is 38.75771. This is less than one-half of the kurtosis value observed for the UK and less than one-quarter of that observed for the US. The L-kurtosis score of 0.389 for the Danish distribution is further evidence that the Danish budget is less leptokurtic than the US's or UK's—and is definitive in showing that the Danish budget has been less stable than either of the other two countries' budgets over time. The skewness value of 3.543758 is, once again, indicative of the fact that Denmark's government budget has tended to grow over time rather than contract, much like the United States' and United Kingdom's, though not nearly to the same degree as the other two countries' skewness scores show. The lower kurtosis and L-kurtosis scores confound my hypotheses somewhat. Rather than the large number of incremental changes punctuated infrequently by massive annual percentage changes like was seen in the US's and UK's distributions, budget changes in the Danish distribution are apparently more evenly distributed and reflect a greater number of moderate percentage changes. This could plausibly be explained, at least in part, by the smaller *t* in the Danish budget dataset (32 years) compared to the US (59 years) and UK (56 years), which affords fewer opportunities for changes in single categories to be recorded over time.

Overall, this analysis of the frequency distributions of annual percentage changes for the US, UK, and Denmark in part refutes and in part confirms my initial hypotheses. Hypotheses 1 and 2 are both partially correct, as the United Kingdom's budget history has been more volatile

than the United States' despite the former's history of very low veto player totals. The US's budget history has actually proven to be the most stable of the three countries overall. Hypothesis 3 has proven incorrect, however—at least according to this initial test. Denmark, the country which has historically seen the highest numbers of veto players in its political system, saw much less stability in its budget frequency distribution than either the US or the UK. These findings suggest that veto players may have some effect on the volatility of budget structures, but it is still too early to say definitively whether such a relationship exists.

Part IV

Veto Players and Change in Budget Structures: Cross-Sectional Time-Series Regression Analyses

I will also perform three sets of time series regression analyses in an attempt to uncover how significantly each country's veto player history has affected their respective budget structures over time. The dependent variable for the first analysis will be the *annual L-kurtosis score* measured across all spending categories within a given year for each of the three countries. In a second set of regressions, the dependent variable will be the *average annual percentage change* from year-to-year across all budget categories for each country. For the third and final set of regressions, in which I will generate a separate model for every function-category of spending for each country, I will use annual percentage changes for each category. These dependent variables will be calculated using the budget data described earlier and will be measured for each year to give us an understanding of the volatility of each country's budget on an annual basis.

4.1 Data and Methods

The dependent variable used in the first set of regressions is essentially the same as that used by Breunig (2006) to analyze budget punctuations in regression models. He explains that higher l-kurtosis scores suggest the presence of more overall budgetary stability across categories of spending for a specific year (Breunig, 2006, 1077). A higher L-kurtosis score is indicative of greater "peakedness" in a distribution, which in this context means that more budget changes are concentrated around the 0 percent mark. L-kurtosis scores can also be inflated by the presence of one or more major punctuations, however. Punctuations, by their very definition, always occur against a backdrop of overall budgetary stability. Thus, a higher score for a single year is likely indicative of a higher degree of budgetary stability, with perhaps one outlier category with a

significant (i.e., punctuated) change. Lower L-kurtosis scores, conversely, will be interpreted to mean a greater degree of budgetary volatility as these will reflect a more even distribution of small, moderate, and large function-category percentage changes.

The dependent variable for the second set of analyses, average annual percentage changes, will be included to give a measure of overall *budgetary volatility*. As opposed to the annual L-kurtosis scores used in the first analysis which show us how "peaked" the distribution of percentage changes in budget categories were for a given year and reveals more about budgetary stability, this dependent variable will allow us to more clearly see periods of significant budgetary changes. Volatility is more visible with this variable because average annual percentage changes will show us how extreme the overall shifts within the budget were within a given year. If a particular year has an unusually high average percentage change across categories, it will be a clear reflection of significant volatility in that annual budget. Unlike the annual L-kurtosis scores, this second dependent variable will not mask periods in which there was a single significant punctuation, which may inflate an L-kurtosis score and present a skewed picture of how stable or volatile a particular year's budget was. Additionally, this measure will also allow us to see the *direction* of volatility—if a change is large and positive then it will indicate a major increase in spending for at least one category and, if the average change is negative, it will reflect a major spending cut in at least one category.

Finally, the dependent variable for the third set of analyses, annual percentage changes for each category of spending, is included so that we may better identify factors which affect *specific types* of spending. Category-specific annual percentage changes will not tell us much of interest about overall budgetary volatility or stability but, rather, allow us to uncover which, if any, of the individual categories of spending are more affected by the independent variables of

interest. For instance, we can see whether the occurrence of wars significantly affects changes in defense spending, or perhaps how the number of veto players in a political system affects changes in social welfare spending and expenditures on environmental cleanup, etc. This final set of models is largely exploratory and is therefore tangential to the core analysis presented in the first two sets of regression models.

The most important independent variable will be a modified veto player measure created by Detlef Jahn (2012). Jahn's measure accounts for three sets of veto players, including "(a) coalition governments, (b) second chambers, and (c) presidents", always using the widest ideological range between players (Jahn, 2013, 23). His work offers two choices of measures, of which I have chosen to use the second as it accounts for changes in upper chambers in countries where this is relevant. For the UK and Denmark, Jahn's measure uses coalitions' ideological ranges to map veto players. For the United States, Jahn uses "the largest ideological range between the President, the Senate, and the House" (Jahn, 2013, 21). I will present the data for the dependent and independent variables later in time-series plots of veto player totals for each country set below time-series plots of annual l-kurtosis scores and average annual percentage changes across all spending categories in each country's budget. This is done so as to give a clearer picture of the variation (or lack thereof) each country has seen over time in each measure.

I will include two additional independent variables in all of the regression models to test alternatives to my main topic of interest (i.e., veto players): one for *wars* which is measured as a dummy variable and one for *government ideology* which is measured using the right/left ideology scores (RILE) from the Comparative Manifestos Project (hereafter CMP). I include the war variable because interstate conflicts are, by their very nature, extremely expensive undertakings. Logically then, a war might require a significant spike in defense spending or a

major reallocation of funding from other categories of spending toward causes that support the war effort. I also include the government ideology variable from the Comparative Manifestos Project's right/left ideology (RILE) scores to test the effects of the ideological profile of parties-in-power on budget structures.

I will also include two control variables—one for *economic conditions* which is measured as year-to-year percentage changes in GDP and one for *electoral cycles* which is measured as a dummy variable. The economic conditions variable is included so as to isolate budget punctuations that occur due to *deliberate* policy change—rather than those which result from general macroeconomic trends—which will logically be more subject to the forces of institutional and partisan friction that I am attempting to measure. The electoral cycle variable is meant to control for the effects of new governments rising to power and the altered political dynamics that this often entails. For the United States, I coded presidential election years as 1 and all others as 0. In Denmark and the United Kingdom, I simply coded any year in which there was a new parliamentary election as 1 and all other years as 0. I also attached a one-year lead to this measure such that a government elected in 1971 would not register a 1 for that year but, instead, would code a 1 for 1972. This is done because a newly elected government would not a have major impact on the budget process until the year after they come to power, when they are responsible for passage of their first budget.

These variables will be tested to see, most importantly, how veto player structures affect the evolution of budget structures over time. Further, alternative hypotheses about the war and CMP right/left index variables will also be analyzed. Before the results of these regressions analyses are presented in full, however, a series of figures graphing the budget structures and veto player structures of each country over time will be helpful. For this further visual

assessment, we will now turn to combined time series graphs of: (1) each country's annual L-kurtosis scores mapped against their veto player structures over time; and (2) each country's average annual percentage change across budget categories mapped against their veto player structures over time.

4.2 Combined Time-Series Graphs

4.2.1 Veto Players and Annual L-Kurtosis Scores

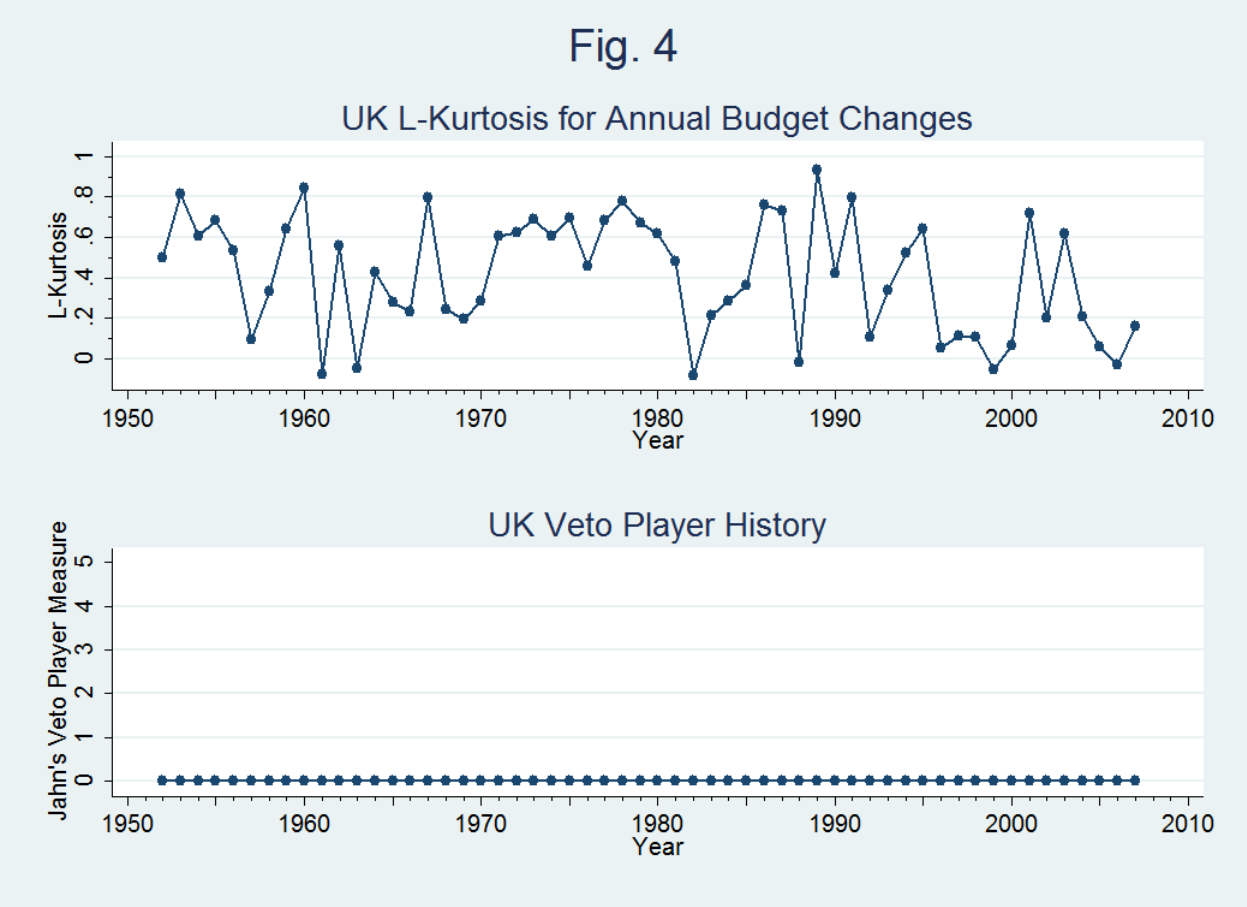

Figure 4: UK Combined Time-Series Graph of Annual LK Scores and Veto Player History

UK L-Kurtosis for Annual Budget Changes: The data used here were originally collected as part of the U.K. Policy Agendas Project (www.policyagendas.org.uk). For further details see Shaun Bevan and Will Jennings. (2014). 'Representation, Agendas and Institutions.' European Journal of Political Research 53(1): 37-56; Peter John, Anthony Bertelli, Will Jennings and Shaun Bevan. (2013). Policy Agendas in British Politics. Basingstoke: Palgrave Macmillan.

UK Veto Player History: The data used here were gathered from the Comparative Politics website from the University of Greifswald's Department of Political Science and Communication Studies at http://comparativepolitics.uni-greifswald.de/data.html. Jahn, Detlef, Thomas

Behm, Nils Düpont, and Christoph Oberst. 2012. "PIP – Parties, Institutions & Preferences: Veto Player (Annual) [Version 2012-02]." Chair of Comparative Politics, University of Greifswald.

Figure 4 is the combined display of time-series graphs for the United Kingdom's "L-kurtosis scores" and "veto player history". The veto player history graph is of little use beyond simply providing a visual representation of the invariance of the UK's veto player history from 1951 to 2007. As mentioned previously, the country was ruled by single-party majority governments controlled by either the Conservatives or Labour, meaning that there was no significant structural impediment to policy change (at least as defined by Jahn's veto player measure).

Given the apparent lack of variability in the UK's veto player measure, I gave serious consideration to simply excluding the country from the regression analyses that follow this section. For the independent variable, Jahn's veto player measure registers a "0" for every year from 1951 to 2007 due to the uninterrupted history of single-party majority rule. Though there are strong methodological reasons for removing the United Kingdom from the analyses that will follow, I have chosen instead to include it for its strong substantive importance to the question at hand. The complete lack of variation in the main independent variable makes the United Kingdom an interesting test case for the set of additional independent variables I have chosen to include. Further, including it in the pooled models that I will test and present in the following pages also allows us to gain a sharper understanding of how a (theoretically) frictionless political system affects outcomes of the policymaking process.

One noticeable problematic aspect of the UK's annual L-kurtosis score time series display is the fact that in some years the L-kurtosis score actually dips below 0—which is theoretically impossible given that this measure is supposed to vary only between 0 and 1. We are able to observe the significant variation in budgetary volatility between years, as the L-

kurtosis scores undulate significantly. However, the fact that it dips below 0 means that something is likely wrong with the calculation. I believe the most likely culprit is the small number of categories from which the L-kurtosis scores are being calculated (seven for the UK compared to 15 and 16 for Denmark and the US, respectively), which is in some way skewing the statistical measure. L-kurtosis scores calculated from a very small *N* can, under the right conditions, return as a negative value (Perez, Menendez & Seco, 2003, 38). This is the only plausible explanation for these results that I could find. Unfortunately, even after attempting to adjust the results by using smoothed averages over a five-year sliding window, the same problem remained. Therefore, we will simply need to be wary of this fact as we interpret the results for the United Kingdom in the regression analyses that will follow in later sections.

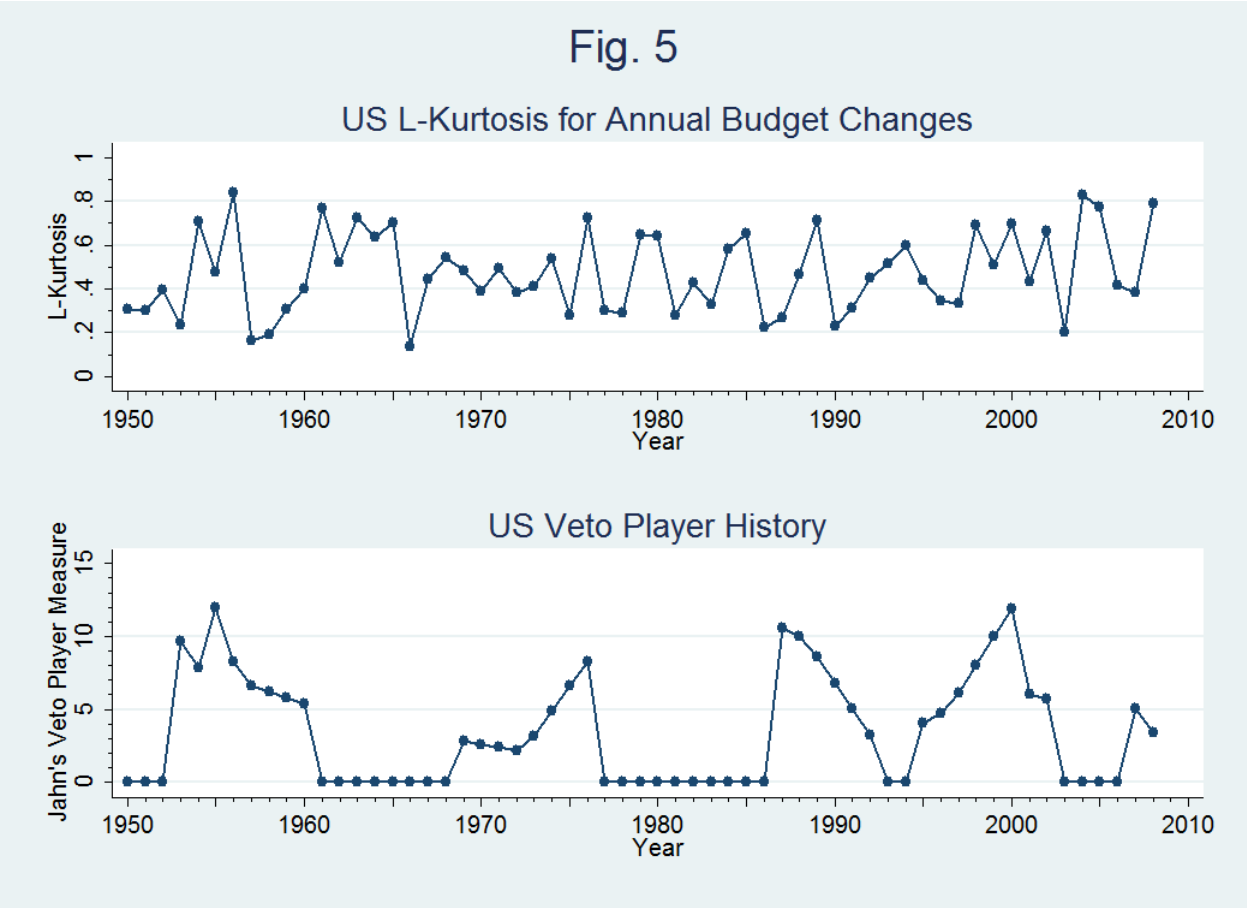

Figure 5: US Combined Time-Series Graph for Annual LK Scores and Veto Player History

US L-Kurtosis for Annual Budget Changes: The data used here were originally collected by Frank R. Baumgartner and Bryan D. Jones, with the support of National Science Foundation grant numbers SBR 9320922 and 0111611, and were distributed through the Department of Government at the University of Texas at Austin. Neither NSF nor the original collectors of the data bear any responsibility for the analysis reported here.

US Veto Player History: The data used here were gathered from the Comparative Politics website from the University of Greifswald's Department of Political Science and Communication Studies at http://comparativepolitics.uni-greifswald.de/data.html. Jahn, Detlef, Thomas Behm, Nils Düpont, and Christoph Oberst. 2012. "PIP – Parties, Institutions & Preferences: Veto Player (Annual) [Version 2012-02]." Chair of Comparative Politics, University of Greifswald.

Figure 5 is the combined time series display of "L-kurtosis scores" and "veto player history" for the United States. Luckily, the US had much more variation in its veto player structure over time than the UK did. This allows for a more meaningful (if preliminary) view of how the US's veto player structure and level of budgetary volatility have coincided over time. Perhaps the most noteworthy thing about the veto player history graph is that the US has

undergone such major shifts in its veto player structure over time, coinciding for the most part with major shifts in power during elections. For instance, the government was significantly divided during the 1950s, for about the middle half of the 1970s, the latter half of the 1980s, and from the latter half of the 1990s through the early 2000s. All of these periods coincide with eras of divided control between the executive and legislative branches which, in theory, should make significant policy change harder to enact.

Upon observing the time-series graph of L-kurtosis scores for annual changes in the US federal budget, a number of periods stick out as well. A large number of years have seen L-kurtosis scores above 0.5, indicating significant budgetary volatility. These years include: 1954, 1956, 1961, 1963 to 1965, 1976, 1979, 1980, 1984, 1985, 1989, 1994, 1998, 2000, 2003, 2005, and 2008. Seven of these years coincided with periods in which there was significant division of government as indicated by the veto player measure, while the remaining eleven occurred in years of unified government with zero effective veto players. The average of L-kurtosis scores for years in which there zero veto players is ≈0.49. The average for years in which there were more than zero but less than five veto players is ≈0.47. Finally, the average of L-kurtosis scores for years in which there were more than five total effective veto players is ≈0.456. This pattern tells us little of substantive interest given how close the averaged scores are.

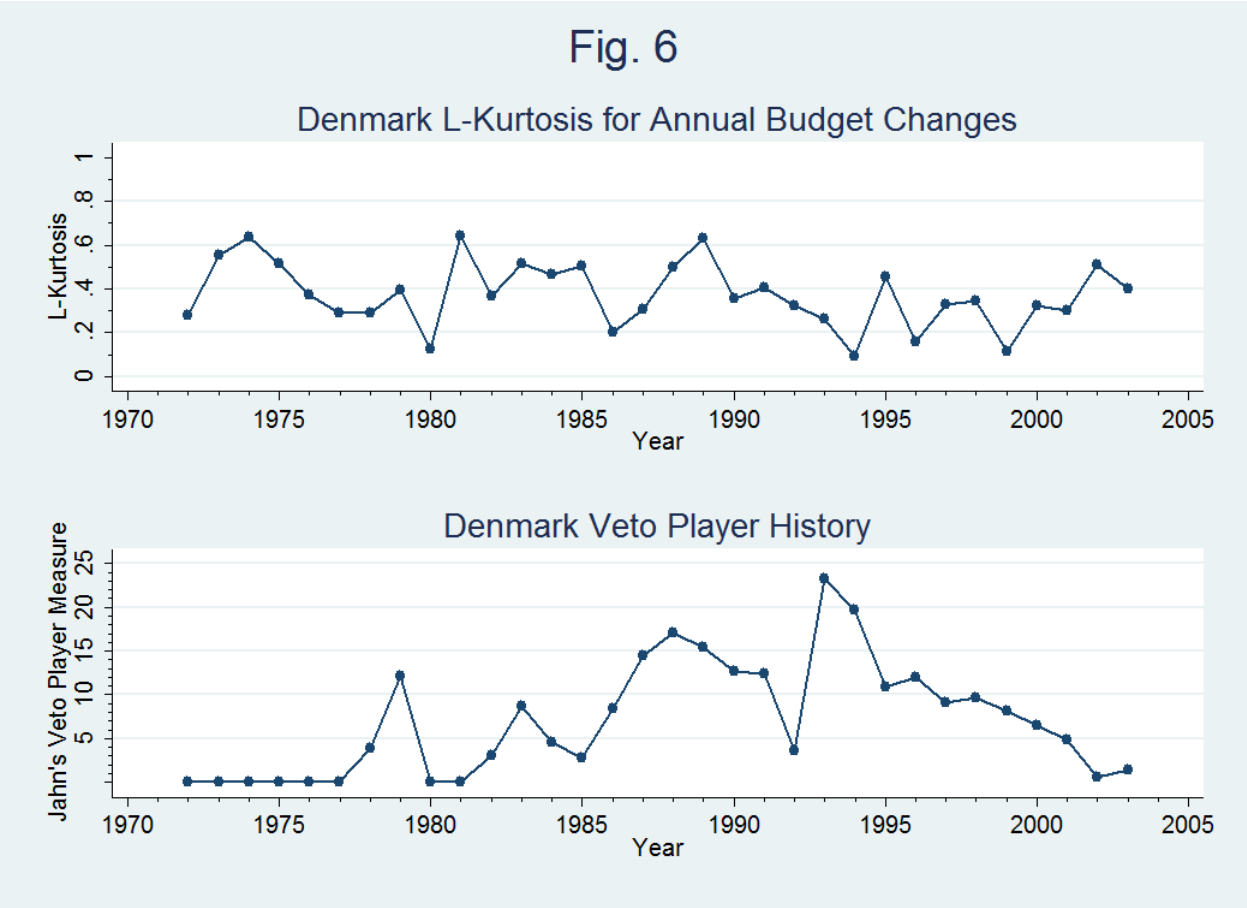

Figure 6: Denmark Combined Time-Series Graph for Annual LK Scores and Veto Player History

Denmark L-Kurtosis for Annual Budget Changes: The data in the Danish Policy Agenda Project have been collected by Christoffer Green-Pedersen and Peter Bjerre Mortensen with support from the Danish Social Science Research Council and the Research Foundation at Aarhus University. For further details see www.agendasetting.dk.

Denmark Veto Player History: The data used here were gathered from the Comparative Politics website from the University of Greifswald's Department of Political Science and Communication Studies at http://comparativepolitics.uni-greifswald.de/data.html. Jahn, Detlef, Thomas Behm, Nils Düpont, and Christoph Oberst. 2012. "PIP – Parties, Institutions & Preferences: Veto Player (Annual) [Version 2012-02]." Chair of Comparative Politics, University of Greifswald.

Figure 6 is the combined time-series display for Denmark's "L-kurtosis scores" and "veto player history". Perhaps the most prominent feature of Denmark's veto player history graph is that it is on such a significantly larger scale than that of either the US or UK, showing just how much division has existed in the Danish government over time between coalition partners. Years with especially high veto player totals for Denmark include 1979, 1986 to 1991, and 1993 to

1999. 1979 was a year in which the Social Democratic Party, a center-left party, and Venstre Liberals, a right-leaning party, formed a coalition. The period from 1986 to 1991 saw a number of significant power shifts. For example, after an election in late 1987, three center-right parties—the Centre Democrats, Christian People's Party, and Conservative People's Party—formed a coalition with a significantly more rightist party, the Venstre Liberals. Then in 1988, another election occurred which brought a new coalition of the Venstre Liberals, Conservative People's Party, and a significantly more leftist party called the Radical Left Party to power. Then, a third election in 1990 brought to power a six-party coalition consisting of the very left Social Democrats and Radical Left Party and a bloc four moderate-right parties including the Conservative People's Party, the Venstre Liberals, the Christian People's Party, and the Centre Democrats. Similar electoral volatility occurred into the later 1990s with two more elections in 1994 and 1998, contributing to Denmark's huge veto player totals for this time period.

Denmark's history of budgetary volatility has also seen some variation (though to a less substantial degree than its veto player history). This once again fits with the hypothesized relationship between veto players and budgetary stability. There are a total of nine years in the Denmark data set with L-kurtosis scores greater than 0.5, including: 1973 to 1975, 1981, 1983, 1985, 1988, 1989, and 2002. Of these nine years, four occurred in years during which there were zero effective veto players in the Danish political system. The average of L-kurtosis scores for years in which there were zero veto players is ≈0.43. The averages for years in which there were more than 0 but less than 10 veto players is ≈0.356 and for years in which there were more than 10 veto players is ≈0.355. Again, this tells us little of major substantive interest but it at least gives us further visual evidence that years with greater numbers of veto players also have lower average L-kurtosis scores than years in which there were fewer veto players in Denmark.

In the end, these time-series graphs show us a number of things which are noteworthy. Most importantly, they showed us the differences between the UK's veto player history and those of the US and Denmark, with the latter two countries displaying significant variation while the UK showed absolutely none. The evidence of overlap between periods of significant budgetary volatility and veto player totals for the US was mixed, with seven of the 18 years with L-kurtosis scores above 0.5 occurring in times with zero effective veto players and the other eleven occurring in periods with higher veto player levels. Additionally, of the nine years in which Denmark had L-kurtosis scores above 0.5, four of them occurred in years with zero effective veto players while the other five occurred in years with higher veto player totals. To gain an even more refined and definitive grasp on the relationship between veto players and budgetary volatility, we can view the time series graphs of "average annual percentage change" and "veto player history" in the next section.

4.2.2 Veto Players and Average Annual Percentage Changes

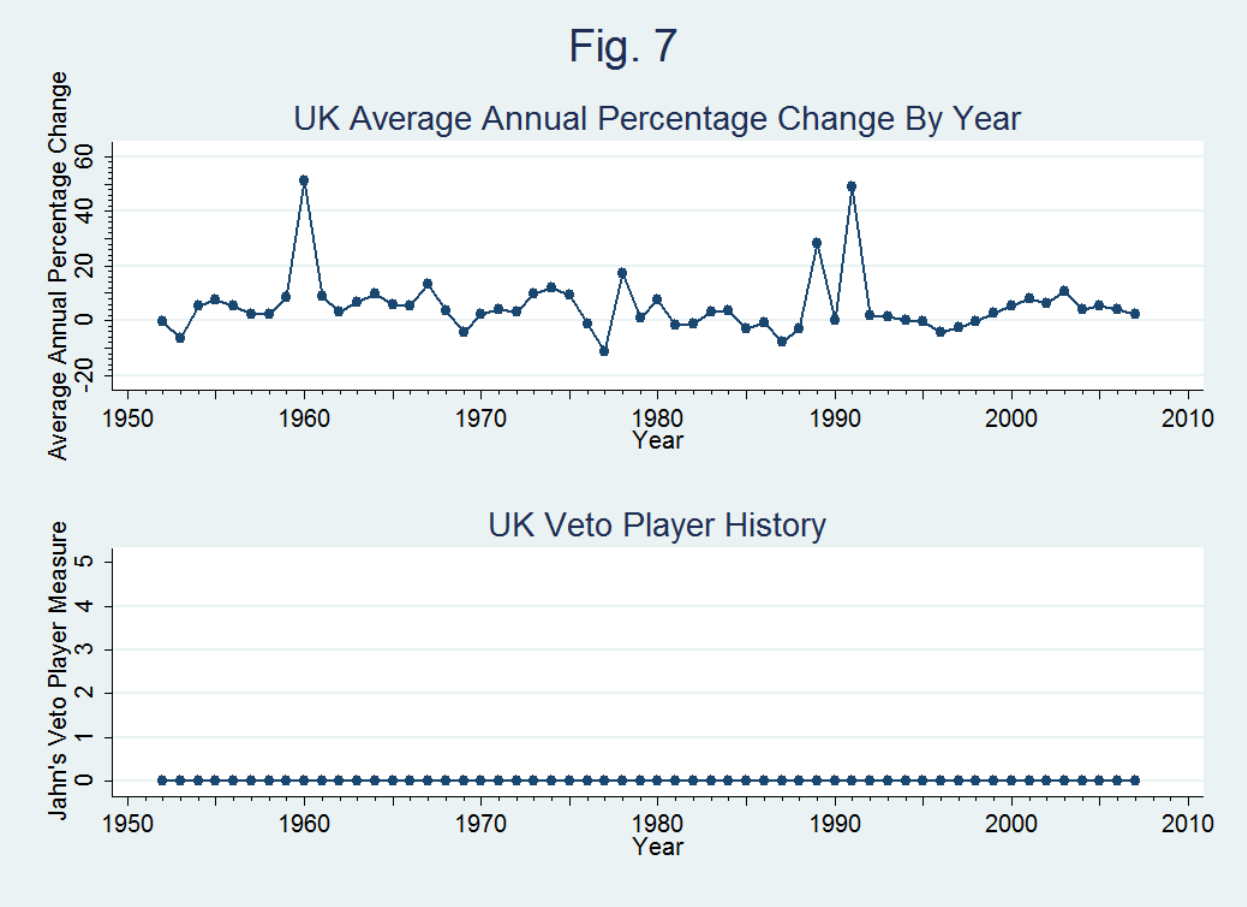

Figure 7: UK Combined Time-Series Graph for Avgerage Annual Percentage Change and Veto Player History

UK Average Annual Percentage Change By Year: The data used here were originally collected as part of the U.K. Policy Agendas Project (www.policyagendas.org.uk). For further details see Shaun Bevan and Will Jennings. (2014). 'Representation, Agendas and Institutions.' European Journal of Political Research 53(1): 37-56; Peter John, Anthony Bertelli, Will Jennings and Shaun Bevan. (2013). Policy Agendas in British Politics. Basingstoke: Palgrave Macmillan.

UK Veto Player History: The data used here were gathered from the Comparative Politics website from the University of Greifswald's Department of Political Science and Communication Studies at http://comparativepolitics.uni-greifswald.de/data.html. Jahn, Detlef, Thomas Behm, Nils Düpont, and Christoph Oberst. 2012. "PIP – Parties, Institutions & Preferences: Veto Player (Annual) [Version 2012-02]." Chair of Comparative Politics, University of Greifswald.

Figure 7 is the combined display of time series graphs for the United Kingdom's "average annual percentage change" and "veto player history". The top graph in figure 4, however, gives us another lens through which to view how the UK's budget volatility has varied over time. There are significant spikes at years 1960 and 1991 of nearly 50 percent, indicating a

major budget punctuation occurred in those years. Additionally, 1972 and 1978 both saw significant spikes of nearly 20 percent, while 1989 shows a jump of in average annual percentage change of nearly 30 percent. These punctuations may be indicative of time-specific phenomena that led to major policy changes.

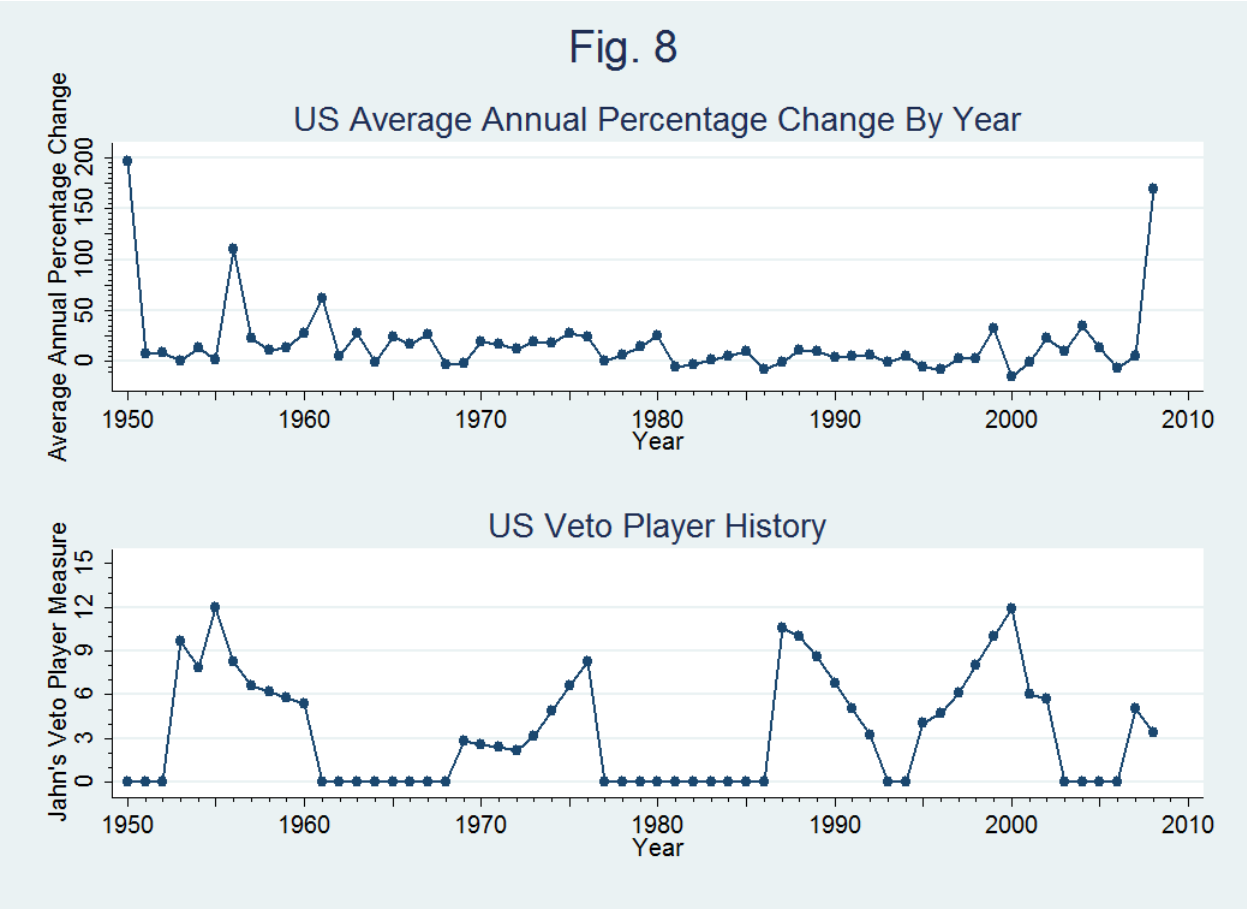

Figure 8: US Combined Time-Series Graph for Average Annual Percentage Change and Veto Player History

US Average Annual Percentage Change By Year: The data used here were originally collected by Frank R. Baumgartner and Bryan D. Jones, with the support of National Science Foundation grant numbers SBR 9320922 and 0111611, and were distributed through the Department of Government at the University of Texas at Austin. Neither NSF nor the original collectors of the data bear any responsibility for the analysis reported here.

US Veto Player History: The data used here were gathered from the Comparative Politics website from the University of Greifswald's Department of Political Science and Communication Studies at http://comparativepolitics.uni-greifswald.de/data.html. Jahn, Detlef, Thomas Behm, Nils Düpont, and Christoph Oberst. 2012. "PIP – Parties, Institutions & Preferences: Veto Player (Annual) [Version 2012-02]." Chair of Comparative Politics, University of Greifswald.

Figure 8 is the combined time series display of "average annual percentage change" and "veto player history" for the United States. Upon observing the time series graph of average annual percentage changes in the US federal budget, a number of periods stick out as well. Perhaps most striking are the two tail-ends of the graph, in 1950 and 2008 with changes of nearly +200 and +175 percent, respectively. More major changes of around +100 percent and +65 percent occurred in 1956 and 1961, respectively. We can also see two changes of around +40 percent in 1999 and 2004. Finally, there are a series of changes of around 25 to 30 percent in the years 1957, 1960, 1963, 1970-1971, 1973-1976, and 2002. All of these years, but especially the first four mentioned, appear to have seen budget punctuations of varying degrees. Interestingly, the punctuations in 1956, 1957, 1960, 1973-1976, 1999, and 2002 appear to have occurred in periods when there was a high number of veto players in the US. The other identified punctuations in 1950, 1960-1961, 1970-1971, 2004, and 2008 all occurred in times when the veto player totals for the US were relatively low.

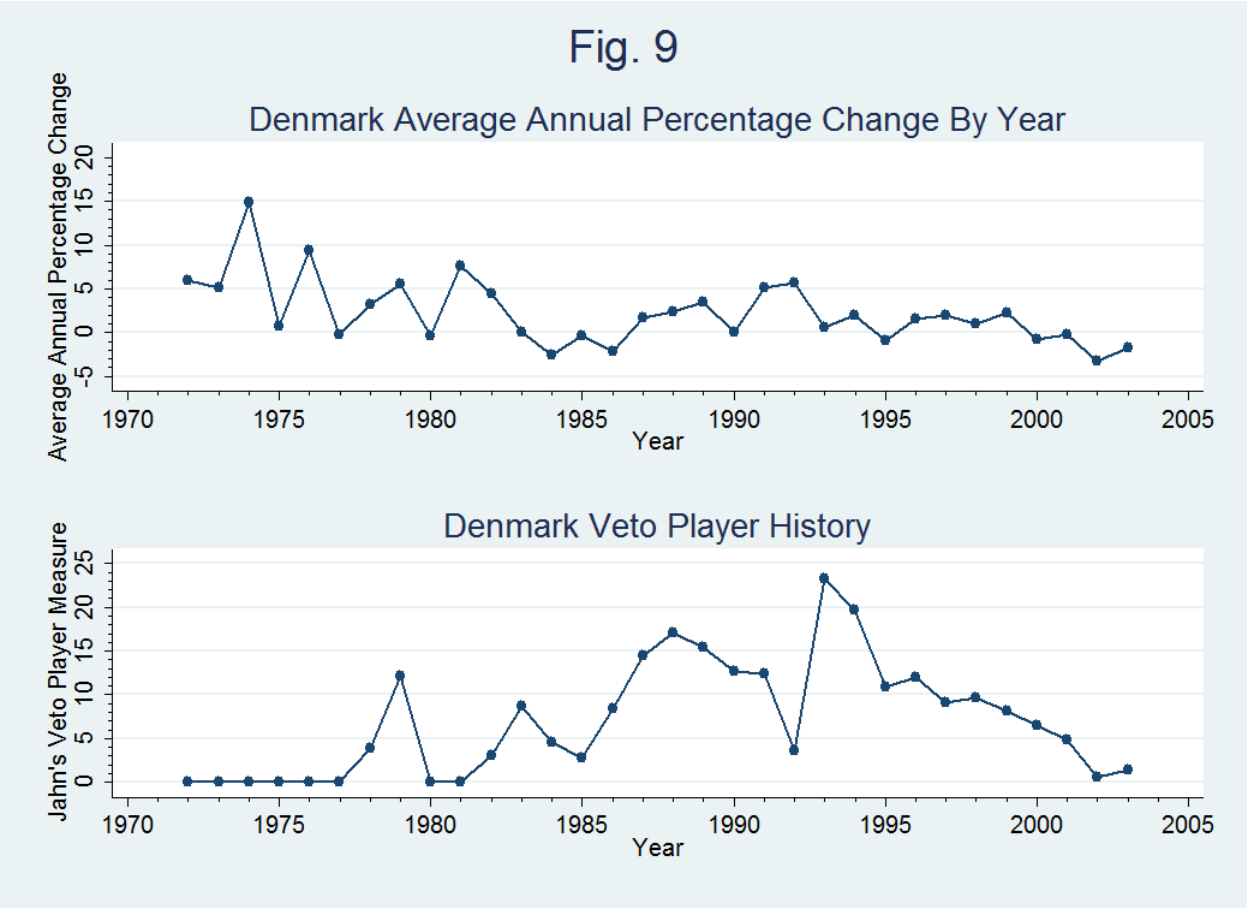

Figure 9: Denmark Combined Time-Series Graph for Average Annual Percentage Change and Veto Player History

Denmark Average Annual Percentage Change By Year: The data in the Danish Policy Agenda Project have been collected by Christoffer Green-Pedersen and Peter Bjerre Mortensen with support from the Danish Social Science Research Council and the Research Foundation at Aarhus University. For further details see www.agendasetting.dk.

Denmark Veto Player History: The data used here were gathered from the Comparative Politics website from the University of Greifswald's Department of Political Science and Communication Studies at http://comparativepolitics.uni-greifswald.de/data.html. Jahn, Detlef, Thomas Behm, Nils Düpont, and Christoph Oberst. 2012. "PIP – Parties, Institutions & Preferences: Veto Player (Annual) [Version 2012-02]." Chair of Comparative Politics, University of Greifswald.

Lastly, Figure 9 is the combined time-series display for Denmark's "average annual percentage changes" and "veto player history". Unlike the volatility seen in its veto player history, Denmark's history of average annual percentage changes within its budget has actually been quite limited overall (due in part to the fact that there were far fewer major punctuations of the kind seen in the US and UK). This fits the pattern seen earlier with Denmark's budget

frequency distribution, which showed a higher frequency of moderate annual percentage changes relative to what was seen in the US and UK along with far lighter tails. Denmark's budget history appears to be so far from punctuated, in fact, that it is impossible to find even one major punctuation in the time-series graph. The most significant average annual percentage change in the graph occurred in 1974 with a +15 percent change. Only 1974 and 1981 show annual changes approaching +10 percent. No other years show changes above +10 percent or below -5 percent. The period of the most significant changes (which, again, are still relatively minor in average percentage terms) appears to extend from 1972 to 1976, which also happens to be the only time in which the Danish political system had no veto players. From the mid-1980s all the way through to 2003, Denmark shows very little variation in its history of average annual percentage changes across budget categories. This coincides with the periods in which Denmark's veto player totals were also the highest, but given the relatively limited degree of average annual percentage changes this visual correlation could mean very little. Much of this apparent stability, however, has to do with the fact that the larger number of moderate year-to-year changes observed in the earlier frequency distribution are being absorbed by the smaller annual percentage changes in other categories when they are averaged together.

These time series graphs, like the three previous figures, also expose a number of intriguing features of the data. To recap, we have seen that there were two major punctuations in the UK's budget history in 1960 and 1991 and three less significant punctuations in 1972, 1978, and 1980. We also saw six major punctuations in the US's budget history in 1950, 1956, 1961, 1999, 2004, and 2008, ten less significant punctuations in 1957, 1960, 1963, 1973-1976, and 2002. We saw no major punctuations in Denmark's budget history. The graphs also showed us the differences between the UK's veto player history and those of the US and Denmark, with the

latter two countries displaying significant variation while the UK showed absolutely none. The evidence of overlap between periods of significant budgetary volatility and veto player totals for the US was mixed, with nine of the 16 punctuations occurring in times with high veto player totals and the other seven occurring in periods with relatively low veto player levels. Additionally, the periods in which Denmark saw the most significant (but still relatively limited) budgetary volatility coincided with a period in which its veto player total was very low while, inversely, the times in which its budgets were most stable occurred while its veto player totals were higher. To gain an even more refined and definitive grasp on the relationship between veto players and budgetary volatility, we now turn to the time series regression analyses for the US, UK, and Denmark.

4.3 Regression Analysis Hypotheses, Results, and Discussion

I have formulated a number of hypotheses which can be tested with the first two models using annual L-kurtosis scores *and* average annual percentage changes as dependent variables. My primary hypothesis addresses the main independent variable (i.e., Jahn's veto player measure) and its relationship to budgetary volatility over time. I will also offer two additional hypotheses regarding the relationships of the war and government ideology variables to budgetary volatility which will be tested with the regressions that follow. My hypotheses for these regression analyses are:

H_4: Lower (higher) numbers of veto players in political systems will create more volatility (stability) in budget structures over time.

H_5: Wars will produce greater volatility in budget structures over time.

H_6: More (less) ideologically conservative governments will produce greater stability (volatility) in budget structures over time.

Hypothesis 4 will obviously be tested by examining the relationship between veto player structures and budget structures over time. I will test Hypothesis 5 by examining the effects of the war variable and Hypothesis 6 by looking at the influence of the Comparative Manifestos Project RILE ideological scores. To test these three independent variables, I intend to run an array of models using both the annual L-kurtosis score and average annual percentage change dependent variables, so the ultimate determination of how my theoretical expectations fare will be judged by looking at the cumulative performance of all of the models together.

I have chosen to use the variety of individual-country and pooled regression models seen below for a number of reasons. The primary driver for this decision was the aforementioned lack of variation in the United Kingdom's veto player independent variable. Another was the discovery of minor problems with the United Kingdom's annual L-kurtosis dependent variable—specifically, the fact that in a few of the years the measure actually returned a negative L-kurtosis value. My initial intention was to simply run three separate regression models for each individual country and then a single pooled model that included panel data from all three countries. If I had adopted this approach, it is very likely that the effects of the UK's veto player variable on the coefficient estimates would have been harder to discern. I also considered simply removing the United Kingdom from the regression analyses altogether, but I ultimately decided against this approach. While there were reasonable methodological justifications for doing so given the veto players variable's lack of variation in the country's dataset, I concluded that too much substantive information would be lost as a result.

The UK's veto player variable offers an interesting test case for us to see how a political system with a complete lack of institutional friction affects overall budget structures—an angle of analysis that would be lost if it were to be excluded from the analysis. To further clarify these

effects, I decided upon running three separate regression models for each individual country, a pooled model including data from all three countries, and three additional pooled models which each include two of the three countries, for both dependent variables. I will specifically analyze how the veto player coefficient estimates vary across the eight pooled models (four for each dependent variable) to see how the invariance in the UK's data for this variable affects the findings.

Prior to running the regressions that follow, I performed a series of tests to arrive at proper model specifications. I first ran tests to determine if there was any heteroskedasticity in my data to see if I could use a panel-level approach for both the annual L-kurtosis and average annual percentage change dependent variable models. Second, I ran a series of tests to reveal whether any of the perennial problems that plague time-series analysis would be a factor in my models. Specifically, I aimed to determine whether there would be issues with serial correlation in my data. Third, I performed a series of Hausman tests to judge whether I should use a fixed-effects or random-effects estimators for the country-pooled analyses. Ultimately, I decided to use random-effects estimators and clustered standard errors for all of my pooled models. For my country-specific models, I have also chosen to use robust standard errors in order to guard against any unobserved heteroskedasticity.

To test for panel-level heteroskedasticity in my data, I ran a series of Breusch-Pagan tests. The tests revealed stark differences between the annual L-kurtosis and average annual percentage change models. For the annual L-kurtosis models, there was no significant heteroskedasticity to concern myself with. For the models using average annual percentage changes as a dependent variable, however, the Breusch-Pagan tests revealed significant

heteroskedasticity. As mentioned above, I will use clustered and robust standard error estimates in these models to account for the observed (and any unobserved) heteroskedasticity.

I also ran a series of Durbin-Watson tests to discover whether serial correlation within the data would prove problematic. Analyzing the Durbin-Watson statistics for these tests in the individual country annual L-kurtosis score models revealed that serial correlation is not a significant problem for the US, though there was some indication of negative serial correlation for Denmark and positive serial correlation for the United Kingdom. Therefore, I will use Prais-Winsten methods for the single-country regressions for Denmark and the UK. For the US, I will simply use standard OLS regression. For the individual country average annual percentage change models there was also some observed serial correlation. For the United States, the Durbin-Watson tests revealed a sizable amount of positive serial correlation. Unfortunately, I was unable to correct for this issue using Prais-Winsten methods as with the annual L-kurtosis models because the transformed DW statistic did not show any improvement. Therefore, for the US I will simply use standard OLS regression and interpret the results with awareness that there is serial correlation, while also counting on the robust standard errors to mitigate its effects. There was also some minor positive serial correlation for the United Kingdom, so I will use Prais-Winsten methods for the United Kingdom. Denmark's DW statistic showed no real serial correlation in its data, so I will simply use standard OLS regression for its annual average percentage change model.

The Durbin-Watson tests for the pooled models revealed serial correlation in the data for three of the four models using annual L-kurtosis scores as a dependent variable. Specifically, the US-UK-Denmark, UK-Denmark, and US-UK pooled models all exhibited noticeable serial correlation. The pooled models using the average annual percentage change dependent variable

also exhibited significant serial correlation in the US-UK-Denmark, US-Denmark, and UK-Denmark models. To correct for this serial correlation and the heteroskedasticity discussed above I will use clustered standard errors in all of my pooled models. Lastly, to determine if either a fixed- or random-effects models would be useful for my pooled analyses, I compared the two options using Hausman tests. The results of the Hausman tests led me to adopt a random-effects approach for all of the pooled models because the various test results showed there was no significant loss of consistency for any of the models compared to a fixed-effects approach.

4.3.1 Annual L-Kurtosis Dependent Variable Regressions

The results for the first set of models, which used the annual L-kurtosis scores of each country's budgetary history as a dependent variable, are presented in Table 1 (individual country regressions) and Table 2 (pooled regressions). For the individual country regressions, the models for the UK and the US performed rather poorly, as none of the included variables attained statistical significance. The model for Denmark, however, actually returned a number of statistically significant results.

The veto player and CMP Right/Left index variables were both significant at the .05 level in the Denmark model. The results for the veto player variable show that for each additional veto player there is actually a 0.01 *decrease* in annual L-kurtosis scores. In practical terms, this means that Denmark's budget actually sees increased volatility as additional veto players are added to its political system—an observation that runs counter to the expectations of Hypothesis 4. The CMP Right/Left index variable results show that each 1 point increase on the -100 to 100 RILE score index leads to approximately a 0.0003 *increase* in annual L-kurtosis scores. In substantive terms, this means that when more conservative parties dominate the government in Denmark, budgetary stability will increase incrementally. Perhaps this can be best understood by way of an example. If the ideological profile of a Danish government shifts 30 points to the right from -15

on the RILE scale to +15 after an election, then the annual L-kurtosis score would increase on average by approximately 0.009. This is evidence in favor of Hypothesis 6, though it is obviously a rather insubstantial effect.

Table 1: Single Country Annual L-kurtosis Score Regression Results

	US	Denmark	UK
Veto Players	-0.00	-0.01	0.00
	(0.01)	(0.00)*	(0.00)
War	-0.02701	0.00000	-0.02582
	(0.04953)	(0.00000)	(0.10374)
CMP RILE	3.32e-04	2.76e-03	-6.13e-04
	(1.66e-03)	(1.05e-03)*	(1.89e-03)
GDP	-0.00	-0.01	-0.00
	(0.01)	(0.01)	(0.02)
Electoral Cycle	0.01	0.13	-0.00
	(0.06)	(0.04)**	(0.09)
Constant	0.50	0.36	0.43
	(0.06)**	(0.04)**	(0.08)**
R^2	0.01	0.55	0.01
N	59	32	56

Note: Robust standard errors in (). * $p<0.05$; ** $p<0.01$

Table 2: Pooled Annual L-kurtosis Score Regression Results

	US-UK-Denmark	US-Denmark	US-UK	UK-Denmark
Veto Players	-0.004	-0.007	0.005	-0.007
	(0.004)	(0.001)**	(0.005)	(0.000)**
War	-0.006	0.009	-0.021	-0.037
	(0.019)	(0.050)	(0.009)*	(0.013)**
CMP RILE	0.001	0.001	-0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)
GDP	-0.002	-0.002	-0.001	-0.011
	(0.003)	(0.002)	(0.000)**	(0.005)*
Electoral Cycle	0.023	0.031	0.007	0.030
	(0.022)	(0.037)	(0.008)	(0.038)
Constant	0.438	0.456	0.444	0.436
	(0.018)**	(0.056)**	(0.026)**	(0.012)**
N	147	91	115	88

Note: Clustered standard errors in (). * $p<0.05$; ** $p<0.01$

Turning to the pooled models, we once again see a mixed set of results. The three-country pooled model with data from the US, UK, and Denmark showed no variables with statistical significance. The two-country pooled models, however, all showed a number of statistically significant results. The veto player variable attained statistical significance in both the US-Denmark and UK-Denmark models at the .01 level, though the fact that the predicted effect is the same in both suggests that this is an artefact of the variable's effect in Denmark. Both models showed that for each additional veto player, annual L-kurtosis scores decreased by 0.007. Much like with the Denmark individual-country model above, this shows that adding veto players can actually increase budgetary volatility rather than stability, contrary to what Hypothesis 4 predicts.

The war variable attained statistical significance in both the US-UK and UK-Denmark pooled models at the .05 and .01 level, respectively. The effect in the US-UK model shows that the occurrence of wars causes an average decrease of 0.021 in annual L-kurtosis scores, suggesting that wars can indeed increase the degree of budgetary volatility. The UK-Denmark model showed an even more substantial decrease of 0.037 in annual L-kurtosis scores, again suggesting that wars create greater budgetary volatility. These results provide clear and strong support for Hypothesis 5.

Looking across the annual L-kurtosis pooled models for the US, UK, and Denmark, we can also identify interesting variation in their veto player coefficient changes, revealing how the invariance of the variable for the UK and Denmark, respectively, affected the model estimations. In the US-UK-Denmark model, the (statistically insignificant) coefficient estimate for the veto player variable is -0.004. Removing the United Kingdom from the regression analysis does not

seem to have any measurable effect on the veto players variable's coefficient estimate, however, as we can see that in the US-Denmark and UK-Denmark models the coefficient estimate is -0.007 and is statistically significant in both. The most substantial coefficient change occurs when Denmark is removed, however, as can be seen in the US-UK model. The coefficient estimate here actually *reverses* its direction and has a (statistically insignificant) positive effect of 0.005. Taken as a whole, these coefficient changes seem to suggest that the UK's veto player invariance was not a major problem for the annual L-kurtosis models. Instead, it more clearly reveals the overall strength of the veto player variable on Denmark's budget structures.

4.3.2 Average Annual Percentage Change Dependent Variable Regressions

The models which used average annual percentage changes in budgetary outlays as the dependent variable can be seen in Table 3 (individual country regressions) and Table 4 (pooled regressions). The individual county regression results in Table 4 are of little interest for analysis given that none of the variables (not even the controls) attained statistical significance. The pooled models, however, show a mixed set of statistically significant results. The veto player variable was statistically significant in the US-UK and UK-Denmark pooled models at the .01 and .05 levels, respectively. For each additional veto player in the US-UK model, the results show slightly over a 1% *increase* in average annual percentage changes. This again defies Hypothesis 4 and shows that increased numbers of veto players can actually increase budgetary volatility. The UK-Denmark model results show a slight *decrease* of approximately 0.18 percent in average annual percentage changes for each additional veto player. This stands alone thus far among the statistically significant veto player results, and the effect is so small that it clearly does not outweigh the others.

Table 3: Single Country Avg. Ann. Percentage Change Regression Results

	US	Denmark	UK
Veto Players	0.392	-0.101	0.000
	(0.790)	(0.105)	(0.000)
War	16.485	0.000	2.320
	(10.808)	(0.000)	(3.789)
CMP RILE	-0.290	-0.026	-0.060
	(0.173)	(0.037)	(0.082)
GDP	-0.671	-0.080	-0.194
	(3.148)	(0.446)	(1.420)
Electoral Cycle	-8.702	0.162	3.173
	(8.382)	(1.375)	(4.354)
Constant	16.649	3.239	4.346
	(10.006)	(1.780)	(3.869)
R^2	0.08	0.06	0.05
N	59	32	56

Note: Robust standard errors in (). * $p<0.05$; ** $p<0.01$

Table 4: Pooled Avg. Ann. Percentage Change Regression Results

	US-UK-Denmark	US-Denmark	US-UK	UK-Denmark
Veto Players	0.127	-0.254	1.066	-0.183
	(0.423)	(0.166)	(0.504)*	(0.054)**
War	12.848	19.096	11.640	2.614
	(6.426)*	(3.543)**	(7.255)	(0.704)**
CMP RILE	-0.087	-0.145	-0.140	-0.051
	(0.061)	(0.114)	(0.099)	(0.014)**
GDP	0.404	-0.220	0.319	-0.120
	(0.215)	(0.275)	(0.284)	(0.075)
Electoral Cycle	-2.681	-6.993	-2.954	1.591
	(4.657)	(3.979)	(6.409)	(1.593)
Constant	6.006	12.524	6.362	4.117
	(4.305)	(5.993)*	(5.471)	(0.468)**
N	147	91	115	88

Note: Clustered standard errors in (). * $p<0.05$; ** $p<0.01$

The war variable is statistically significant in the US-UK-Denmark (.05 level), US-Denmark (.01 level), and UK-Denmark (.01 level) models with substantial effects in all three. The effects were massive in the US-UK-Denmark pooled model, with the occurrence of a war causing nearly a 13 percent increase in the average annual percentage change. The effects in the

US-Denmark model were even more substantial, with a war leading to a 19 percent increase in the dependent variable. The UK-Denmark model reveals more modest effects of only a 2.6 percent increase, though this is still not an insignificant change. Yet again, we see clear confirmatory evidence for Hypothesis 5. The CMP Right/Left index variable also showed statistical significance at the .05 level for the UK-Denmark model, with the results showing a 0.05 percent decrease in average annual percentage changes for each 1 point increase on the -100 to 100 RILE scale. This again suggests that more conservative governments produce (slightly) more stable budgets. Taking our earlier example, if a government were to shift 30 points on the RILE scale from -15 to +15, the average annual percentage change in spending would decrease about 1.5 percent. Once again, this result supports Hypothesis 6.

As with the annual L-kurtosis pooled models, we can also see some patterns in the veto player coefficient changes in the average annual percentage changed pooled models. The US-UK-Denmark model shows a (statistically insignificant) positive effect of 0.127. The effects of the UK's veto player variable can be more clearly discerned in the other three pooled models, however. In the US-Denmark model, we see a reversal of the coefficient estimates sign. The results show a (statistically insignificant) result of -0.254. In the two-country models with the UK we really begin to see the effects of the country's veto player invariance. In the US-UK model, the coefficient estimate is a statistically significant 1.066 and in the UK-Denmark model it is a statistically significant -0.183. The positive sign and strength of the US-UK model could be seen to show an inflation effect of the veto player variable's invariance in the UK. As with the annual L-kurtosis dependent variable regressions, it appears that it is also due in part to the strength of the veto player variable in Denmark. For the model in which Denmark is not included (US-UK), the effect of veto players on budget structures is hugely positive. When Denmark is

included and the UK is excluded (US-Denmark), we can also see how the effect of veto players on budget structures is (somewhat) negative. When the two are pooled together, we can see how the effect is still slightly negative. Thus, it would appear that with the regression models which use the average annual percentage change dependent variable, the UK's lack of variation in its veto player structure has a somewhat positive effect on the models' regression results. In the three-country pooled model, however, this positive effect is blunted by the strongly negative effects that Denmark's veto player variable has on the coefficient estimates.

4.3.3 Exploratory Analysis: Category-Specific Regressions

The category-specific regressions using annual percentage changes as their dependent variable are mostly exploratory and not a critical part of the main theoretical argument of this paper. Therefore, no hypotheses will be presented prior to the following exploration of the results. As we can see below, very few variables in these models attained statistical significance. This is not terribly surprising, as these individual categories are subject to a wide variety of influences that are beyond the scope of this analysis, such as the influence of interest groups and the whims of various committees and even individual legislators within the countries analyzed here. With that said, there were a few results of interest that are presented in the tables below.

Prior to running these regression models, I first ran a series of tests to see where serial correlation was present. Where it was discovered, (i.e., where the DW statistic was substantially above or below 2), I used Prais-Winsten estimation methods to correct for the serial correlation. For the United States, I used the Prais-Winsten estimation method for the following categories: (1) defense; (2) international affairs; (3) science, space, and technology; (4) natural resources; (5) transportation; (6) education; (7) health; (8) income security; (9) justice administration; and (10) general government. I chose to use standard OLS methods for: (1) energy; (2) agriculture; (3) commerce and housing credit; (4) community and regional development; (5) social security; and

(6) veterans benefits. For Denmark's spending function-categories, I discovered serial correlation in the following: (1) macroeconomics; (2) agriculture; (3) energy; (4) transportation; (5) law, crime, and family issues; (6) social welfare; (7) community and housing development issues; (8) banking, finance, and domestic commerce; (9) defense; (10) international affairs and foreign aid; (11) government operations; (12) public lands, water management, and territorial issues; and (13) cultural policy issues. Prais-Winsten methods were used for all of these function-categories' regression models. The remaining two categories' models, health and education, were both estimated using standard OLS regression. In the United Kingdom's category-specific regression models, all of the function-categories showed serious serial correlation in the dependent variable. Therefore, I used Prais-Winsten estimation methods for all of them, including: (1) macroeconomics; (2) health; (3) education; (4) law, crime, and family issues; (5) social welfare; (6) community development, planning, and housing issues; and (7) defense.

The 16 US category-specific regressions (presented in Tables 5a, 5b, and 5c) reveal two independent variables that attained statistical significance in two different category-specific models. In the defense spending regression (Table 5), the veto players variable is statistically significant at the .05 level. These results show that, for each additional veto player that enters the US political system, defense spending actually decreases by an average of approximately 1.13 percent. In the Social Security spending regression (Table 7), the CMP Right/Left index variable attained statistical significance at the .01 level and shows that, for each 1 point increase on the -100 to 100 RILE scale, Social Security spending actually decreases by an average of 0.145 percent. This means, in effect, that if a Democratic administration situation at -20 on the RILE scale were to be replaced in an election by a Republican administration at +20, spending on Social Security would decrease by an average of 5.8 percent per year. This is obviously not an

outcome that would be likely to occur in reality, but it does display that more conservative governments are more likely to favor restraining Social Security spending.

Table 5: US Category-Specific Annual Percentage Change Regression Results (1-5)

	Defense	IntAff	SST	NatRes	Trans
Veto Players	-1.132	-0.398	0.485	0.378	0.938
	(0.561)*	(1.759)	(0.969)	(0.552)	(0.839)
War	11.029	3.240	-11.780	4.140	-7.494
	(8.415)	(10.298)	(10.052)	(4.754)	(5.182)
CMP RILE	-0.117	0.006	-0.330	-0.115	-0.383
	(0.163)	(0.282)	(0.217)	(0.091)	(0.248)
GDP	3.636	0.033	3.691	0.795	-4.242
	(2.380)	(2.696)	(3.168)	(1.055)	(3.559)
Electoral Cycle	-8.034	-15.794	-6.033	7.818	-12.693
	(6.334)	(12.787)	(8.156)	(7.183)	(7.759)
Constant	-4.408	11.081	6.358	-2.135	29.075
	(6.349)	(13.747)	(9.112)	(5.465)	(17.919)
R^2	0.19	0.03	0.12	0.07	0.11
N	59	59	59	59	59

Note: Robust standard errors in (). * $p<0.05$; ** $p<0.01$

Table 6: US Category-Specific Annual Percentage Change Regression Results (6-10)

	JustAd	GenGov	Edu	Health	IncSec
Veto Players	0.205	0.957	1.565	0.155	0.412
	(0.427)	(0.817)	(1.104)	(0.430)	(0.463)
War	5.771	11.324	8.059	3.734	-0.617
	(3.484)	(8.706)	(5.881)	(4.904)	(3.294)
CMP RILE	-0.053	-0.020	-0.355	-0.155	-0.239
	(0.080)	(0.136)	(0.177)	(0.113)	(0.131)
GDP	-0.127	1.937	3.215	1.438	-3.101
	(0.471)	(1.260)	(2.128)	(1.227)	(1.884)
Electoral Cycle	-4.954	12.903	6.503	0.459	0.841
	(3.398)	(14.415)	(8.783)	(4.076)	(4.057)
Constant	6.806	-12.774	-7.042	4.490	17.000
	(3.230)*	(8.755)	(9.392)	(4.158)	(8.999)
R^2	0.10	0.10	0.19	0.10	0.16
N	59	59	59	59	59

Note: Robust standard errors in (). * $p<0.05$; ** $p<0.01$

Table 7: US Category-Specific Annual Percentage Regression Results (11-16)

	CRD	SocSec	VetBen	Energy	Ag	CHC
Veto Play	1.686	0.261	0.046	-0.021	-0.366	1.164
	(8.128)	(0.196)	(0.242)	(5.885)	(2.328)	(3.999)
War	2.999	1.484	3.278	94.649	-2.869	134.457
	(49.479)	(1.844)	(3.150)	(50.572)	(18.911)	(98.138)
CMP RILE	-1.817	-0.145	0.036	-0.515	-0.484	0.057
	(1.185)	(0.047)**	(0.059)	(1.197)	(0.483)	(1.228)
GDP	-0.762	0.235	-0.112	5.826	-3.979	-19.806
	(12.026)	(0.467)	(0.987)	(15.801)	(6.342)	(24.041)
Elec. Cycle	58.099	-0.944	-2.267	-103.051	-7.830	-66.666
	(68.515)	(1.643)	(2.811)	(40.005)*	(17.819)	(56.860)
Cons	65.812	6.297	0.815	21.865	39.081	87.371
	(59.936)	(1.719)**	(2.830)	(50.744)	(27.928)	(88.841)
R^2	0.03	0.16	0.04	0.13	0.03	0.09
N	59	59	59	59	59	59

Note: Robust standard errors in (). * $p<0.05$; ** $p<0.01$

The Denmark category-specific regressions (displayed in Tables 8, 9, and 10) show a few variables which attained statistical significance, though the vast majority in these 15 models did not. In the international affairs spending model (Table 9), the CMP Right/Left index is statistically significant at the .05 level. The CMP Right/Left index variable results show that, for each 1 point increase on the RILE scale, spending on international affairs decreases by 0.095 percent in Denmark. This means that more conservative governments are less prone to spend money on international diplomacy and engagement in Denmark.

In the cultural policy issues spending model (Table 10), the two variables that attained statistical significance include the veto player (.05 level) and CMP Right/Left index (.01 level) variables. The veto player variables results show that, for each additional veto player in Denmark, spending on the cultural policy issues category increases by a little over 0.2 percent.

While this may seem like a small amount, we must keep in mind the rapid and sizable swings that Denmark's veto player structure has undergone over time. If the country were suddenly to jump from a mere 3 effective veto players in one year to 18 in the next, spending on this category would be predicted to decrease by around 3 percent. Lastly, the CMP Right/Left index variable results for the cultural policy issues category show that for each 1 point increase on the RILE scale, spending in this category decreases by approximately 0.06 percent. This is a rather small effect; though, if the Danish government were to become significantly more conservative from one election cycle to the next, it could result in a substantial predicted reduction in spending on this category.

Table 8: Denmark Category Specific Annual Percentage Change Regression Results (1-5)

	Macro	Ag	Energy	Trans	LCFI
Veto Players	-0.062	-0.516	0.166	-0.262	-0.050
	(0.844)	(0.470)	(0.542)	(0.157)	(0.136)
War	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CMP RILE	-0.220	-0.271	-0.150	-0.009	-0.007
	(0.210)	(0.174)	(0.189)	(0.044)	(0.022)
GDP	0.265	0.388	-0.920	-0.101	-0.035
	(2.003)	(1.175)	(2.699)	(0.696)	(0.419)
Electoral Cycle	-4.742	-8.253	9.182	0.325	-1.761
	(10.028)	(4.956)	(9.673)	(2.247)	(1.200)
Constant	-0.490	10.921	0.348	1.647	3.020
	(10.249)	(7.651)	(11.722)	(2.699)	(1.679)
R^2	0.05	0.25	0.08	0.09	0.06
N	32	32	32	32	32

Note: Robust standard errors in (). * $p<0.05$; ** $p<0.01$

Table 9: Denmark Category-Specific Annual Percentage Change Regression Results (6-10)

	SocWel	CDHI	BFDC	Defense	IntAff
Veto Players	0.045	0.259	-0.870	-0.062	-0.220
	(0.107)	(0.388)	(0.633)	(0.070)	(0.125)
War	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CMP RILE	-0.006	0.074	0.112	-0.036	-0.095
	(0.042)	(0.084)	(0.112)	(0.020)	(0.036)*
GDP	-0.374	-0.848	-2.542	-1.204	1.496
	(0.440)	(1.298)	(2.082)	(0.243)**	(0.658)*
Electoral Cycle	0.798	8.916	5.560	-0.473	-0.329
	(1.181)	(7.076)	(6.581)	(1.221)	(2.543)
Constant	3.916	-2.797	17.027	4.014	3.594
	(1.645)*	(5.918)	(11.853)	(1.303)**	(2.668)
R^2	0.12	0.16	0.18	0.47	0.43
N	32	32	32	32	32

Note: Robust standard errors in (). * $p<0.05$; ** $p<0.01$

Table 10: Denmark Category-Specific Annual Percentage Change Regression Results (11-15)

	PLWMTI	GovOps	CulPolIss	Health	Edu
Veto Players	-0.146	-0.227	0.212	-0.037	0.047
	(0.165)	(0.115)	(0.092)*	(0.075)	(0.071)
War	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CMP RILE	-0.095	-0.022	-0.064	0.013	-0.020
	(0.069)	(0.031)	(0.021)**	(0.033)	(0.025)
GDP	0.231	-0.358	0.067	-0.354	-0.342
	(0.721)	(0.385)	(0.342)	(0.341)	(0.294)
Electoral Cycle	-2.872	-0.454	0.366	-1.442	0.445
	(1.813)	(1.664)	(1.258)	(1.353)	(1.104)
Constant	5.805	5.214	0.903	3.455	2.845
	(2.771)*	(1.840)**	(1.281)	(1.263)*	(1.159)*
R^2	0.16	0.17	0.33	0.07	0.12
N	32	32	32	32	32

Note: Robust standard errors in (). * $p<0.05$; ** $p<0.01$

The UK category-specific regressions (all displayed in Table 11) showed no statistical significance in any variables of interest. In fact, only a few control variables attained statistical

significance in any of the UK's models. While this would be expected with the veto player variable given that it is excluded from the regression model because of a lack of variation, I am surprised to see absolutely no effect on any of the categories from either the war or CMP Right/Left index variables. Only the GDP and electoral cycle control variables have any statistical significance at all in any of the category-specific models, and even these show relatively small effects.

Table 11: UK Category-Specific Annual Percentage Change Regression Results

	Macro	LCFI	Defense	SocWel	Edu	Health	CDPHI
Veto Player	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
War	7.994	0.926	1.218	1.826	1.116	-0.061	3.538
	(22.383)	(1.354)	(1.986)	(2.220)	(1.349)	(1.374)	(4.593)
CMP RILE	-0.165	-0.008	0.021	-0.019	-0.038	-0.004	-0.194
	(0.503)	(0.027)	(0.028)	(0.041)	(0.028)	(0.025)	(0.143)
GDP	-1.261	-0.149	-0.216	-1.445	0.224	-0.716	1.960
	(8.597)	(0.313)	(0.375)	(0.675)*	(0.251)	(0.546)	(1.960)
Elect. Cycle	19.044	-0.898	3.234	-3.096	0.967	3.218	-0.481
	(27.813)	(0.967)	(1.446)*	(1.516)*	(1.049)	(2.187)	(3.869)
Constant	12.729	5.260	-0.321	8.695	2.778	5.235	-3.293
	(23.572)	(1.185)**	(1.224)	(2.021)**	(1.091)*	(1.754)**	(6.387)
R^2	0.03	0.02	0.10	0.24	0.06	0.12	0.11
N	56	56	56	56	56	56	56

Note: Robust standard errors in (). * $p<0.05$; ** $p<0.01$

Overall, these results show that the main and alternative independent variables seem to have little effect on any specific categories of spending. Only two of the 16 categories in the US and three of the 15 categories in Denmark showed any statistically significant results for these variables, while none showed any statistical significance in the UK's seven categories. I would have expected to see some logical relationships, like war leading to increased defense spending

or more rightist governments decreasing public health spending, but nothing so clear-cut emerged from the regression results. Instead, it was shown that an increased number of veto players in the US actually leads to a *decrease* in defense spending, which could be explained as a result of this category's rather large place in the United States' discretionary budget (of which it has historically often constituted over half, or nearly 20 percent of *all* appropriations) (Austin, 2014, 25). Perhaps in times of divided government, defense spending is reduced in the budget negotiation process because it is such a large overall share of the US's discretionary budget. The US's results which showed decreased spending on Social Security as governments become increasingly conservative is not totally surprising, as common intuition about American politics would assume that Republicans would be less favorable toward entitlement spending. This is also in line with many findings in welfare-state studies, which consistently show that more conservative governments tend to spend less on social insurance programs (Amable, Gatti, & Schumacher 2006; Klitgaard & Elmelund-Praestekaer, 2013).

The three statistically significant results for Denmark showed that increased conservatism in governments led to decreased spending on international affairs and cultural policy issues. The results also show that an increase in the number of veto players leads to increased spending on cultural policy issues in Denmark. The reasons behind these patterns are less easily discerned than those for the two findings for the United States discussed above. In the case of decreased international affairs spending with more conservative governments, one could theorize that conservative parties in Denmark are less interested in international engagement. The decreased spending on cultural policy issues that appears to be associated with increased conservatism might be explained similarly. Perhaps conservative parties in Denmark are less favorable towards government involvement in the promotion and funding of cultural issues. The most

perplexing of the results is the veto player coefficient estimate showing that increased institutional friction in Denmark actually leads to *increased* spending on cultural policy issues. Perhaps this reflects a compromise between parties in times of divided governments in which cultural policy issues receive more funding in exchange for increased spending elsewhere. All of these ideas about the category-specific results for Denmark are conjectural, but further analysis of them is outside of the scope of this work and so it will be pursued no further here.

4.3.4 Discussion of Regression Analyses Results

The results from the annual L-kurtosis score and average annual percentage change dependent variable regressions present a mixed picture for the performance of Hypotheses 4, 5, and 6. The main prediction of interest was Hypothesis 4, which expected to see decreased volatility and increased stability in budget structures as more veto players were added to political systems. This hypothesis performed most poorly of the three, as four of the five models in which the veto player variable was statistically significant showed relationships that suggested the very opposite of my theoretical expectations. Rather than additional veto players leading to greater policy stability, the preponderance of the evidence points to them actually increasing budgetary volatility. Three of the four models which contradicted my hypotheses also featured Denmark, either in an individual-country model or as part of a pooled model. In the Denmark, US-Denmark, and UK-Denmark models which used annual L-Kurtosis scores as the dependent variable, all showed that each additional veto player led to a sizable decrease in L-kurtosis on average. If this variable were increasing stability rather than volatility, we would expect to see the very opposite of this. Veto players also showed a sizable effect of an average 1 percent increase in average annual percentage change in the US-UK model, suggesting that more veto players cause larger budget changes and more overall volatility.

Hypothesis 5, which predicted that wars would lead to increased budgetary volatility, performed the best of all of the variables and showed the most substantial coefficient changes (though this is likely largely due to it being a dummy variable). All five of the models in which the war variable was statistically significant showed the hypothesized direction of the relationship, suggesting that wars do indeed lead to greater budgetary volatility. In the annual L-kurtosis dependent variable models, it caused substantial decreases in the UK-Denmark and US-UK models. In the second set of models, war caused a 13 percent increase in average annual percentage change in the US-UK-Denmark pooled model, a 19 percent increase in the US-Denmark model, and a 2.6 percent increase in the UK-Denmark model. Hypothesis 6, which predicted that more conservative governments would lead to more budgetary stability, was also validated by two of the models. In the annual L-kurtosis dependent variable regression for Denmark, an increase in this measure caused a statistically significant 0.0003 decrease. It also led to a 0.05 percent decrease in average annual percentage change in the UK-Denmark pooled model from the second set of regressions.

One interesting pattern that was noted earlier is the frequency of Denmark's appearance in the models which returned statistically significant results for the veto player measure. It is exceptionally surprising given the fact that this country appears to be the most volatile despite its utter lack of any significant punctuations like those seen in the US's and UK's budgetary histories. There is a very plausible set of explanations that I believe can account for Denmark's apparent oddities—both its observed volatility and relative lack of punctuations that we see despite its history of significant political division. Part of the solution is provided by Green-Pedersen (2001); specifically, Denmark's history of minority governments forged an ethic of compromise and conciliation, as parties that have occupied this tenuous position have by sheer

necessity been forced to grant concessions to opposition parties. He suggests that the "effectiveness of minority governments seems to depend on their flexibility, which again—apart from depending on parliamentary norms—depends very much on developments within the party system" (Green-Pedersen, 2001, 23). This, coupled also with the extensive history of coalition governments, has led to an institutional norm of accommodation and negotiation between ruling and opposition parties within the Folketing.

Danish parties' history of budgeting by consensus certainly explains how they've managed to avoid complete stasis in their budget structure, as parties on all sides are able to pass small to moderate fiscal adjustments that accord with their preferences. Another element of the Danish budgetary process which helps to elucidate the relative lack of major punctuations is the country's practice of adopting multi-year expenditure agreements. This system of budgetary procedures poses "challenges for effective [fiscal] reallocation in Denmark, as [it] places large portions of the budget off-limits" (Ruffner & Blöndal, 2004, 60). I believe that these two features of the Danish political system work in tandem to create the unexpected form that its budget structure has taken over time.

Clearly, I was incorrect in my most important hypothesis about the relationship between veto player structures and the evolution of budget structures over time. My predictions for both of the alternative models are well-supported, but this is of little analytical interest for my purposes beyond what it might suggest about avenues for further research. Given the unique structural characteristics of the Danish political system and budget process, coupled with the complete lack of variation in the veto player independent variable in the United Kingdom's dataset, it is at least somewhat reasonable to interpret the evidence that refutes Hypothesis 4 with mild skepticism.

Part V
Conclusion

Regardless of whether a different set of data might have given this analysis different results, the findings outlined above still have important meaning and implications for the broader veto player and punctuated equilibrium theories. First, the frequency distributions that were generated for the United States, United Kingdom, and Denmark all match the theoretical expectations of punctuated equilibrium theory that budgets will be leptokurtic and punctuated. This provides further confirmation for the vast punctuated equilibrium literature that has consistently shown budgets to have tall peaks and heavy tails in their distributions. Further, this analysis has shown that specific factors like the war and government ideology alternative independent variables included in my models can have significant effects on how volatile budget structures are. This paper has also revealed the dangers of calculating L-kurtosis scores from an insufficiently large *N*—specifically by estimating the UK's annual L-kurtosis variable from only seven spending categories—and how this can result in a negative L-kurtosis score which falls outside of the measure's theoretical range of 0 to 1. Finally, I have also offered a template upon which later analyses of factors that affect budgetary distributional outcomes can be built and improved.

This work's contributions to the veto player literature are numerous as well. Most importantly, this analysis has provided evidence regarding the effects of veto player structures on the evolution of fiscal policy across time and space. The unexpected findings in the case of Denmark have also revealed possible intervening factors that can overcome the institutional friction created by a large number of veto players—specifically, institutional norms and budgetary processes and practices. Finally, at least to my knowledge, this analysis has directly

applied Jahn's modified veto player measure to an analysis of budget structures using the punctuated equilibrium model for the first time.

This analysis certainly can be improved upon in a variety of ways. Future researchers interested in the question of how veto player structures affect budget structures would be wise to choose a larger set of countries with a greater degree of variability in veto player structures over time—though in this analysis that option was severely restricted by the availability of budget data. Using a country other than the United Kingdom in future analyses, specifically one which has at least some degree of variation in its veto player structure over time, might reveal different results. The most pressing need for future research in this area to address is the construction of more consistent and comprehensive budget data than are currently available in the classification format used by the Policy Agendas Project and Comparative Agendas Project. Budgets are just one slice of these research programs, but if budgetary research using the punctuated equilibrium model is to advance significantly further beyond the type of analysis presented in the above pages, much more coding of budget data needs to be completed.

A number of methodological improvements could be made as well. The use of alternative regression models, like quantile regression, could enhance studies of this sort by revealing the differential effects of independent variables on a variety of points in the budget distributions. Specifically, quantile regression could reveal "whether the same causal processes influence large and small cuts, as well as small and large budget increases" by analyzing "conditional quantile functions" rather than the standard "conditional mean," as was analyzed in this research (Breunig & Jones, 2011, 112). Further improvements could also be made in the veto player measure that extend beyond the effects of just the legislative and executive branches. Candidates for inclusion as possible veto players might include constitutional courts, interest groups, or citizens voting in

referenda (where applicable). Any and all of these steps would, if not improve on this research, then at the very least provide new angles from which to view the research question at hand.

Bibliography

Amable, B., Gatti, D., & Schumacher, J. (2006). Welfare State Retrenchment: The Partisan Effect Revisited. *Oxford Review of Economic Policy, 22*(3), 426-444.

Austin, D. A. Congressional Research Service, Economic Policy. (2014). *The Budget Control Act and Trends in Discretionary Spending* (RL34424)

Baumgartner, F. R., Brouard, S., et al. Divided Government, Legislative Productivity, and Policy Change in the US and France. Forthcoming, *Governance*, 2014. Retrieved from: http://www.unc.edu/~fbaum/articles/Div-Govt-Governance-2014.pdf

Baumgartner, F. R., Foucault, M., & François, A. (2006). Punctuated Equilibrium in French Budgeting Processes. *Journal of European Public Policy, 13*(7), 1086-1103.

Bawn, K. (1999). Money and Majorities in the Federal Republic of Germany: Evidence for a Veto Players Model of Government Spending. *American Journal of Political Science, 43*(3), 707-736.

Breunig, C. (2006). The More Things Change, the More Things Stay the Same: A Comparative Analysis of Budget Punctuations. *Journal of European Public Policy, 13*(7), 1069-1085.

Breunig, C., & Koski, C. (2009). Punctuated Budgets and Governors' Institutional Powers. *American Politics Research, 37*, 1116-1138.

Breunig, C., & Koski, C. (2006). Punctuated Equilibria and Budgets in the American States. *The Policy Studies Journal, 34*(3), 363-379.

Breunig, C., & Jones, B. (2011). Stochastic Process Methods with an Application to Budgetary Data. *Political Analysis, 19*, 103-117.

Breusch, T., & Pagan, A. (1979). A Simple Test for Heteroscedasticity and Random Coefficient Variation. *Econometrica, 47*(5), 1287-1294.

Citi, M. (2013). EU Budgetary Dynamics: Incremental or Punctuated Equilibrium?. *Journal of European Public Policy, 20*(8), 1157-1173.

Conley, R., & Bekafigo, M. (2010). "No Irish Need Apply"? Veto Players and Legislative Productivity in the Republic of Ireland, 1949-2000. *Comparative Political Studies, 43*, 91-118.

Danish Institute for Parties and Democracy. (2011). The Parliamentary System of Denmark. Retrieved September 15, 2014, from http://dipd.dk/materials-on-danish-democracy/

Frees, E. W. (2004). *Longitudinal and Panel Data: Analysis and Applications in the Social Sciences*. West Nyack, NY, USA: Cambridge University Press.

Green-Pedersen, C. (2001). Minority Governments and Party Politics: The Political and Institutional Background to the "Danish Miracle". *Max-Planck-Institute Discussion Paper*, March 2001, 1-30. Retrieved from http://www.mpifg.de/pu/mpifg_dp/dp01-1.pdf

Hallerberg, M., & Basinger, S. (1998). Internationalization and Changes in Tax Policy in OECD Countries: The Importance of Domestic Veto Players. *Comparative Political Studies*, *31*(3), 321-352.

Jahn, D. (2013). The Veto Player Approach in Macro-Comparative Politics: Concepts and Measurement. *Griefswald Comparative Politics*, Working Paper No. 4, 1-30.

John, P., & Margetts, H. (2003). Policy Punctuations in the UK: Fluctuations and Equilibria in Central Government Expenditure since 1951. *Public Administration, 81*(3), 411-432.

Jones, B. D., & Baumgartner, M. (2009). A General Empirical Law of Public Budgets: A Comparative Analysis. *American Journal of Political Science*, *53*(4), 855-873.

Jones, B. D., & Baumgartner, F. R. (2005). *The Politics of Attention: How Government Prioritizes Problems*. Chicago, IL: The University of Chicago Press.

Jones, B. D., Baumgartner, F. R., & True, J. L. (1998). Policy Punctuations: U.S. Budget Authority, 1947-1995. *The Journal of Politics*, *60*(1), 1-33.

Klitgaard, M. B., & Elmelund-Praestekaer, C. (2013). Partisan Effects on Welfare Retrenchment: Empirical Evidence from a Measure of Government Intentions. *Social Policy & Administration*, *47*(1), 50-71.

National Institute of Standards and Technology. 1.3.5.11. Measures of Skewness and Kurtosis. *1.3.5.11. Measures of Skewness and Kurtosis*. Retrieved April 25, 2014, from: http://itl.nist.gov/div898/handbook/eda/section3/eda35b.htm

Perez, N., Menendez, S., & Seco, L. (2003). New Families of Distributions Fitting L-moments for Modelling Financial data. 1-42. Retrieved from: http://www.risklab.ca/seco/EntropyTechnicalArticle.pdf

Posner, P., & Park, C. K. (2007). Role of the Legislature in the Budget Process: Recent Trends and Innovations. *OECD Journal on Budgeting*, *2007*(3), 1-25. Retrieved from: http://www.oecd.org/gov/budgeting/43411793.pdf

Ruffner, M., & Blöndal, J. (2004). Budgeting in Denmark. *OECD Journal on Budgeting, 4*(1), 49-79.

Tsebelis, G. (1995). Decision Making in Political Systems: Veto players in Presidentialism, Parliamentarism, Multicameralism and Multipartyism. *British Journal of Political Science*, *25*(3), 289-325.

Tsebelis, G. (1999). Veto Players and Law Production in Parliamentary Democracies: An Empirical Analysis. *The American Political Science Review, 93(3)*, 591-608.

Tsebelis, G., & Chang, E. C. C. (2004). Veto Players and the Structure of Budgets in Advanced Industrialized Countries. *European Journal of Political Research*, *43*, 449-476.

Wooldridge, J. (2002). *Introductory Econometrics: A Modern Approach* (2nd ed.). Mason, Ohio: Thomson-Southwestern.

Young, S. (2006). The British Budget Process: A Case Study. *Harvard Law School Federal Budget Policy Seminar, Briefing Paper 32*.

Zulianello, M. (2014). Analyzing Party Competition through the Comparative Manifesto Data: Some Theoretical and Methodological Considerations. *Quality & Quantity, 48*, 1723-1737.

Data Sources

Bertelli, A. *UK Policy Agendas Project*. (2014). Retrieved from: http://www.policyagendas.org.uk/

COW Wars v. 4.0, 1816-2007. (2010). Unpublished raw data, available from Correlates of War. Retrieved from: http://www.correlatesofwar.org/

Green-Pedersen, C. & P. B. Mortensen. *Danish Policy Agendas Project*. (2014). Retrieved from Peter Bjerre Mortensen through e-mail conversation.

Hills, S., & Ryland, T. Bank of England, Monetary Assessment and Strategy Division. (2010). *The UK Recession in Context: What Do Three Centuries of Data Tell Us?* Retrieved from http://www.bankofengland.co.uk/publications/Pages/other/monetary/mpreadinglistf.aspx

Jahn, D., T. Behm, N. Düpont, & C. Oberst. (2012). "PIP – Parties, Institutions & Preferences: Veto Player (Annual) [Version 2012-02]." Chair of Comparative Politics, University of Greifswald.

Jones, B. D. & F. R. Baumgartner. *Policy Agendas Project*. (2014). Retrieved from: http://www.policyagendas.org/page/datasets-codebooks#budget_authority_(adjusted)

Organization for Economic Cooperation and Development, Statistical Extracts. (2014). *Country Statistical Profiles: Denmark*. Retrieved from: http://stats.oecd.org/

U.S. Department of Commerce, Bureau of Economic Analysis. (2014). *National Economic Accounts*. Retrieved from website: http://www.bea.gov/national/Index.htm

Volkens, A., Lehmann, P., Merz, N., Regel, S., Werner, A., Lacewell, O. P., & Schultze, H. (2014). "The Manifesto Data Collection. Manifesto Project (MRG/CMP/MARPOR). Version 2014a." Berlin: Wissenschaftszentrum Berlin für Sozialforschung (WZB).

Data Appendix

Dependent Variables: Budget Data from the Policy Agendas and Comparative Agendas Projects

Budget data for all three countries was obtained through internet archives or in e-mail correspondence with scholars involved in the Policy Agendas Project and Comparative Agendas Project. Consistency with budget data across time and space is a difficult thing to achieve, which complicates many efforts to comparatively analyze budget institutions and fiscal outcomes across different countries. Fortunately, the datasets for the US, Denmark, and the UK are inflation-adjusted and rescaled at certain points to reflect changes in budgetary procedures that have occurred in each country over time. The US dataset provided by Baumgartner and Jones on the Policy Agendas Project website contains "annual data, adjusted for inflation, of U.S. Budget Authority from FY 1947 through FY 2012" (www.policyagendas.org). Data for different government programs/functions are broken down into 60 different "subfunction" categories as per the Office of Management and Budget's classifications. The values are also recalculated to adjust for inflation and are thus presented in millions of constant 2009 dollars. There is one small hiccup in the dataset—after fiscal year 2008 expenditure figures are not available for all of the categories, meaning that spending in years from 2009 to 2012 is not consistent or comparable. Data for the entire 1949 to 2008 period is consistent and uninterrupted, however, so this will be the period of analysis for the United States.

The US dataset that the analysis employs covers a total of 59 years (1949 to 2008) across 16 categories of federal spending, for a sum total of 944 category-year observations. The 16 categories of spending in the US dataset (with corresponding Policy Agendas Project function/subfunction codes) include: (50) national defense; (150) international affairs; (250) science, space, and technology; (270) energy; (300) natural resources; (350) agriculture; (370)

commerce and housing credit; (400) transportation; (450) community and regional development; (500) education; (550) health; (600) income security; (651) Social Security; (700) veterans' benefits and services; (750) justice administration; and, (800) general government.

The Danish budget dataset was available for a shorter time period than either the US or the UK. Expenditure figures were only available for the years 1971 to 2003. These data were assembled by the Danish Policy Agendas Project team, under the stewardship of Christoffer Green-Pedersen and Peter Bjerre Mortensen, who graciously provided me with access to the raw data needed to carry out the analysis in the following pages. The data are categorized and coded in accordance with the "Classifications of the Functions of Government" (hereafter "COFOG") classification system produced under the auspices of the Eurostat project. The extensive number of categorical and sub-categorical breakdowns and the uninterrupted nature of the data across time make it very user-friendly and, therefore, easy to incorporate into this analysis. However, I did need to make some minor adjustments to the classification structure of the budget data in order to improve comparability between Denmark and the other countries under study.

Denmark's original dataset featured a total of 26 spending functions/subfunctions, more than the US and UK datasets combined. The Danish budget data covered 32 years (1971 to 2003) for a sum total of 832 category-year observations. The categories of spending (with corresponding Eurostat COFOG function/subfunction codes) include: (110) general administration; (120) external affairs; (200) defense; (300) law, order, and safety; (410) primary education; (420) secondary education; (430) institutions of higher education; (440) spare-time education; (450) services related to education; (510) hospitals; (520) individual health services; (610) social security; (620) welfare services; (710) housing; (730) sanitation services; (810) religious services; (820) recreational services; (830) cultural services; (900) energy supply;

(1000) farming, fishing, and forestry; (1100) industrial issues; (1210) roads and transportation; (1220) inland and coastal waterways; (1230) public transport; (1310) trade services; and, (1320) general business development. These did not line up entirely with the datasets for the United States and United Kingdom, so some reclassifications were made. This involved collapsing some of the COFOG subcategories into broader categories in line with the Comparative Agendas Project's (hereafter CAP) codebook classifications.

Specifically, I consolidated the original 26 categories/subcategories into 15 broader categories. The 15 new categories (with corresponding CAP function code) include: (1) macroeconomics; (3) health; (4) agriculture; (6) education; (8) energy; (10) transportation; (12) law, crime, and family issues; (13) social welfare; (14) community development and housing issues; (15) banking, finance, and domestic commerce; (16) defense; (19) international affairs and foreign aid; (20) government operations; (21) public lands, water management, and territorial issues; and (23) cultural policy issues. These 15 categories and the 32 years of data give an adjusted sum total of 480 category-year observations for Denmark. To arrive at these 15 adjusted categories, I recoded the following COFOG classifications as CAP codes: (1110) industrial issues as (1) macroeconomics; (1000) farming, fishing, and forestry as (4) agriculture; (900) energy supply as (8) energy; (300) law, order, and safety as (12) law, crime, and family issues; (130) defense as (16) defense; (120) external affairs as (19) international affairs/foreign aid; (110) general administration as (20) government operations; and (820) recreational services as (21) public lands, water management, and territorial issues.

Additionally, I added a number of subcategories' budget data together into broader categories and recoded them from COFOG classifications to CAP codes. These adjustments included recoding: (510) hospitals and (520) individual health services as (3) health; (410)

primary education, (420) secondary education, (430) institutions of higher education, (440) spare-time education, and (450) services related to education as (6) education; (1210) roads and transportation, (1220) inland and coastal waterways, and (1230) public transport as (10) transportation; (610) social welfare and (620) welfare services as (13) social welfare; (710) housing and (730) sanitary services as (14) community development and housing issues; (1310) trade services and (1320) general business development as (15) banking, finance, and domestic commerce; and, finally, (810) religious services and (830) cultural services as (23) cultural policy issues. These 15 adjusted categories ensure that the US, UK, and Denmark budget data are all analyzed at the same level and, therefore, provides greater comparability between the datasets.

The UK dataset proved to be somewhat problematic because of a large number of missing values between different categories over time. Of the 23 "program functions" defined by Baumgartner and Jones, data were only consistently available for 13 in the UK dataset. This is in some sense a reflection of the changing nature of government in the developed world during the twentieth century, because many of the function-categories delineated on the UK Policy Agendas Project website were simply not even part of the government agenda until the latter half of the 1900s. To obtain a single uninterrupted timespan of budget data for the UK, I was forced to include only seven categories of government spending covering the period from 1951 to 2007.

With 56 years and seven categories of spending, there is a sum total of 392 category-year observations for the UK. The seven spending categories for the UK (with corresponding CAP function code) include: (1) macroeconomics; (3) health; (6) education; (12) law, crime, and family issues; (13) social welfare; (14) community development, planning, and housing issues; and, (16) defense. Though this limited number of categories does constrain the extent to which

we can observe budget volatility for the United Kingdom, this sample still represents a significant portion of the country's annual expenditures. For most of the 1951 to 2007 timespan, these seven categories account for 80 percent or more of total reported government spending in the UK.

Table 12: Budget Function-Category Codes

United States	
Code	Function-Category
Defense	Defense
IntAff	International Affairs
SST	Science, Space, and Technology
Energy	Energy
NatRes	Natural Resources
Ag	Agriculture
CHC	Commerce and Housing Credit
Trans	Transportation
CRD	Community and Regional Development
Edu	Education
Health	Health
IncSec	Income Security
SocSec	Social Security
VetBen	Veterans Benefits
JustAd	Justice Administration
GenGov	General Government
Denmark	
Code	Function-Category
Macro	Macroeconomics
Health	Health
Ag	Agriculture
Edu	Education
Energy	Energy
Trans	Transportation
LCFI	Law, Crime, and Family Issues
SocWel	Social Welfare
CDHI	Community Development and Housing Issues
BFDC	Banking, Finance, and Domestic Commerce
Defense	Defense
IntAff	International Affairs and Foreign Aid
GovOps	Government Operations
PLWMTI	Public Lands, Water Management, and Territorial Issues
CulPolIss	Cultural Policy Issues
United Kingdom	
Code	Function-Category
Macro	Macroeconomics
Health	Health
Edu	Education
LCFI	Law, Crime, and Family Issues
SocWel	Social Welfare
CDPHI	Community Development, Planning, and Housing Issues
Defense	Defense

Independent Variable: Detlef Jahn's Veto Player Data

Veto player data for the US, Denmark, and the UK were acquired from the archives of Detlef Jahn. Jahn's efforts to update and improve Tsebelis' original veto player data have proven quite fruitful, as he has assembled rigorous and analytically complex data sets for 23 OECD countries from 1944 to 2010. Jahn (2013) improves upon traditional veto player models (which Jahn refers to as "veto point analysis"), which often simply map the *number* of veto players in a given political system. These approaches suffer from a failure to account for Tsebelis' contention that *ideological distance between veto players* is of more importance than the sheer number of them. Tsebelis' original model (and Jahn's updated model) of veto player analysis incorporates three factors to operationalize the concept of veto players: "(a) the number of veto players, (b) their maximum ideological distance, and (c) the coherence of individual veto players" (Jahn, 2013, p. 17). This method creates an index that more accurately captures the effects of veto players on policy change across different political systems.

Jahn's (2013) veto player index is a further improvement upon Tsebelis' original model as it allows the use of "time-variant veto player preferences" (Jahn, 2013, p. 21). He accounts for different players' ideological preferences across time by using data from the Comparative Manifestos Project. The "estimated party positions" derived from the CMP are applied to each party-in-government in parliamentary systems for election years and are imputed in interim years (for which CMP data are unavailable). He accounts for three sets of veto players, including "(a) coalition governments, (b) second chambers, and (c) presidents", always using the widest ideological range between players (Jahn, 2013, p. 23). His work offers two choices, of which I have chosen to use the second as it accounts for changes in upper chambers in countries where this is relevant. Jahn also makes clear that, in this second veto player index, he has chosen to

disregard the second chambers in Denmark (because it was abolished) and Britain (because it is effectively powerless in the policy realm). Thus, for the UK and Denmark he has chosen to use coalitions' ideological ranges to map veto players. For the United States, Jahn uses "the largest ideological range between the President, the Senate, and the House" (Jahn, 2013, p. 21). These data will provide the independent variable for the time-series regression analyses.

Alternative Independent Variables: Correlates of War and Comparative Manifestos Project Data

The data for the additional independent variables were gathered from internet archives. The data for the war variable was gathered from the Correlates of War project's website. Specifically, the data include instances of "interstate war" and "extrastate war" that are available in the COW War version 4 archive. A number of wars were documented for the United States and the United Kingdom during the period under study (often with the same wars involving both countries simultaneously). None were documented for Denmark during the 1971 to 2003 period under study for that country.

Data for the ideological positions of parties-in-government were obtained through the Comparative Manifestos Project website. Specifically, I use the RILE measure in the CMP dataset, which is constructed by "qualifying statements as 'Right' or 'Left' by merit of their factor loadings, and the RILE index is calculated by summing up the relative frequencies of thirteen 'Right' statements and subtracting the relative frequencies of thirteen 'Left' statements from a total of 56 statements" (Zulianello, 2014, 1725). This measure has a range of -100 to 100, with negative values indicating ideological "leftness" and positive values indicating ideological "rightness." Given the fact that each country under analysis here has different characteristics in

its political structure, I chose to use the ideology of the executive in each country to arrive at their respective right/left ideological variable measures.

For the United States, I used the CMP right/left ideology measure of the President's party for each year in the analysis. The United Kingdom was rather simple given the country's extensive history of one-party majority governments, so I simply used the right/left score for the party-in-government for each year. Denmark proved to be the most challenging of the three countries, due in large part to its varied history of minority and coalition governments. This required that I create a weighted government ideology measure based upon the ideology of each party in a government coalition (using the standard right/left score) and the relative strength of each party in the coalition (using the absolute number of seats each party held divided by the total number of seats held by parties in the government coalition). This procedure rendered a weighted ideology score that reflects the overall left/right position of the Danish government for each year under analysis.

Control Variables

GDP data for the US, Denmark, and UK economic conditions control variables were gathered from three separate sources. The data will be used as a percentage of growth or decline from year-to-year and are all inflation-adjusted to reflect changes in *real* rather than *nominal* GDP. Data for the United States was obtained from the Bureau of Economic Analysis' website, which provides significant data detailing US annual GDP growth from 1950 to 2013. Data for Denmark was accessed through the OECD's website. Finally, GDP data for the United Kingdom was gathered from the Bank of England's website, which provides a dataset with comprehensive and detailed economic data for over 300 years of British history.

The data for the electoral cycle control variable, meant to control for the effects of new governments rising to power and the altered political dynamics that this often entails, was constructed simply by looking at years in which an election occurred. For the United States, I coded presidential election years as 1 and all others as 0. I chose to exclude midterm elections because they are often more low-profile and result in less significant turnover and less of a sense of an "electoral mandate" compared to presidential elections. I considered using a three-level variable coding nonelection years as 0, midterm election years as 1, and presidential election years as 2. I ultimately decided against this, however, because I could not think of a similar justification for Denmark or the UK given their unicameral parliamentary designs with irregular elections. While this dummy variable measure is imperfect, it represents the best compromise position between myriad considerations. In Denmark, I simply coded any year in which there was a new parliamentary election as 1 and all other years as 0. I also attached a one-year lead to this measure such that a government elected in 1971 would not register a 1 for that year but, instead, would code a 1 for 1972. This is done because a newly elected government would not a have major impact on the budget process until the year after they come to power, when they are responsible for passage of their first budget.

Main Regression Model Specifications

Prior to running the regressions for the average annual percentage change and annual L-kurtosis dependent variable models, I performed a series of tests to arrive at proper specifications for the models. I first ran tests to determine if there was any heteroskedasticity in my data to see if I could use a panel-level approach for both the annual l-kurtosis and average annual percentage

change dependent variable models. Second, I ran a series of tests to reveal whether any of the perennial problems that plague time-series analysis would be a factor in my models. Specifically, I aimed to determine whether there would be issues with serial correlation in my data. Third, I performed a series of tests and comparisons to judge whether I should use a fixed-effects or random-effects estimators for the country-pooled analyses. Ultimately, I decided to use random-effects estimators and clustered standard errors for all of my pooled models. For my country-specific models, I have also chosen to use robust standard errors in order to guard against any unobserved heteroskedasticity that may lurk in the dark.

To test for panel-level heteroskedasticity in my data, I ran a series of Breusch-Pagan tests. This test is described by its original creators, Breusch and Pagan (1979) as a "test for heteroscedasticity with the same asymptotic properties as the likelihood ratio test in standard situations, but which can be computed by two least squares regressions" (Breusch & Pagan, 1979, 1287). The tests revealed stark differences between the annual l-kurtosis and average annual percentage change models. For the annual l-kurtosis models, there was no significant heteroskedasticity to concern myself with. All of the p-values for the Breusch-Pagan statistics were well above the .05 value that would require a rejection of the null hypothesis of homoskedasticity. Therefore, I can comfortably say that heteroskedasticity is not an issue for the analyses that use annual l-kurtosis scores as a dependent variable. For the models using average annual percentage changes as a dependent variable, however, the Breusch-Pagan tests revealed significant heteroskedasticity. All of the models using this dependent variable had statistically significant p-values, requiring that I reject the null hypothesis of homoskedastic standard errors. As mentioned above, I will use clustered and robust standard error estimates in these models to account for the observed (and any unobserved) heteroskedasticity.

I also ran a series of Durbin-Watson tests to discover whether serial correlation within the data would prove problematic. The Durbin-Watson is a "test for AR(1) serial correlation… based on the OLS residuals" (Wooldridge, 2002, 397). Analyzing the Durbin-Watson statistics for these tests in the annual l-kurtosis score models reveals that serial correlation is not a significant problem for the US, though there was some indication of negative serial correlation for Denmark and positive serial correlation for the United Kingdom. For the United States, the Durbin-Watson statistic was ≈2.06, very close to 2—the value at which residuals are said to be uncorrelated. For Denmark, however, the Durbin-Watson statistic was ≈2.604, sufficiently higher than 2 to be cause for some concern. The UK's DW statistic was also a bit low at ≈1.77; however, the UK's Prais-Winsten transformed DW statistic is ≈2.03 and Denmark's is ≈1.93. Therefore, I will use Prais-Winsten methods for the single-country regressions for Denmark and the UK. For the US, I will simply use standard OLS regression.

For the average annual percentage change models there was also some observed serial correlation. For the United States, the Durbin-Watson tests revealed a sizable amount of positive serial correlation, with its Durbin-Watson statistic returned at ≈1.39. I am unfortunately unable to correct for this issue using Prais-Winsten methods as with the annual l-kurtosis models because the transformed DW statistic for the US is actually lower at ≈1.34. Therefore, for the US I will simply use standard OLS regression and interpret the results with awareness that there is significant serial correlation, while also counting on the robust standard errors to mitigate its effects. There was also some minor positive serial correlation for the United Kingdom—given that its Prais-Winsten transformed DW statistic is ≈1.986, which is a modest improvement from its original at ≈1.91, I will use Prais-Winsten methods for the United Kingdom. Denmark's DW

statistic of ≈2.03 indicates that there is no real serial correlation in its data, so I will simply use standard OLS regression for its annual average percentage change model.

The Durbin-Watson tests for the pooled models revealed serial correlation in the data for three of the four models using annual l-kurtosis scores as a dependent variable. Specifically, the US-UK-Denmark, UK-Denmark, and US-UK pooled models all exhibited noticeable serial correlation with original Durbin-Watson statistics of 1.8, 1.82, and 1.8 respectively. The pooled models using the average annual percentage change dependent variable also exhibited significant serial correlation in the US-UK-Denmark, US-Denmark, and UK-Denmark models, with original Durbin-Watson statistics of 1.33, 1.36, and 1.37 respectively. To correct for this significant serial correlation and the heteroskedasticity discussed above I will use clustered standard errors in all of my pooled models.

Lastly, to determine if either a fixed- or random-effects models would be useful for my pooled analyses, I compared the two options using Hausman tests. I chose to use the Hausman test because it is among the most widely used tests to determine whether a random-effects model remains consistent while also providing efficiency gains over the fixed-effects alternative model (Frees, 2004, 247). The results of the Hausman tests led me to adopt a random-effects approach for all of the pooled models because the various test results showed there was no significant loss of consistency for any of the models compared to a fixed-effects approach. Specifically, the tests never returned a statistic of Prob($\chi^2 > x$) of lower than the .05 level required to reject the null hypothesis that the coefficients estimated between the random- and fixed-effects models are the same (though the pooled US-UK-Denmark model with an average annual percentage change dependent variable came close at Prob($\chi^2 > 10.83$)=0.0549). Therefore, all of my pooled models will use random-effects estimators.

Table 13: Statistical Test Results (Main Regression Models)

Annual L-Kurtosis Pooled Models				
Model	US-UK-Denmark	US-Denmark	UK-Denmark	US-UK
Breusch-Pagan	1.44	7.85	1.44	2.03
BP p-value	0.92	0.16	0.92	0.92
Hausman	6.46	6.84	0.10	1.66
Prob>χ^2	0.26	0.23	1.00	0.89
Durbin-Watson (original)	1.80	2.05	1.82	1.80
Durbin-Watson (transformed)	2.00	1.94	1.99	2.03
Annual L-Kurtosis Individual Country Models				
Model	US	Denmark	UK	
Durbin-Watson (original)	2.06	2.60	1.77	
Durbin-Watson (transformed)	1.95	1.93	2.03	
Average Annual Percentage Change Pooled Models				
Model	US-UK-Denmark	US-Denmark	UK-Denmark	US-UK
Breusch-Pagan	218.13	39.09	218.13	218.13
BP p-value	0.00	0.00	0.00	0.00
Hausman	10.83	1.52	0.50	4.22
Prob>χ^2	0.05	0.91	0.99	0.52
Durbin-Watson (original)	1.33	1.36	1.37	1.93
Durbin-Watson (transformed)	1.36	1.36	1.35	0.99
Average Annual Percentage Change Individual Country Models				
Model	US	Denmark	UK	
Durbin-Watson (original)	1.39	2.03	1.91	
Durbin-Watson (transformed)	1.34	1.87	1.99	

Exploratory Regression Model Specifications

For the exploratory models using annual percentage changes as a dependent variable, I ran a series of Durbin-Watson tests to determine where serial correlation would prove problematic. Where it was discovered, (i.e., where the DW statistic was substantially above or below 2), I used Prais-Winsten estimation methods to correct for the serial correlation. For the

United States, I chose to use the Prais-Winsten estimation method for the following categories: (1) defense; (2) international affairs; (3) science, space, and technology; (4) natural resources; (5) transportation; (6) education; (7) health; (8) income security; (9) justice administration; and (10) general government. All of these saw improvements between their original DW statistics and the transformed DW statistic provided with a Prais-Winsten correction. I chose to use standard OLS methods for: (1) energy; (2) agriculture; (3) commerce and housing credit; (4) community and regional development; (5) social security; and (6) veterans benefits. All of these function-categories showed no serious serial correlation, or their transformed DW statistics were actually further from 2 than their original, untransformed versions.

The United Kingdom and Denmark's function-category specific regression models showed a substantial amount of serial correlation in the dependent variable. For Denmark's spending function-categories, I discovered serial correlation in the following: (1) macroeconomics; (2) agriculture; (3) energy; (4) transportation; (5) law, crime, and family issues; (6) social welfare; (7) community and housing development issues; (8) banking, finance, and domestic commerce; (9) defense; (10) international affairs and foreign aid; (11) government operations; (12) public lands, water management, and territorial issues; and (13) cultural policy issues. Prais-Winsten methods were used for all of these function-categories' regression models. The remaining two categories' models, health and education, were both estimated using standard OLS regression. In the United Kingdom's category-specific regression models, all of the function-categories showed serious serial correlation in the dependent variable. Therefore, I used Prais-Winsten estimation methods for all of them, including: (1) macroeconomics; (2) health; (3) education; (4) law, crime, and family issues; (5) social welfare; (6) community development, planning, and housing issues; and (7) defense.

Table 14: Statistical Test Results (Exploratory Regression Analyses)

United States Category-Specific Models		
Model	Durbin-Watson (original)	Durbin-Watson (transformed)
Defense	1.89	1.99
IntAff	2.52	2.07
SST	1.55	1.76
Energy	1.62	1.50
NatRes	2.44	1.92
Ag	2.16	1.72
CHC	1.29	1.24
Trans	2.43	2.16
CRD	2.08	1.90
Edu	2.31	2.01
Health	1.79	1.81
IncSec	2.22	1.85
SocSec	1.96	1.93
VetBen	1.96	1.55
JustAd	1.89	2.00
GenGov	2.12	1.98
Denmark Category-Specific Models		
Model	Durbin-Watson (original)	Durbin-Watson (transformed)
Macro	1.96	1.99
Health	1.98	1.87
Ag	1.88	1.99
Edu	2.05	1.85
Energy	2.41	1.88
Trans	1.85	1.91
LCFI	2.12	2.02
SocWel	1.59	2.00
CDHI	2.37	2.06
BFDC	2.55	1.95
Defense	2.58	2.06
IntAff	2.53	1.98
GovOpss	2.24	2.14
PLWMTI	1.89	1.97
CulPolIss	2.85	2.09
United Kingdom Category-Specific Models		
Model	Durbin-Watson (original)	Durbin-Watson (transformed)
Macro	1.94	1.98
Health	2.50	1.95
Edu	1.57	2.03
LCFI	1.58	1.98
SocWel	1.91	1.98
CDPHI	1.59	1.92
Defense	1.71	1.87