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Patterns and Punctuations in the US Budget

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Discussion Paper for Budgetary Policy Change: Measures and Models, Conference at Nuffield College, Oxford, March 8-9, 2002.

Patterns and Punctuations in the US Budget[1]

In the previous chapter, we mapped large-scale budget changes over time. But this bird's eye view masks great turbulence underneath. In this chapter, we apply the evolutionary theory of policy change to lower levels of budget decision—the OMB subfunction level. We examine two aspects of budget change. The first is the distribution of budget changes—what proportion of these changes are incremental, and what proportion are punctuated? The second topic we address here is the time trace of volatility. Has the volatility of budget allocations to government programs changed over time?

PART I: Budget Distributions

Extending the evolutionary theory of policy change detailed in the previous chapters leads us to expect to find the following:

- Most of the time budgets don't change very much. They follow a logic of stability as programs are buttressed through a network of defenders who provide the necessary countermobilization (negative feedback) to demands for change. Attention is not directed consistently at budget adjustment to political demands; when attention is not directed at particular programs, those programs are left to drift in equilibrium.
- Sometimes budgets change dramatically, with great impact on the budgeting process, as positive feedback forces and information cascades replace more typical negative feedback for a period of time.
- Incrementalism in the fundamental sense of continuous adjustment to changing circumstances generally fails to describe budget decision-making, because moderate changes are extraordinarily difficult to make.[2] This is a consequence of the operation of selective attention for individual decision-makers, as well as of the necessity of mobilizations to overcome entrenched interests to force change.
- Punctuations can occur within programs, within subsystems, or at the macro level. They are not solely driven by macro-level forces. They may be so driven, but it is also possible that major budget changes are confined to a single sub-system or program, or to an interconnected net of programs.

This set of general predictions may be distinguished from models of budgets (and political change more generally) that imply adjustment to exogenous forces. Our model demands, first, that punctuations in the policy process occur. Second, we expect that punctuations occur at all levels of scale, from the subsystem level to the

[1] This chapter draws in part on Bryan D. Jones, James L. True, and Frank R. Baumgartner 1997. Does Incrementalism Stem from Consensus or From Institutional Gridlock? *American Journal of Political Science* 41: 1319-1339.

[2] This kind of continuous adjustment process is what Lindblom's (1959) normative incremental decision-making would suggest.

macro level, and, moreover, that punctuations at the subsystem level are not always driven by macro-level punctuations.

"There are a Million Stories in the Budget"

We argue that policymaking and budget policy are closely linked, and that attention-driven choice affects both. We can begin to appreciate this by examining time series of budget allocations to policy areas. Figure1diagrams budget authority for two policy areas: the OMB functions centering on science and technology and on income maintenance (excluding social security). Each graph depicts the aggregate level of real budget authority for the function and the associated annual percentage change. Both cases are classic policy punctuations with persistence. Both punctuations are associated with major program initiatives; science policy was dominated in the 1960s by the race to the moon, with major cutbacks and stabilization afterward. Income maintenance was dramatically impacted in the mid-1970s with the addition of SSI and the Earned Income Tax Credit; unlike science policy, the area experienced no decline in expenditures after the punctuation.

[Figure 1 about here]

Classic punctuation with persistence is not the only story in the budget, however. Figure 2 displays two other OMB functional policy areas: Education and Crime and Justice. Both areas experience explosive growth at one or more times in their developments. Education experiences continual periods of explosive growth from the early 1950s through the mid 1970s, a pattern somewhat obscured by the scale of the real budgetary commitment but clearly exposed by the percentage change graph. The largest increase occurred after 1965, with the passage of the Educational Elementary and Secondary Act (EESA). Crime and justice policy experiences a less chaotic beginning, but experienced a great increase in federal expenditure in the late 1960s with the establishment of the Law Enforcement Assistance Agency (LEAA). After a level period of funding during the 1970s and early 1980s, expenditures began a steep upward climb that continues to the present.

[Figure 2 about here]

The budget stories for science and income maintenance, on the one hand, and education and justice, on the other, display some commonalities but considerable differences as well. All policy areas experience one or more periods of punctuation, but these periods do not all occur in a sudden 'macropunctuation'. This is graphically illustrated in Figure 3, in which the percentage change in real BA is tabulated for Natural Resources and Agriculture each against Education. Tabulating Natural Resources against Education displays similar amplitudes in the two policy areas—that is, the percentage change figures reach about the same maximums, and after the policies become established, the amplitude becomes damped. But the periods of the two series is distinctly different, with large changes in education funding occurring some years before large changes in natural resource funding. (Education funding

experiences a longer period of large amplitude changes, as noted earlier.) If, however, we compare Education and Agriculture, we see that it is Agriculture that experiences higher amplitude increases and decreases in funding commitment. Unlike either Education or Natural Resources, Agriculture policy gives no indication of settling down to an equilibrium funding level.

[Figure 3 about here]

Next we examine two great social programs—Social Security and Medicare. Interestingly, the two programs experience similar amplitudes—that means that the percentage changes in the two programs are about the same (with the exception of the great growth after the establishment of Medicare in 1965). But the periods are distinct; moreover, while Social Security has settled into a period of equilibrium (regarding current spending, at least), Medicare continues to experience spurts of growth.

[Figure 4 about here]

We have noted that punctuations in budgets do not occur simultaneously, even though macropunctuations have occurred twice in US postwar history. It could be argued that exogenous event As a final exercise in budget specifics we take a brief look at defense budgets. In Figure 5, it is clear that war ratchets defense budgets. In particular, upward shifts seem evident in response to mobilization in Korea and Vietnam. But the Reagan buildup, driven by politics and rhetoric ("the Evil Empire") dwarfs the Vietnam effect, and drove real budget authority to its highest point in the modern era. A close look at the figure shows that Vietnam was part of a long-run increase that begun in 1955, but the Reagan Era increase jump-started from a declining trend. One might be able to predict an outbreak of war, but how does one predict an outbreak of politics?

[Figure 5 about here]

We could continue with this issue-by-issue analysis, but there are a million stories in the budget.

Leptokurtosis Implies Punctuation

One way to study budget changes is to take the percentage change time series we have presented in the figures above and compare them directly in a frequency distribution. Figure 6 presents a frequency distribution of annual percentage changes for one OMB subfunction, Corrections. That figure graphically displays the lack of incrementalism in the series. Five changes increased the budget for corrections more than 20.5%, while four decreased it by more than 9.5%. The whole series is shifted upward, with the typical budget allocation a solid increase. Moreover, very few of the

changes are clustered at the median value of the series, indicating that any change is likely to be either quite sizable.

[Figure 6 about here]

How do we know that we have not chosen an atypical example? We can order the changes from the largest change (in percentage change) to the smallest, regardless of what year or what subfunction they occurred in. This results in a frequency distribution that maps the size of the increase against the number of similar-sized changes. This is like the familiar frequency distribution of heights, in which there are very few really tall people and really few short people, but lots of moderate-sized people. In the case of heights, the frequency distribution is the familiar Normal, or Gaussian, distribution. The reason heights are distributed Normally is that lots of factors go into the determination of heights—genetic and environmental factors—that tend to cancel one another out. This tends to eliminate extreme values. The most famous theorem in statistics, the Central Limit Theorem (really several related theorems) shows that when there are many factors determining an outcome, and these factors are added up, the result is a Normal curve (in the limit, when many factors are involved).

If budgets were determined through an equilibrium process in which minor adjustments were made each year, the resulting budget *changes* would be Normal. A Gaussian distribution would be implied if continuous dynamic adjustment were the primary decisional mechanism, or if a systematic budgeting process were affected by random Gaussian error resulting from many factors impinging on the process[3].

Our model of budget change, however, implies something quite different. If we array annual budget changes in a simple frequency distribution, we expect that it will follow a particular non-normal frequency distribution. The distribution will be leptokurtic, with a large slender central peak, representing a stability logic; very weak shoulders, representing the difficulty in making moderate changes; and big tails, representing episodic budget punctuations. The distribution should be quite distinct from the more familiar Gaussian

Figure 7 presents this frequency distribution for US Budget Authority (BA) for the seventy-four non-financial OMB subfunctions. Arrayed on the x-axis is year-to-year percentage change in BA, in real (inflation-adjusted) dollars. On the y-axis are the frequencies associated with these percentage changes. It is easy to see that most changes are very small—they are bunched up near the middle. That means that the total for the subfunction category is pretty much the same as last year's total (plus or minus a little adjustment). This part of the frequency distribution operates according to the rules of limited rationality isolated so many years ago by Aaron Wildavsky and his colleagues and by Richard Fenno.

[3]The latter is implied by Davis, Dempster, and Wildavsky (1974). Budget shocks are systematic, but Gaussian error describes budget allocations after the removal of these shocks.

There are, however, plenty of very large changes on both ends of the distribution (increases and decreases). Indeed, there are so many of these changes that it is difficult to depict the tails on a single graph, so we have simply aggregated the tails into two frequency categories (less than 80% and more than 130%, respectively). Finally, there are very few moderate changes—budget changes in the US tend to be very small adjustments or sizable punctuations. There are plenty of minute and very big changes, but moderate budget adjustment to changing economic and political circumstances is relatively rare.

[FIGURE 7 ABOUT HERE]

Budget Patterns

Let us examine this general pattern in more detail. Large increases and decreases are a feature of virtually all subfunctions. Somewhat arbitrarily we may define a 'large increase' as an annual adjusted budget change of 20% or more, while a 'large decrease' is an annual adjusted budget decrease of 15% or more. All other changes are termed 'incremental'.[4] This would doubtless include changes that few would term 'incremental', but we want to illustrate just how pervasive budget punctuations are. Of the 62 policy-relevant subfunctions, 60 experienced one or more large increase and 58 experienced one or more large decreases during the post-war period. Another way of appreciating the magnitude of episodic change in the national budget is to note that fully 33% of subfunctions in a typical year experienced non-incremental changes.

It is difficult to analyze the likely myriad of patterns comprehensively, because simple index measures of change patterns are not adequate to do so. But we can at least examine some empirical conditional probabilities of change, and this is what we present in Table 1.

[TABLE 1 ABOUT HERE]

Table 1 presents estimates of unconditional probabilities of a large budget increase (18%; n = 476 of 2569 possible changes[5]); a large decrease (15%; n = 381) and an incremental change (66%; n = 1712). The conditional probability estimates indicates what happens following each of these occurrences. In 20% of the cases of a large decrease, a further large decrease occurs; in 31% a large, perhaps offsetting increase occurs; in 49% small incremental changes take place. So more offsetting, perhaps regression to the mean effects occur than further decreases. But in 69% of

[4]Because the distribution is skewed upward, so that the two arbitrary cut-off points delimit approximately equal areas under the curve. Indeed, the points correspond fairly closely to the cut-off points for the intersextile range.

[5] There are 2698 budget entries for the 62 subfunction series. Calculating percentage changes eliminates the first entry for each of the 62 series; calculating the estimates for the conditional probabilities eliminates 62 more entries. Five bookkeeping 'credit' entries were also eliminated.

the cases, one might say that the changes were confirmed in that either further major decreases occurred or the budget stabilized at a lower level. Large increases behave similarly; 68% are either followed by a large increase or an incremental change. Finally, of the incremental changes in one year, 80% are incremental in the next. But even here one ought not overestimate stability; in a single year 20% of subfunction budgets that were incrementally allocated the year before experience episodic change.

Do some subfunctions experience more punctuated changes than others? If we aggregate subfunctions into macrofunctions associated with National Security, Discretionary Domestic, and Mandatory Domestic spending, we find the proportion of large and incremental changes varies, but large changes occur in each macrofunction as is shown in Table 2. Note in particular that mandatory domestic spending (that is, spending required by statute) experiences less episodic change than the other categories, but that this category experiences both budget spurts and plunges.

[TABLE 2 ABOUT HERE]

The Robustness of Leptokurtosis and Scale Invariance

Having described the leptokurtosis of budget changes, we ask: Is the leptokurtotic distribution invariant with respect to scale? One line of thinking argues that the macropunctuations we reported in the previous chapter simply get passed on down to the subfunction and program levels. As exogenous events change, they are reflected throughout the federal budget. Our model suggests something different. We think that mobilizations can occur in ways that reverberate throughout the budget through macropunctuations that isolate eras of budgetary politics. But mobilizations can also be more limited, to some programs but not to others. For example, the Reagan defense mobilization noted in the previous chapter seems to have caused no particular major cutbacks or buildups in other budget categories, and was not associated with a government-wide macropunctuation.

In an attempt to address this issue, we have examined plots of the following: budget authority data after 1976; budget outlay data, 1962-1994; and agency-level budget authority data, 1976-1994. All of these series were assembled by OMB. We also plotted aggregate budget authority data for the full period, which is dependent on our categorizations prior to 1974, and subfunction outlay data after 1962.[6] Finally, we have categorized budget authority data by whether it involved mandatory (statute-based) domestic programs, discretionary domestic programs, or defense programs. In all cases, the distributions are leptokurtotic and roughly similar to the distribution presented in Figure 1.[7]

[6]And we even plotted outlay data for the U.S. Government for the period 1800-1994, adjusted for inflation using the CPI. Again leptokurtosis was in evidence.

[7]Chi square and Kolmogorov-Smirnov tests allow the rejection of the null hypotheses that the observed results were drawn from a normally distributed population at the .001 level of significance. The null

There seems to be nothing in our approach that would bias the results toward leptokurtosis. The robustness of the distribution, furthermore, suggests that budget changes are characterized by invariance with respect to scale. That is, whether we aggregate budget data at the function, agency, or subfunction level, the signature leptokurtotic distribution is in evidence. This finding indicates that the debate about whether incremental patterns in budgeting emerge because of aggregation was misdirected; budget punctuations and budget incrementalism seem to emerge at all levels of scale (Natchez and Bupp, 1973; Gist, 1982).

Nonetheless, within this ubiquity of leptokurtotic distributions, we do observe some differences. As we had expected, punctuations were somewhat more pronounced at the bottom of the organizational hierarchy than at the top. Subfunctions were somewhat more leptokurtotic than functions were, and functions were somewhat more leptokurtotic than aggregate totals were. And mandatory (so-called 'uncontrollable') spending was less leptokurtotic than either defense spending or domestic discretionary spending. These differences suggest some asymmetry in the occurrence of punctuations, and that stability is enhanced in larger programs and in programs in which spending is mandated by statute rather than being left to the vicissitudes of the budgetary process alone.

A second ramification of the scale invariance hypothesis is that different time sequences of budget authority should be similarly leptokurtotic. It is plausible that budget decisions have differed during several different 'epochs' since the Second World War. The key question for this paper is whether leptokurtosis exists in all political epochs. We have plotted our basic percentage change frequency distribution for four basic epochs: Truman-Eisenhower; Kennedy-Johnson; Nixon-Ford-Carter; and Reagan-Bush-Clinton. In all epochs, the characteristic leptokurtotic distribution is in evidence. This suggests that the decisional processes underlying budget authority are generally similar across presidential regimes, even though there has been a clear trend toward lower volatility in the budget process over time. Punctuations are more pronounced (that is, leptokurtosis is more severe) in the early part of the series.

PART II: Declining Budget Volatility

In the view of many observers, the quiet, consensual political decision-making of the early post-war years has been replaced by a more rancorous politics involving fundamental differences over the direction of national public policy. The new politics of rancor have, according to at least some students of the budgetary process, undermined the consensual norms that previously stabilized the process of appropriating public

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hypothesis of a Gaussian distribution was rejected at that level whether the tests were conducted on annual percentage changes in real budget authority or standardized annual percentage changes in logged real budget authority.

funds. In the final edition of *The New Politics of the Budgetary Process*, Aaron Wildavsky (1992: xvi) explicitly associated incrementalism with consensus and large budget changes with dissensus: "Just as budgeting was incremental because it was consensual, and consensual because incremental, so dissensual budgeting leads to larger and more rapid changes, which increases disagreement".

Wildavsky raised the issue of a linkage between consensual politics and incremental budgets and suggested that budgeting in recent times has been less incremental because politics has become less consensual. There are actually two arguments here: first, that budgeting today is less incremental than in the past, and, second, that consensual politics (reflected in the budgeting process) yields more incremental budgeting. A natural extension of this line of reasoning would suggest a role for divided government: eras of separated party control of the national policymaking institutions should lead to more dissensual and less incremental budgeting.

There is, however, a second plausible story-line. Political dissensus could lead to classic 'gridlock,' with nothing of policy consequence being accomplished. Budgets may change little because political leaders are unable to forge broad enough coalitions to overcome the policy deadlock made possible in the American system of governance. How would one distinguish between the two potential explanations? Clearly observing changes in budget outcomes alone would not allow one to decide.

But is budgeting more volatile or more incremental today than in the past? Second, is incrementalism a result of consensus over political goals, or does it stem from dissensus and deadlock?

We find that the federal budget has become considerably more incremental over the years. Contrary to popular myth, the early post-war years were remarkable for dramatic changes in spending priorities, not for a staid and dampened politics based on incrementalism. Overall trends in incrementalism have increased dramatically over the years, even within that part of the budget that remains in domestic discretionary programs. Moreover, this increase in incrementalism cannot be explained by an increase in consensus, as Wildavsky expected. Divided government is associated with greater volatility in spending, not greater incrementalism.

Consensus and Volatility

Consensus, of course, can come in many guises. It may mean a general agreement among policy elites on the direction of public policy—on goals, but not necessarily means. It may mean that there is general agreement among participants on the specifics of existing programs, but disagreement about adding more programs—on means, but not goals. Consensus may have little to do with agreement and much to do with inattention to the growth of programs. It may apply to cuts as well as to growth in budgeting. Finally, a consensus may emerge that allows political leaders to ignore the size of the deficit as they allow all programs to creep upward. Hence one might have a

budget that was easy to build (the norms of base and fair share would be honored), but hard to fund. Budgetary consensus is not the same as good public policy.

We intend 'consensus' to refer to any of the above meanings—any process that causes government programs to be treated in a similar manner rather than some being singled out for special treatment or attention. If there were considerable growth in government, a consensual pattern would imply that the growth increment is shared with reasonable equality among programs. If there is contraction (either politically- or financially-caused), then the pain is shared reasonably equally. In the budget process, this general conception of consensual politics is reflected in the norms of "base" (every program deserves consideration of its baseline budget) and "fair share" (the proportion of the available funds or the necessary cuts which are to be distributed to programs; Wildavsky 1979, 16-18).

The consensus hypotheses. What we term *the consensus hypotheses* claims that the norms of budgeting are built on a foundation of generally consensual politics. There are two forms. First, if consensus over government objectives has deteriorated during the postwar period, one might expect that budgeting processes would have become less incremental over time. This is Wildavsky's claim, cited earlier. As the norms of behavior associated with process incrementalism deteriorated, output incrementalism should decrease, and there should be more large changes (positive and negative) in annual budgets. More importantly, as the norms of base and fair share deteriorated, programs would be treated differently, depending on whatever considerations had replaced these understandings. Hence dissensus in the policy process should yield heightened volatility in the budgeting process.

The causes of such dissensus could be manifold. Partisan disagreement over the proper role in government might foster on-again, off-again support for particular programs; decelerating growth in the economy might engender a more general conflict over the aims of government as resources became more constrained; or disparate groups might successively press conflicting claims on government. From whatever cause, declines in incrementalism as a governing norm should lead to a higher variability in budget outcomes.

On the other hand, budget outcomes may become less volatile over time, and that this has occurred because of an increasing consensus about the role of government. The Second World War was enormously disruptive of domestic programs (Peacock and Wiseman 1994; Hughes 1991). The early period after the Second World War and the years thereafter were times of great experimentation and energy in government. The U.S. struggled with the challenges of world leadership abroad and a neglected domestic infrastructure at home, which could have led to considerable volatility in the budgeting process. But as time progressed volatility may have declined as programs and structures were put into place and have been generally accepted as proper functions of government. As programs become established, opponents may find it difficult to attack them within the budget process, finding it necessary to use harsher and harsher language to attack the smaller and smaller number of programs about

which there is major disagreement. In this line of thought, volatility is associated with innovation and experimentation, perhaps within a framework of an attributed limit to the overall size of government (hence requiring either growth or cuts to fund new initiatives).

In short, as the underlying consensus over the proper role of government grows, and experimentation and innovation declines, budget volatility should decrease.[8] This line of thought adopts Wildavsky's reasoning that budget volatility and dissensus are linked, but suggests that the modern era is characterized by more consensus than the past.

The gridlock hypothesis. Political consensus, however, may not play the key role in budgetary policies envisioned by the early budget theorists. Perhaps budget volatility declines in the face of increasing political resistance to change, with gridlocked institutions precluding either substantial increases or decreases in existing government programs. If such gridlock has worsened over the years, then a decrease in budget volatility over time would occur. So it is not clear that observing budget data alone will allow one to distinguish between incrementalism as a governing norm that reflects consensus or stasis as a policy deadlock which reflects dissensus.

Divided Government as Empirical Lever

If partisan politics plays an important role in budget volatility, the nature of that role should give us insight into the relationship between political consensus and budget volatility. During periods of unified government, when the presidency and congressional majorities are in the hands of the same political party, budgetary conflict (and hence volatility) may be suppressed because of a greater consensus about what government should be doing. On the other hand, if the 'gridlock' hypothesis has validity, divided government would lead to decreased volatility, because less activity is possible.

Of course, periods of divided government may not differ significantly from those of unified control in regard to budget incrementalism. Charles O. Jones (1994) notes the various methods in which presidents may operate in a system of diffused responsibility and split-party control—methods which could act to impose policymaking similarities on divided and unified governments. Empirical findings concerning the passage of major legislation suggests but a scant role for unified versus divided government. David Mayhew (1991) argues that divided governments are not less innovative than unified ones, and Rohde's (1991) study of the post-reform House of Representatives indicates that divided government did not slow the pace of legislation. More directly relevant for the purposes of this paper, levels of budgeting do not seem to respond to alterations in unified and divided control: Jones, Baumgartner and True (1996b) show no effect on budgetary changes by function as a consequence of divided

[8] There are times when large-scale consensual mobilizations also create large budget changes, such as Democratic and Republican agreement on re-arming America at the beginning of the Cold War or going to the moon in the 1960s (Schulman 1980; Kingdon 1984; Baumgartner and Jones 1993). These instances are likely to be relatively rare, if very important. To the extent that they result in uneven budget increases, they would add to volatility.

government. On the other hand, presidential legislative initiatives are more likely to be blunted by opposition Congresses (Edwards, Barrett, and Peake 1997). In the American states, divided control affects the match between spending and taxing (Alt and Lowery 1994). None of these studies has addressed the issue of volatility—essentially unpredictability on a year-to-year basis, however.

Patterns in Budget Data

So the problem is that low volatility in budgeting could indicate consensus or dissensus, and we have no ready way to distinguish the two. We can, however, use divided government as a lever to pry apart the causal relationships, because it is so obviously associated with dissensus over political goals.

Of course, budget functions and programs respond to a variety of exogenous and endogenous pressures, some exacerbate changes and some encourage stability. Consequently, to expect a complete explanation for every budget change is unrealistic. Nonetheless, the overall dynamics of the subfunctional components of the national budget over the last 54 years should provide evidence of a long-term trend in budget volatility, if there is one, as well as evidence of any effects upon it from divided government.

Based on the above discussion, we may envision two general types of patterns, with two specific patterns for each type. These are:

A. *First Type [The Consensual Hypotheses]:* High budget volatility implies political dissensus because divided government is positively associated with volatility:

Pattern I: *[The Wildavsky Hypothesis]*. If the trend is toward *increasing* volatility, and if divided government *increases* volatility independently of the trend, then we may conclude: 1) that dissensus causes volatility; and 2) present volatility is due to a break-down in consensual norms of governance of the past.

Pattern II:[The Innovation Hypothesis]. If the trend is toward *decreasing* volatility, and if divided government *increases* volatility independently of the trend, then we may conclude that 1) dissensus causes volatility; and 2) the past was an era of dissensus and the present is characterized by more consensus, and that divided institutional government does detract from consensus when it occurs.

B. *Second Type*: Budget volatility does *not* imply political dissensus because divided government is negatively associated with volatility:

Pattern III: *[The Gridlock Hypothesis].* If the trend is toward *decreasing* volatility, and if divided government *decreases* volatility independently of the trend, then we may infer that 1) dissensus does not cause budget volatility, and 2) the low volatility is likely a result of institutional deadlock.

Pattern IV: If the trend is toward *increasing* volatility, and if divided government *decreases* volatility independently of the trend, then we can conclude that dissensus does not cause volatility, and we have no evidence for any linkage between consensus politics and budget volatility.

Divided government is obviously not the only measure of policy dissensus one might use. Moreover, divided governments (as well as unified ones) might reflect differing levels of dissensus about the desirable course of public policy. Sometimes presidents reach across parties for support; sometimes they are opposed by factions within their own parties. As a consequence, we introduce two additional variables that can be used to assess political dissensus. The first assesses dissensus between the policymaking branches of government. It is the percentage of public acts vetoed by the president. The second assesses dissensus within the legislative branch. It is the ideological divergence between the Congressional parties as assessed by their voting records.

The Empirical Study of Budget Volatility

Volatility in budgets implies that growth (or decline) is not uniform across the functions of government. Budget volatility could be associated with either efforts at expansion or contraction or both. Large increases, if balanced with large decreases elsewhere in the budget, would yield high volatility. If the amount of either large increases or large decreases shrinks, so does volatility. In any case, more volatility implies less incrementalism (and less predictability) in the budgeting process.

As a consequence, we define budget volatility empirically as variability in year-to-year percentage changes in governmental subfunctions (employing in this paper all 55 domestic subfunctions with inflation removed). The larger the variation in year-to-year change, the more volatile (and less incremental) the budget process. Then we calculate a measure of variability for each year. Finally, we trace this measure of volatility across the period studied. To calculate volatility, one needs fine enough categorization to ensure a sizable enough numbers of budget categories for a given year, so that the volatility measure may be traced over time without being too influenced by a 'small-n' problem. Our focus on the subfunction level offers this statistical leverage (see the Data Appendix).

Figure 8 plots the intersextile range of annual percentage changes in all domestic budget subfunctions for the last 54 years. The intersextile range is the absolute difference between the annual percentage change for subfunctions at the 16.67th percentile and the 83.33rd percentile. It is a robust measure of variability, less influenced by large outliers than is the variance (Western 1995). We use the intersextile range as our indicator of variability because our distributions are highly skewed and the variance is, therefore, potentially misleading.

Figure 8 summarizes the degree to which all the categories of spending were subject to an equal percentage change, or to the degree to which different categories experienced different degrees of change. The figure tells us that year-to-year change in subfunctions in the past were more variable, and that this variability has been declining steadily if not monotonically throughout most of the post-war period. Since the late 1980's, however, volatility has largely stabilized, with further declines marginal at best.

[FIGURE 8 ABOUT HERE]

In order to pry apart the relationships between budget volatility and political consensus, we introduce divided government into the mix. We estimate a model that includes divided government and the trend in order to avoid confounding effects. The dependent variable in this analysis is the annual intersextile range of percentage changes in subfunction budget authority. [9] Figure 9 presents the fit of this model incorporating divided government and the trend toward lower volatility.

[FIGURE 9 ABOUT HERE]

It is clear that budget volatility has decreased, and decreased dramatically, in the last half-century, but that divided government operated to decrease incremental budgeting. We still don't know exactly why volatility has declined, but several possibilities exist. One possibility is that as the budget has grown large changes have been harder to make. A second is that the growth of mandatory spending categories relative to discretionary categories has made it more difficult to make large changes (at least in the former budget categories) by handcuffing lawmakers. It turns out, however, that neither of these account for declining budget volatility. Details are in the technical appendix.

We have also examined several different measures of political dissensus in addition to divided government—particularly polarization in Congress and the number of acts that the President vetoed. From this analysis, it is clear that divided government rather than other aspects of the changing political climate that shifts the budgeting system into a less consensual mode. Details are in the technical appendix.

Conclusions

We have addressed the issue of budget volatility in this chapter. An examination of the frequency of annual budget changes displayed a strongly leptokurtic structure. Mostly budget changes are very small, but these small changes are interspersed with large punctuations. Moreover, these punctuations are not simple reflections of external events. Punctuations in subfunctions are not simple reflections of macropunctuations, nor can they be associated simply with external events. Budget punctuations occur at all levels of scale, from large budget functions to much more limited budget programs. Budget volatility, however, is greater at the smaller levels of scale and seems to have declined during the last half-century.

[9] Estimating the trend requires a little care, since a declining linear trend makes no theoretical sense here. Volatility is bounded at zero, whereas a linear estimate would imply the possibility of negative values for the measure. Instead we have estimated an exponential decay model, which is asymptotic with the x-axis.[9] Fitting an exponential decay trend implies very rapid change in volatility at first, but less and less change as time proceeds.

Recent studies have confirmed the leptokurtic structure of budget change in different venues. Jordan (2001) shows a distinctively leptokurtic pattern in the budgets of US municipalities, and indicates that different policy areas are subject to different degrees of kurtosis. Mortensen (2001) similarly shows that Danish municipal budgeting is characterized by a pattern of strong stability and substantial punctuations, again with different policy areas displaying different degrees of kurtosis. John, Margetts, and Gilbert (2001) demonstrate generally similar patterns for national budgeting in the United Kingdom. This research raises the issue of whether different institutional arrangements lead to different patterns of punctuations and stability, given that all budgeting tends toward this pattern.

In the US, Overall budget volatility has declined since the years immediately after World War II. At the same time, volatility increased during periods of divided government, controlling for this trend. Interestingly, it is clearly not the case that divided government produces institutional gridlock. Incrementalism, assessed as subdued volatility in the budget process, is more associated with unified than divided governments. It is clear, then, that the institutional gridlock hypothesis cannot account for stasis in the budgetary process.

If institutional gridlock does not account for stasis in the budgetary process, then what does? These two findings, that budgeting is less volatile than in the past but is more volatile in periods of divided government, lead us to infer that decreasing budget volatility is due to consensus on the general direction of government policy.

In terms of the patterns discussed in above, empirically we detect Pattern II—what we termed the *Innovation Hypothesis*. Overlaying a secular trend of decreasing volatility (and increasing consensus) are specific periods of increased dissensus associated with divided government. This suggests that there was considerable budgetary dissensus during the period immediately following the Second World War, a period of considerable innovation and experimentation, and reductions in the funding of various public programs. During periods of divided control, it seems, programs are affected differentially, with some increases and some decreases. In periods of unified control, funding increments or decrements tend to be more uniform.

Surprising to many will be our suggestion that the policymaking process was more dissensual in the past than in the supposedly rancorous present. It may be that the rancorous electoral politics of today are not as connected with the policy process as one might expect--or at least the budgetary part of the policy process. There are good reasons to suspect this. First, divided government—institutional dissensus—has little effect on mandatory spending categories. Budgeting is generally easier in mandatory categories, absent statute changes, because spending is tied to the time trace of external events, such as the number of elderly, rather than the calculations of bureaucrats, presidents, and members of congress. Second, much of the polarization in Congress may center on statutory direction, not budgetary direction—especially in periods of unified government. Third, dissensus on budgetary issues may have more effect on the timely passage of appropriations and on the language for budget execution

than on changes in the subfunctional budget totals for each year. Finally, political rhetoric may proceed quite independently of the budgetary process. If rancor concerns character or if it concerns issues that are not prominent in funding decisions--such as many regulatory policies, or abortion and other social issues, then the political discourse and budgetary policies can become disconnected. Dissensus on these issues does not necessarily imply dissensus on budgeting.

In the end, our evidence implies that Wildavsky was wrong about modern budgets being less incremental than earlier ones, at least if one measures incrementalism in terms of damped volatility across categories of Congressional budget authority. On the other hand, he was probably right in associating incremental changes with an underlying consensus about the role of public spending in society.

TECHNICAL APPENDIX

In this appendix we present analyses to support the finding of declining budget volatility discussed above. Table A1 presents estimates for the regression of the intersextile ranges of annual percentage changes in budget authority on the exponential trend and the dummy variable for divided government (=1 when the national government was divided; else=0).[10] Plots of the residuals, runs tests, and Lagrange multiplier statistics indicated no significant autocorrelation, so we employed OLS estimates for the model. The obvious heteroskedasticity of the dependent variable does not seem to have had a large effect on the estimates.[11]

[TABLE A1 ABOUT HERE]

Divided government does have a statistically significant effect, even after we have controlled for the overall declining trend. The positive coefficient indicates that divided government is associated with increased "churning" or volatility in the final domestic budgets produced by Congress from one year to the next. The coefficient of .236 means that logged volatility increases over 20% when shifting from a unified to a divided government (controlling for the generally decreasing trend). Because the trend is non-linear, however, the relative role of divided government on (unlogged) volatility is variable. The exponential decay model implies that the trend was far more important, both relatively and absolutely, in the past than in the present, because year-to-year changes were more dramatic in the past. So the influence of divided government is somewhat ironic: in absolute terms, it was greater in the past. But relative to the declining trend, it is greater in more recent periods.

There is a second way to appreciate the role of divided government in a more explicit fashion. If we allow the exponential decay model to consume as much of the

[10] Governments were matched with FY budgets with a one-year lag. That is, the inaugural year of a president was matched with a fiscal year lagged by +1. So, for example, Truman 1949 was matched with FY 1950. This gives presidents credit for affecting an on-going budget process (and one in which they were not responsible for the initial budget submission). In that sense, it credits a president for affecting congressional negotiations over his predecessor's budget. This may capture recent practices better than earlier ones. Governments were coded as divided if at least one house of Congress was in opponents' hands. All of the Reagan years were scored as divided, including 1981-84 when the House was Democratic and the Senate was Republican.

[11] Some evidence of heteroskedasticity remains even after logs are taken of the series of intersextile ranges of domestic budget changes. SHAZAM's DIAGNOS / HET command produced a variety of statistical tests, some of which allowed for rejection of the null hypothesis of homoskedasticity at .05 level. Consequently, while these OLS estimates are unbiased, we should use a measure of caution in interpreting them as well as their related standard errors and t-ratios (Kennedy 1992:114-118; Greene 1993:394-395). However, re-estimating the model attempting to control for dependent variable heteroskedasticity did not produce large changes in the estimates. SHAZAM's HET command (White 1993:207-215) produced the following coefficients and asymptotic t-ratios for domestic spending: Trend, -0.027 (-10.86); Divided, 0.237 (3.41); and Constant, 3.97 (51.32).

variance in volatility as it can, divided government still accounts for an additional 8% of the variance in volatility.[12]

Budget Size and Mandatory Spending

In Table A2, we present regression analyses to test the hypotheses that budget size and the increasing reliance on mandatory spending account for declining budget volatility. In particular, we have added the percentage of the domestic budget that falls in mandatory spending categories and the absolute size of the budget into the model presented in Table A1. The first column presents the basic results from Table 1, for comparative purposes. The second column enters percent mandatory with the trend; the third column enters both percent mandatory and budget size without the trend, and the final column enters both variables and the trend.

[TABLE A2 ABOUT HERE]

Whatever the combination of variables entered, the divided government relationship is robust; the variable remains significant and of about the same magnitude regardless of the other variables entered into the equation. Second, percent mandatory does not add perceptibly to the trend variable. Finally, none of the three trending variables is significant if all are included in a single model. We conclude that the trend component we estimated is at least a function of budget size, but may also include other unmeasured elements (the R^2 for the equation with the trend estimated but without the size of the budget [column 2] is marginally higher than the equation with budget size but without trend [column 3]). For theoretical and for statistical reasons, we proceed with the model estimated in Table A1.

While entering the percentage of mandatory spending into the equation estimated in Table A1 does not change the size or significance of the coefficient for divided government, estimating separate models for mandatory and discretionary spending does. Table A3 presents estimates separately, and divided government does not affect volatility in mandatory categories, but has a strong and statistically significant effect on discretionary spending. To the extent that divided government increases budget volatility, it does so entirely through discretionary spending categories.

[12] As noted above, we used intersextile ranges of the annual percentage changes in budget authority as our measure of volatility. The intersextile range is robust; that is, it is less affected by outliers, than is the variance (which gives disproportionate weight to outliers by weighting each observation by the square of its distance from the mean, which itself is sensitive to outliers). The distribution of percentage changes across budget categories is highly skewed, with extremely high outliers in many years. In such a case, measures based on means and standard deviations are often misleading and can be highly erratic. Indeed, using the variance as a measure of volatility produces such noise in the dependent variable that no model would be likely to be as efficient with this indicator. Nevertheless, we have estimated the model presented in Table 1 using the logged standard deviations in annual percentage changes instead of the intersextile ranges. The coefficients for the trend variable and the divided government variable are both in the same direction as in Table 1, but divided government is not significant, and the adjusted coefficient of* determination drops from .67 to .21.

[TABLE A3 ABOUT HERE]

Finally, we estimated a more complex model to test the hypothesis that volatility is higher during the first year of a unified government, in which much may be accomplished in a few spending categories. Our procedure was to enter a counter variable that equaled 1 in the first year of a unified government, 2 in the second year, etc. Our volatility measure would be inversely related to the unified government counter if the hypothesis of limited-category surges is correct. The counter was, however, statistically insignificant for both domestic and discretionary budget volatility. We also ran a model in which the first year of unified governments was entered as a dummy variable (=1 if the first year of a unified government; 0 otherwise). The coefficient was positive, but did not reach statistical significance.

Further Evidence of the Role of Dissensus in the Budget Process

We suggest that political dissensus causes increased budgetary volatility. In this section, we present other two other measures of political dissensus, and examine whether they are related to budget volatility. The measures we use are first, the percent of public acts vetoed by the president; and second, a measure of party polarization within Congress. The measure of party polarization is calculated as the difference in means in ADA scores for Democrats and Republicans separately for each house of Congress, and the mean between the houses is taken for the final measure. The measure is available for the period since 1962. The houses track similar time paths, but the Senate is consistently less ideological than the House (Fleisher and Bond 1996). [13]

These measures assess different aspects of dissensus. The percent acts vetoed taps differences between the executive and legislative branches of government, and should be higher in periods of divided control. This is in fact the case: the percentage of acts vetoed is highest during the Nixon-Ford years, peaking at over 6% in FY 1975 and 1976, and is lowest during the Kennedy-Johnson years. But vetoes differed in periods of divided government: Reagan and Bush each vetoed a higher percentage of public acts than did Eisenhower.

The party polarization measure is reasonably constant between 1962 and 1979, but has risen steadily since then. Indeed, the simple correlation between our trend counter and the polarization measure is .924. Moreover, the variable gives evidence of non-stationarity: Augmented Dickey-Fuller and Phillips-Perron tests fail to reject the null hypothesis of a unit root. Nonetheless, the series is bounded between 0 and 100, and thus must have finite mean and variance. We note, in addition, that the measures of dissensus do not track similarly—one could not, for example, think of party polarity in Congress as some kind of continuous surrogate for divided government.

[13] These data were graciously made available to us by Jon Bond and Richard Fleisher. The ideology scores are purged of votes in which the president took a public position, and are thus a measure of polarization independent of presidential activity.

First we examined the role of acts vetoed. If the percentage of acts vetoed is included in a model with the trend, it is statistically significant. If it is included with divided government, divided government is significant, but acts vetoed is not. This adds confidence that divided government is a sound measure of inter-branch policy dissensus.

In Table A4, we include both new dissensual variables in our model explaining budget volatility (now including only the period 1962-95). In the table, the first column presents an estimate of an OLS regression equation which includes divided government, percent public acts vetoed, and the trend. The second column presents an estimate including the trend, divided government, and the party polarity variable. The third column includes all three dissensus measures, but not the trend. The final column includes divided government, the trend, and the two new dissensus variables.

[TABLE A4 ABOUT HERE]

First, the percent public acts vetoed adds nothing to the explanation of budget volatility beyond what divided government explains. Second, the party polarization measure adds no explanatory power beyond what the trend explains—indeed, party polarization is not significant whereas the trend is, as the second column indicates. Dropping the trend variable allows party polarization to reach statistical significance, but does not displace the divided government variable. Polarity is negatively related to volatility—seemingly offering support for the gridlock hypothesis that volatility is damped by dissensual politics. If all variables are included, only divided government is significant.[14]

We conclude, first, that divided government is related to increases in volatility, and that the relationship is robust. There is no efficient surrogate for divided control among our other measures of dissensus. Second, the role of party polarization remains somewhat enigmatic. It adds nothing beyond our trend variable, which carries with it the size of the budget. It is not significant if the trend is included. If the trend is not included, party polarization is significant. We feel that the best interpretation is that party polarization is not important in explaining budget volatility. This interpretation is supported by the fact that during the period of greatest declines in budget volatility (approximately the 1960s), party polarization was quite stable. Hence it would seem that the secular declines in volatility are but spuriously associated with party polarization in Congress.

[14]One might entertain the hypothesis that divided institutions and polarized parties act in multiplicative fashion, reinforcing one another and producing extra large budget variability. A simple examination of the data allow us to rule this out. The two measures operate in opposite directions (if, indeed, there is any effect due to polarization). Divided government is associated with heightened volatility, whereas polarized parties are, if anything (and we think not) associated with damped volatility. As a consequence, they cannot reinforce one another.

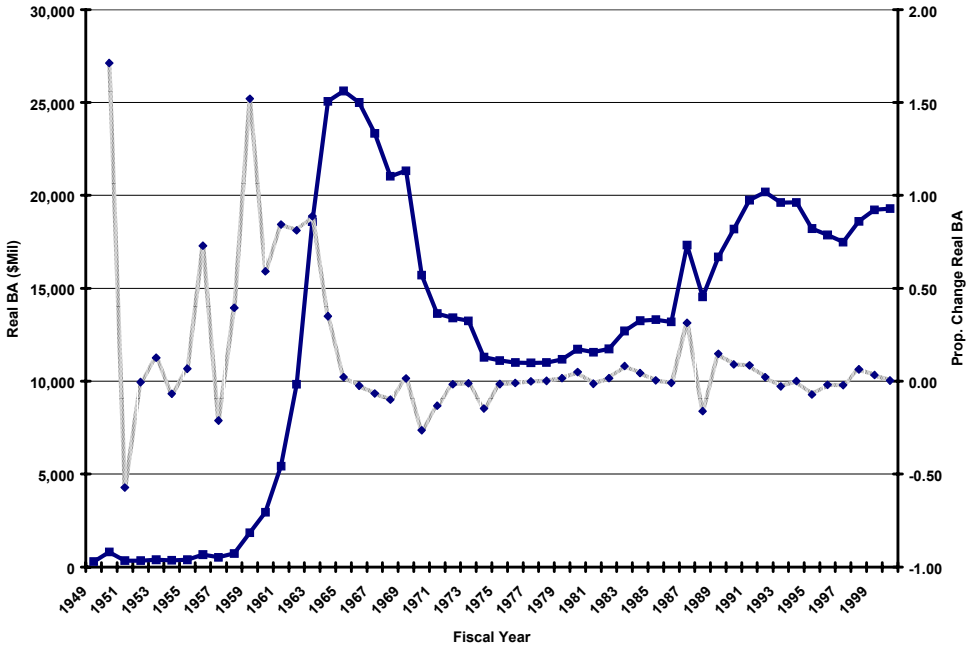
The addition of other measures of political dissensus, in particular, the proportion of bills vetoed by the president and ideological polarization between the congressional parties, makes the picture somewhat more complex. First, the veto measure supports the general line of argument here, since it can serve as a continuous surrogate for the divided government dichotomous variable, albeit a somewhat less satisfactory surrogate. In the case of party polarization, however, the results are more complex. Polarization has increased in recent years. On the other hand, it is unlikely that this polarization has affected volatility. Polarization certainly has not increased budget volatility. It probably has not decreased volatility either, although this interpretation is a little more suspect because the trend toward increasing polarization and that toward decreased volatility are confounded. The key empirical point, however, is that polarization was not increasing much between 1962 and 1979, whereas volatility was experiencing major declines during these years. Finally, it is difficult to imagine that divided government and congressional party polarization have *opposite* effects on volatility, with divided government encouraging volatility and polarization suppressing it. As a consequence, we argue that, in the budget process, consensus yields stasis (in the sense of damped volatility) whereas dissensus yields increased budget changes that are not uniform in direction.[15]

In the end, then, the model presented in Table 1 is our best estimate of the causes of budget volatility: a trend component representing at least the increasing size of the budget, and divided control of national governing institutions.

[15] We also examined potential effects on budget volatility from two additional variables: (1) a dummy variable indicating the first two fiscal years in the administration of a president from a different party from his predecessor; and (2) a dummy variable for when a Republican president was in office. The president-of-a-new-party variable had no statistically significant relationship with budget volatility. The Republican-president variable had almost the same effect as the divided government variable, although the Schwartz criterion and the Akaike information criterion indicate that divided government is slightly superior statistically. That should not be surprising, for except for two years in the Truman Administration, and two years in the Eisenhower Administration, both variables are the same.

Figure 1: Punctuations with Persistence: Science Policy and Income Maintenance

a. Science Policy



b. Income Maintenance

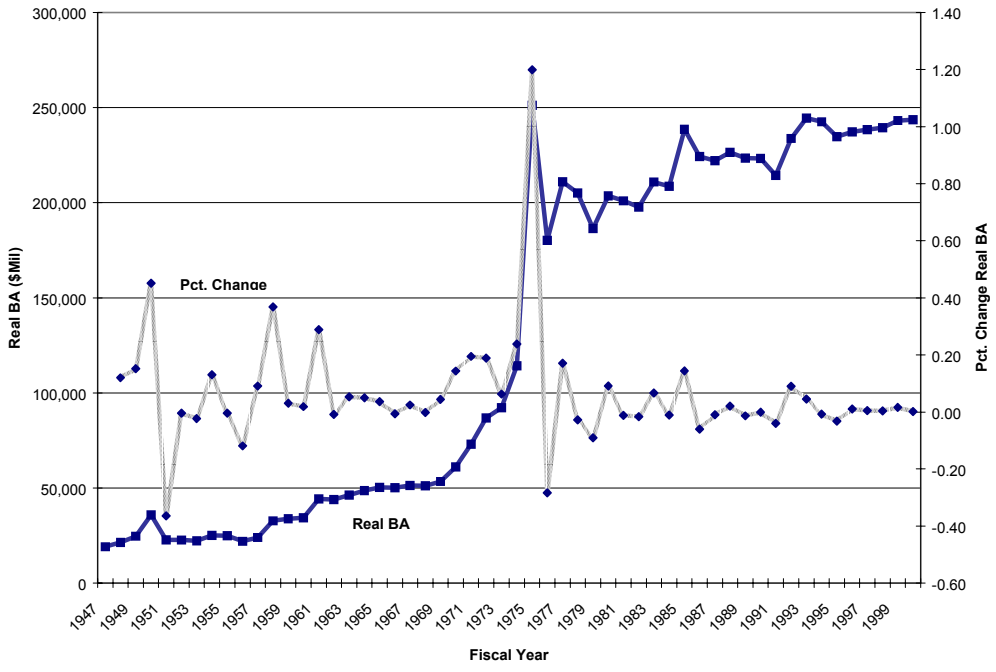
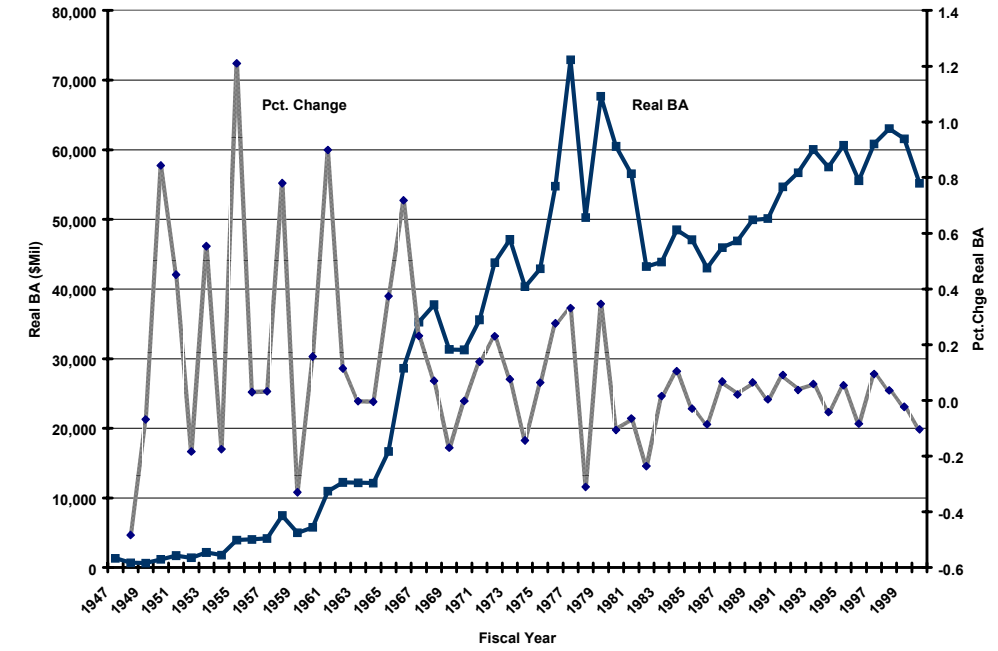


Figure 2: Education and Justice Policies



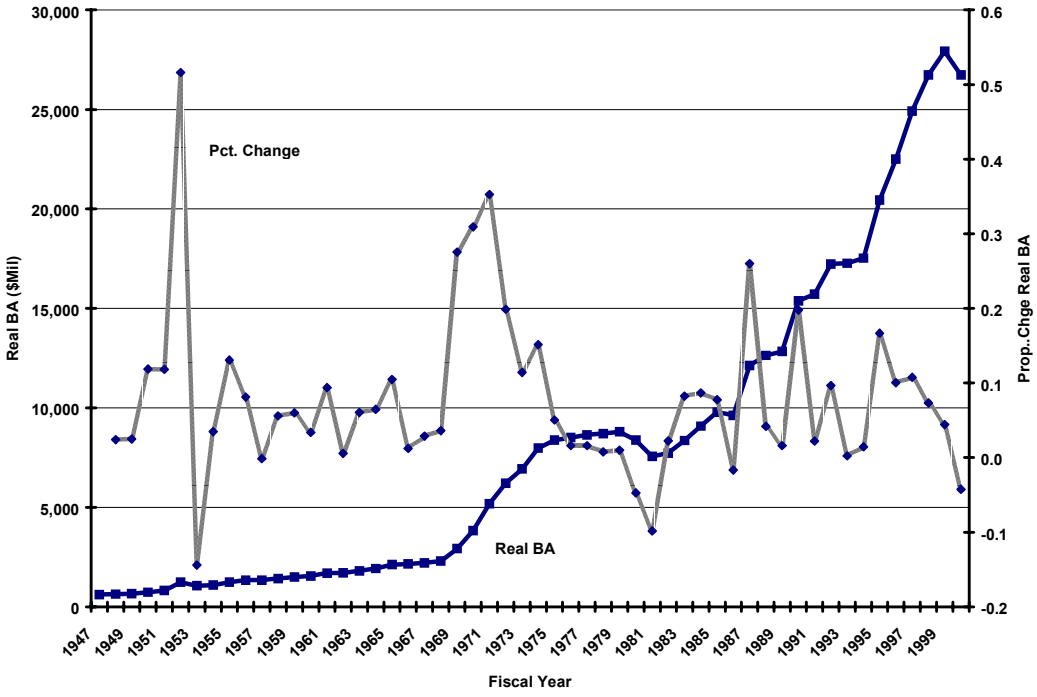
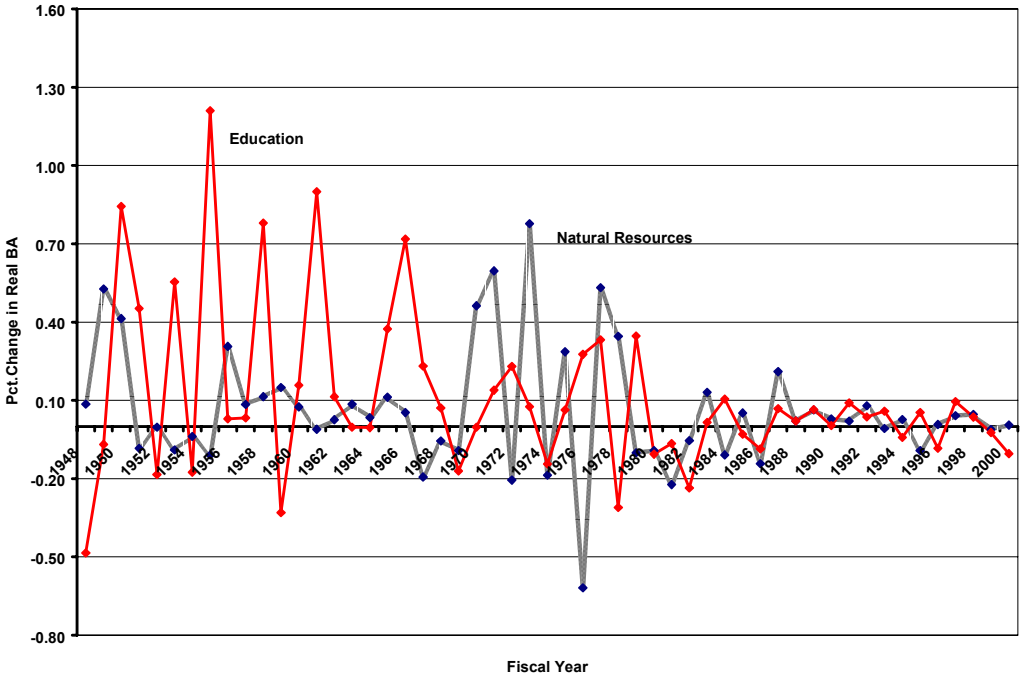


Figure 3: Comparing Period and Amplitude for Policy Areas

a. Education and Natural Resources (Environment)



b. Agriculture and Education

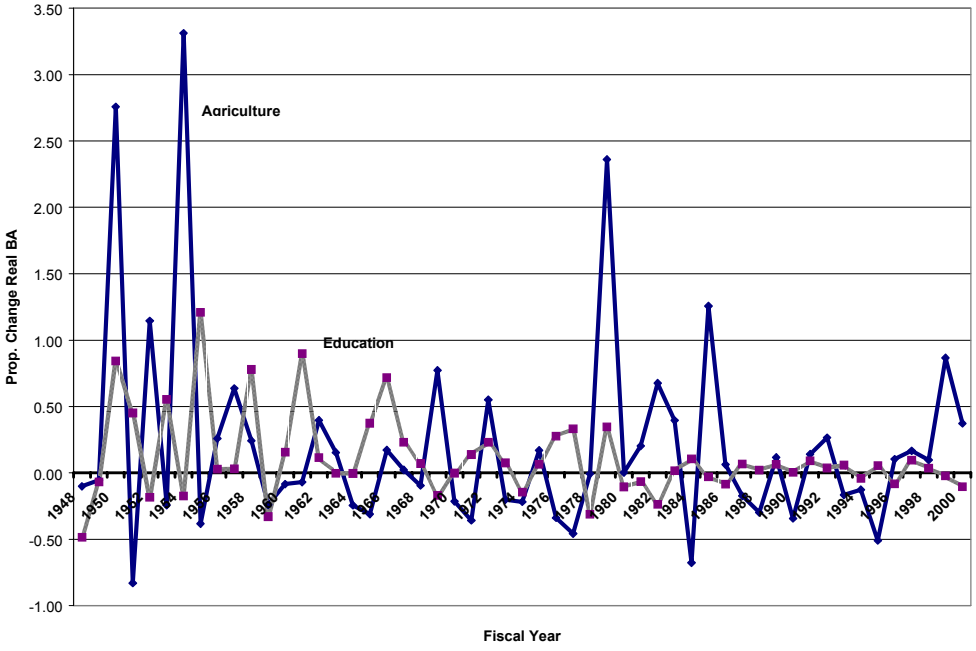


Figure 4: Two Big Social Programs, Social Security and Medicare, Display Similar Amplitudes but different Periods

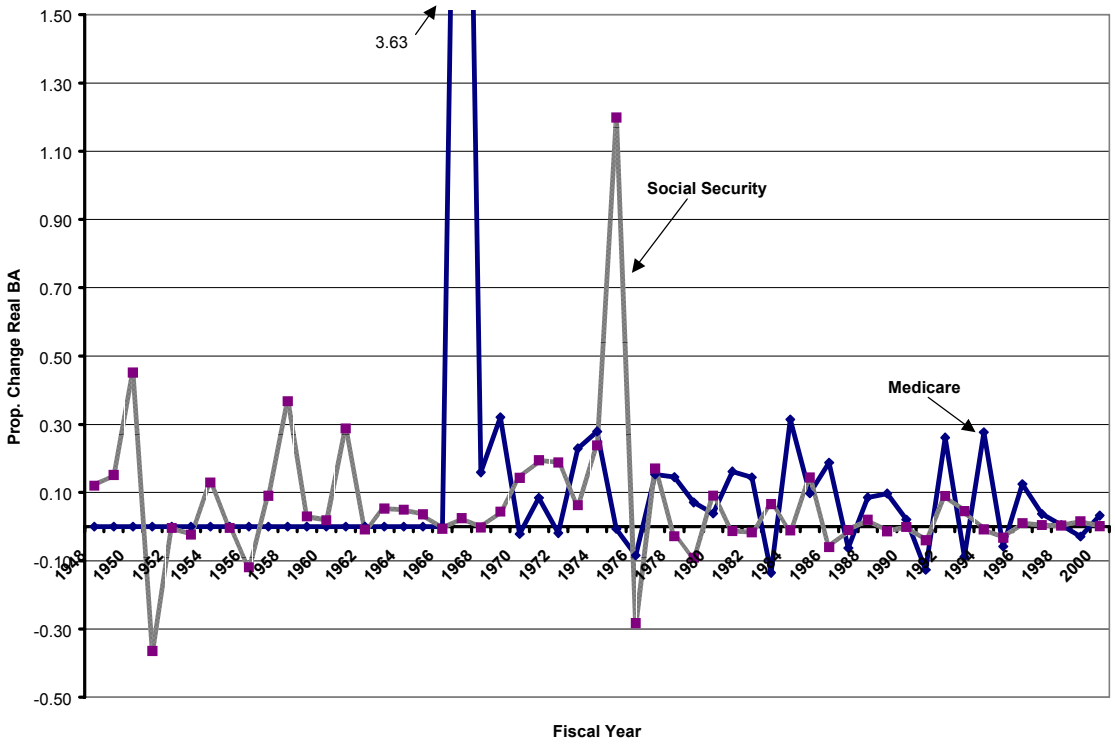


Figure 5: Defense Budgets

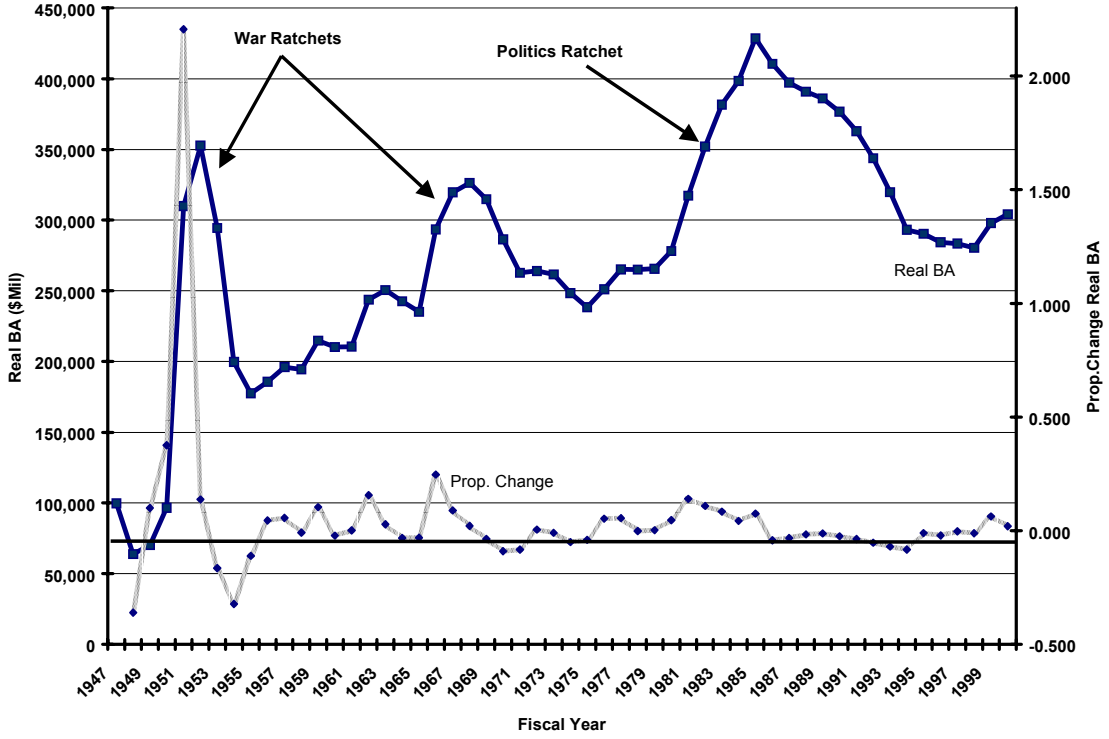


Figure 6: Frequency Distribution of Annual Percentage Changes in Real BA for Corrections

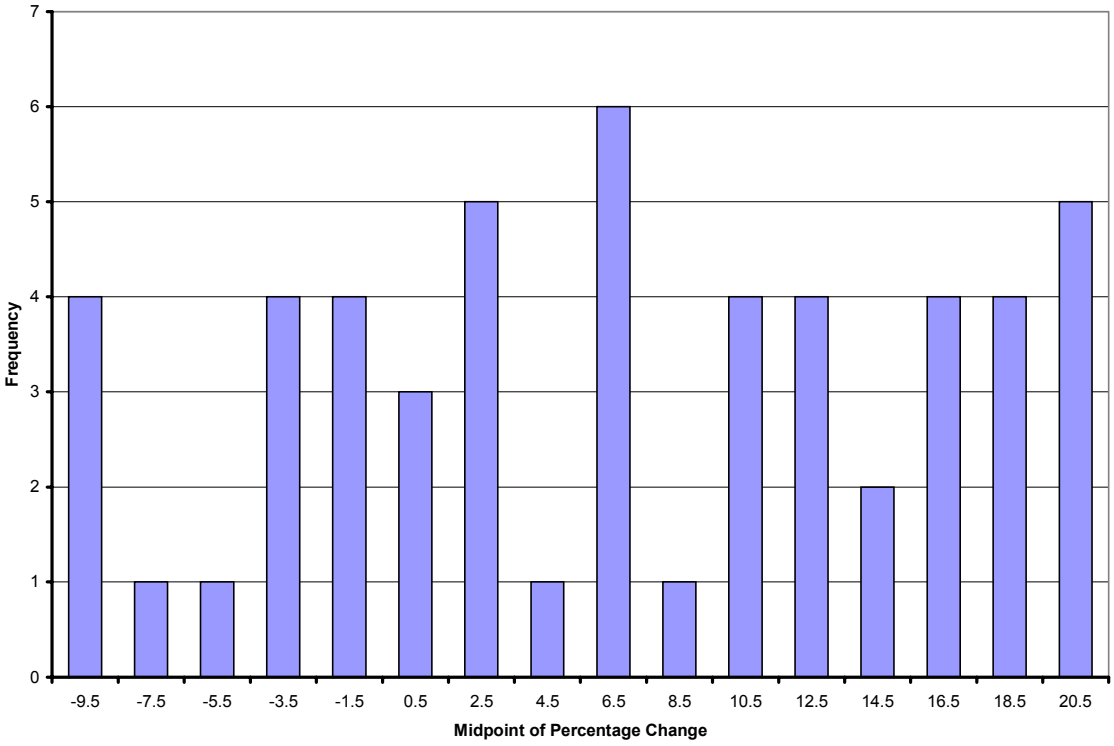


Figure 7:
Histogram of Real Percentage Changes in US Budget Authority, Pooled by OMB Sub-functions, FY1947 – FY2000

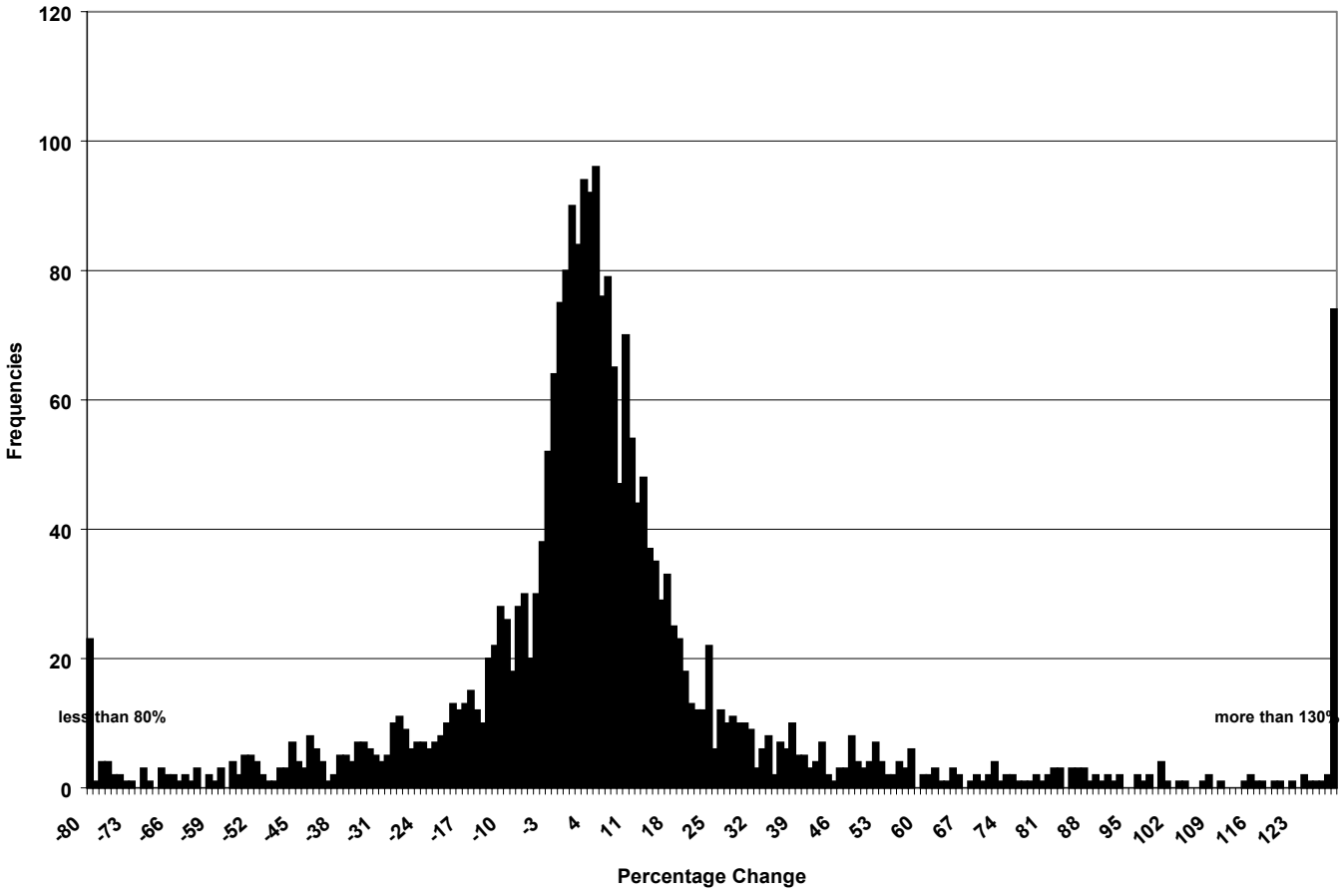


Figure 8: Intersextile Ranges for Annual Percentage Changes in US Budget Authority by Domestic Subfunction

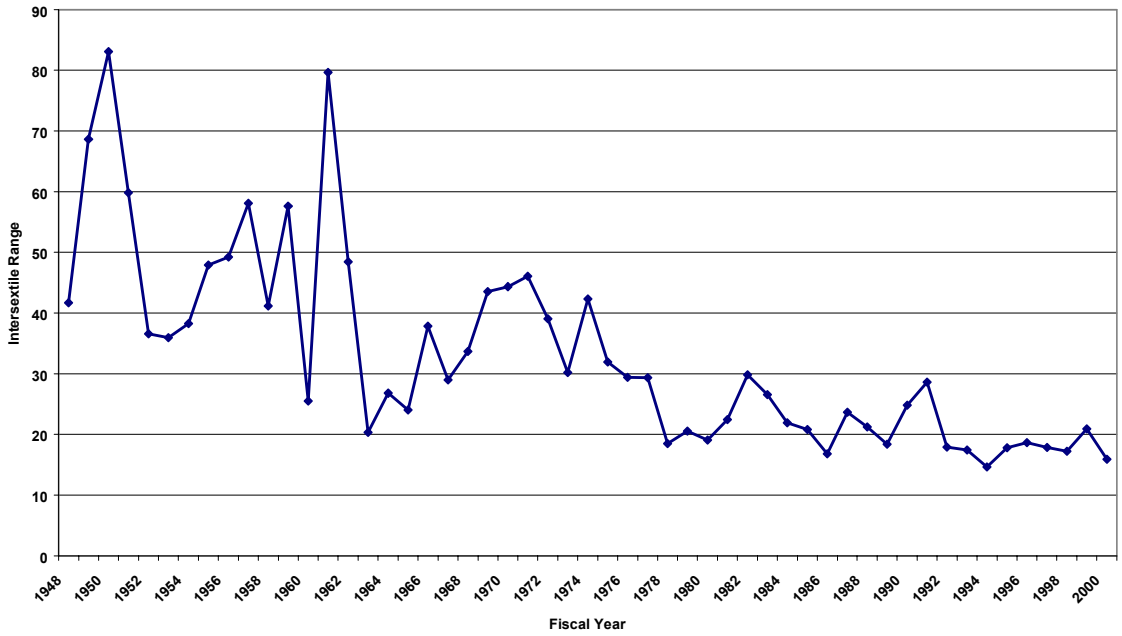


Figure 9: Intersextile Ranges for Annual Percentage Changes in US Budget Authority by Subfunction, Actual and Predicted

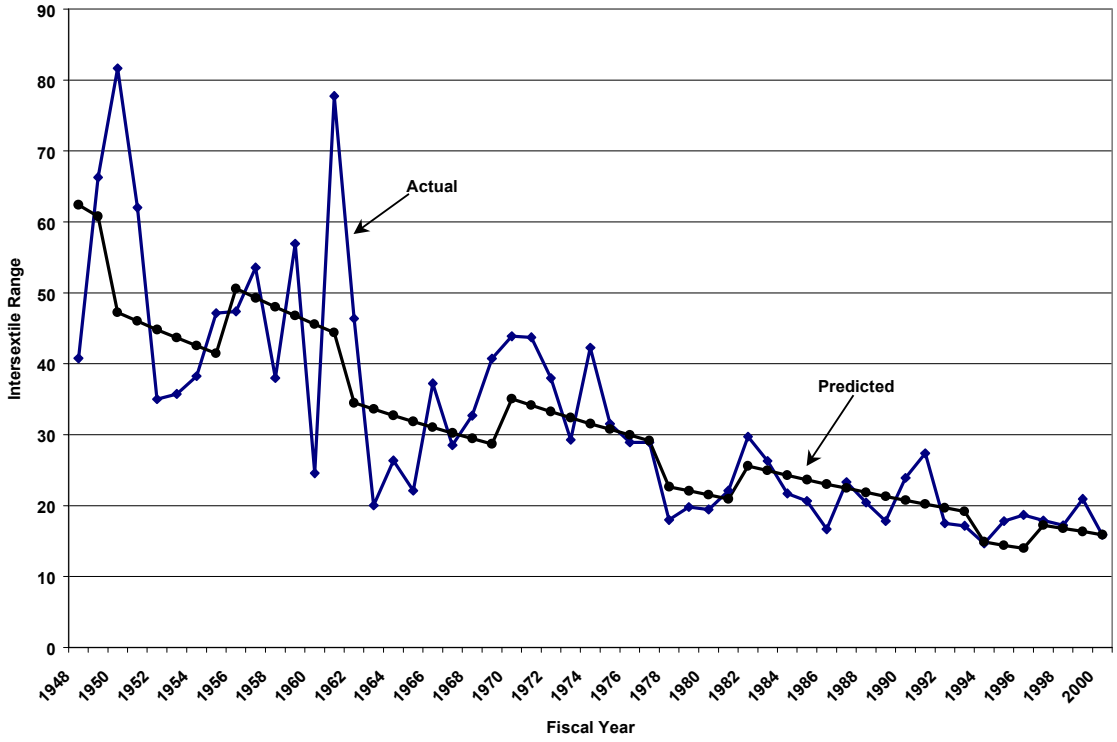


TABLE 1: ESTIMATES OF PROBABILITIES OF CHANGE PATTERNS, FY 1947-95

	UNCONDITIONAL PROBABILITIES:		
	Large Increase (18%)	Incremental (66%)	Large Decrease (15%)
CONDITIONAL PROBABILITIES:			
Large Increase:	28%	12%	31%
Large Decrease:	32%	8%	20%
Incremental:	40%	80%	49%
	100% (n = 476)	100% (n = 1712)	100% (n = 381)

TABLE 2: LARGE AND INCREMENTAL CHANGES BY BUDGETARY MACROFUNCTION, FY 1947-95

NUMBER OF ANNUAL CHANGES	NATIONAL SECURITY	DISCRETIONARY DOMESTIC	MANDATORY DOMESTIC	TOTAL
LARGE INCREASE	67 (21%)	328 (18%)	82 (15%)	477 (18%)
INCREMENTAL CHANGE	196 (62%)	1172 (66%)	399 (75%)	1767 (67%)
LARGE DECREASE	53 (17%)	281 (16%)	53 (10%)	387 (15%)
SUBTOTALS	316 (100%)	1781 (100%)	534 (100%)	2631 (100%)

TABLE A1: Regression Analysis of Logged Intersextile Ranges of Percentage Changes in Subfunctions of US Domestic Budget Authority, FY 1948-1995

VARIABLES	Coefficient	Standard Error	T-ratio
Trend (exponential decay)	-0.027*	0.003	-9.78
Divided Government	0.236*	0.076	3.09
Constant	3.961*	0.079	50.22

N = 48
R^2 = .68; Adj. R^2 = .67
Est. Rho = .011; Runs Test Normal Statistic: -0.28; Goldfield-Quandt Test (df=20,19): 3.86[a]; Breusch-Pagan/Godfrey Test (df=2): 6.12[a]. LaGrange multiplier statistics for a Box-Pierce-Ljung test that the residual correlations are jointly zero through lag five appear in Table 2.

* - Statistically significant at <.01 level, one-tailed test.
[a] - Allows for rejection of null hypothesis of homoskedasticity at <0.05 level.
Source: Budget data compiled by the authors; divided government from *Vital Statistics on Congress.*

TABLE A2: Regression Analysis of Logged Intersextile Ranges Of Percentage Changes in Subfunctions of U.S. Domestic Spending on Time, Growth in Mandatory Spending, and Growth in Total Budget

	Coefficient (t-ratio)	Coefficient (t-ratio)	Coefficient (t-ratio)	Coefficient (t-ratio)
Trend (exponential decay)	**-0.027*** ** (-9.78)	**-0.026*** ** (-3.74)	**---**	**-0.017** (-1.19)
Divided Govt	**+0.236*** ** (3.09)	**+0.240*** ** (3.06)	**+0.223*** ** (2.81)	**0.235*** ** (2.96)
Pct Mandatory	**---**	**-0.0018** (-0.030)	**+0.0015** (0.235)	**-0.00048** (-0.07)
Total Budget ($million)	**---**	**---**	**-1.11*** ** (-8.58)	**-0.038** (-0.61)
Constant	**3.961*** ** (50.22)	**4.082*** ** (9.964)	**4.016*** ** (9.63)	**4.050*** ** (9.74)
RSqr	.681	.682	.674	.684
Adj RSqr	.667	.660	.652	.655
N	48	48	48	48
Breusch-Pagan/ Godfrey Test Stat (degrees of freedom)	6.117 2	6.257 3	7.306 3	7.718 4
Box-Pierce-Ljung Test Stat (degrees of freedom)	2.469 5	2.574 5	3.037 5	2.788 5
Akaike Info Criterion	0.0675	0.0702	0.0719	0.0726
Schwartz Criterion	0.0759	0.0821	0.0841	0.0882

***** - Statistically significant at <0.10 level, one-tailed test; ** - at <0.05 level; and *** - at <0.01 level.
Test statistics from Shazam DIAGNOS procedure with ACF and HET options (White 1993:172-175).
Sources: Budget data from authors, and divided government from *Vital Statistics on Congress*.

TABLE A3: Regression Analysis of Logged Intersextile Ranges Of Percentage Changes in Subfunctions of U.S. Domestic, Discretionary, and Mandatory Spending

	Domestic Spending	Discretionary Spending	Mandatory Spending
	Coefficient (t-ratio)	Coefficient (t-ratio)	Coefficient (t-ratio)
Trend (exponential decay)	**-0.027*** ** (-9.78)	**-0.031*** ** (-8.13)	**-0.016*** ** (-3.27)
Divided Govt	**+0.236*** ** (3.09)	**+0.352*** ** (3.32)	**-0.017** (-0.13)
Constant	**3.960*** ** (50.22)	**4.058*** ** (37.12)	**3.685*** ** (26.60)
RSqr	.681	.601	.207
Adj RSqr	.667	.583	.171
N	48	48	48
Breusch-Pagan/ Godfrey Test Stat (degrees of freedom)	6.117 2	4.795 2	3.219 2
Box-Pierce-Ljung Stat (degrees of freedom)	2.469 5	7.726 5	6.430 5

* - Statistically significant at <0.10 level, one-tailed test; ** - at <0.05 level; and *** - at <0.01 level. Test statistics from Shazam DIAGNOS procedure with ACF and HET options (White 1993:172-175). Sources: Budget data from authors, and divided government from *Vital Statistics on Congress*.

TABLE A4: Regression Analysis of Logged Intersextile RangesOf Percentage Changes in Subfunctions of U.S. Domestic Spending FY 1962-1995

	Coefficient (t-ratio)	Coefficient (t-ratio)	Coefficient (t-ratio)	Coefficient (t-ratio)
Trend (exponential decay)	**-0.028***** (-6.86)	**-0.023**** (-2.09)	**---**	**-0.019** (-1.55)
Divided Govt	**+0.337***** (3.14)	**+0.275***** (3.15)	**+0.318***** (2.90)	**+0.336***** (3.12)
Pct Public Acts Vetoed	**-0.020** (-0.68)	**---**	**-0.050** (-1.67)	**-0.031** (-0.97)
Ideological Polarity	**---**	**-0.005**[a] (-0.50)	**-0.276***** (-6.56)	**-0.010**[a] (-0.85)
Constant	**4.000***** (31.59)	**4.061***** (20.01)	**4.379***** (23.77)	**4.162***** (18.23)
RSqr	.616	.613	.595	.626
Adj RSqr	.578	.575	.554	.574
N	34	34	34	34
Breusch-Pagan/ Godfrey Test Stat (degrees of freedom)	5.907 3	7.809 3	7.961 3	8.901 4
Box-Pierce-Ljung Stat (degrees of freedom)	1.400 5	2.233 5	2.331 5	1.971 5
Akaike Info Criterion	0.0511	0.0514	0.0539	0.0528
Schwartz Criterion	0.0611	0.0616	0.0645	0.0661

* - Statistically significant at <0.10 level, one-tailed test; ** - at <0.05 level; and *** - at <0.01 level.
Test statistics from Shazam DIAGNOS procedure with ACF and HET options (White 1993:172-175). Sources: Budget data from authors, and divided government from *Vital Statistics on Congress*.
a - The simple correlation between the time counter and ideological polarity is .924.

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DATA APPENDIX

Researchers must surmount serious technical difficulties to study budget change. First, budget categories are not consistent across time, with programs and program-units moving across agencies and subfunctions as organizational changes and analytical convenience dictates. The problem of temporal inconsistency stems from the tendency for programs to migrate across agencies (a real-world organizational problem) or across budget categories (a problem of the categories used by OMB analysts). When new categories are added, it is necessary to adjust backwards, making the previous allotments to categories consistent with the new categories, but the Office of Management and Budget has done this for budget authority only since 1976. Budget outlays are consistent for a longer period of time, but outlays in too many cases do not occur when budget decisions are made. The disjoint between outlays and decisions means that mistaken inferences about the causes of a budget allocation can be made.. In order to surmount these major difficulties, we have constructed a data set that ensures temporal consistency for US Budget Authority for the period FY 1947-FY2000.

The data are tabulated at the subfunction level. The US Office of Management and Budget groups expenditures according to common objectives. At the largest scale are the major functions. Each major function incorporates several subfunctions. A subfunction can include several programs, where the programs are directed at similar ends.

One may object that, in general, budget decisions are made at the program level rather than the subfunction level; or even at the generally larger agency level. Program data, however, are not available for a consistent time series for this length of time; our new subfunction data is the lowest level of aggregation available for an extended time period. Agency levels of aggregation are problematic for three reasons: programs can shift agency locales, measures of variability are more unstable on the smaller n's, and agency totals often include offsetting receipts from primarily financial subfunctions..

Domestic subfunctions exclude financial functions and subfunctions as unsuitable for analysis because they consist mainly of net, rather than complete, transactions. The excluded financial subfunctions are: 155, International financial programs; 371, Mortgage credit; 373, Deposit insurance: 704, Veterans Housing; 809, Deductions for offsetting receipts; 902, Interest received by on-budget trust funds; 903, Interest received by off-budget trust funds; 908, Other interest; 951, Employer share, employee retirement (on-budget); 952, Employer share, employee retirement (off-budget); 953, Rents and royalties on the outer continental shelf; and 954, Sale of major assets. Domestic spending includes all remaining subfunctions except for those in function 050, National Defense, and function 150, International Affairs.

Mandatory and Discretionary Domestic Spending: We further disaggregated domestic spending by assigning its subfunctions to mandatory or discretionary categories based upon our analyses of Table 8–5, "Outlays for

Mandatory and Related Programs," in the FY 1995, 1996, and 1997 *Budgets of the United States Government*. Details are available from the authors

Data Sources: The primary sources of the budget authority data in this paper are the *Budget of the United States Government,* hereafter *BUSG* [serial, fiscal year 1949 through 1994, in print form published by the Government Printing Office, Washington DC and serial, fiscal year 1995 through 1997, on CD-ROM from the Department of Commerce]. Secondary sources include the *Report of the President's Commission on Budget Concepts* (Washington: October 1967) and the "Budget System and Concepts" sections of contemporary budgets, which were used in defining the contents of the contemporary budget authority by subfunction. The data were recategorized into the subfunctions extant in the FY 1995 *Budget* and converted into constant dollar form. Thus this dataset uses contemporary budget records to extend the OMB historical tables from FY 1976 back to FY 1947.

Budget Authority: Budget authority consists of appropriations and re-appropriations, borrowing authority, and contract authority. It should not be confused with budget authorizations. Legally, BA constitutes specific authority to make obligations that will result in immediate or later outlays. The present Office of Management and Budget definition of budget authority includes both federal funds and trust funds. The data presented in this paper consist of actual budget authority figures from contemporary *Budgets* which have been adjusted to conform to the current definition and corrected for inflation. The data are composed of appropriations, borrowing authority, and contract authority for both on- and off-budget federal entities from FY 1976 through FY 1994; of appropriations, borrowing authority, and contracting authority for on-budget entities from FY 1967 through FY 1975; of administrative appropriations and trust fund budget authority from FY 1962 through FY 1966; of new obligating authority and trust fund expenses from FY 1949 through FY 1961; and of appropriations and trust fund expenses from FY 1947 through FY 1948. We omit data from the three months of the transition quarter between FY 1976 and FY 1977.

Current and Constant Dollar Figures: We converted the contemporary actual budget figures into constant calendar year 1987 dollars by using the implicit price deflators for the U.S. gross domestic product (GDP) transformed from calendar year to fiscal year. The deflator removed the effects of inflation for the fiscal year in which the new budget authority was available for obligations by government agencies, *i.e.,* the FY 1955 deflator was used on the FY 1955 data, although an argument can be made for using the inflation rate in effect while Congress in considering budgets for the coming year (White 1995). The source of the deflators was the *National Income and Product Accounts of the United States* (Washington: U.S. Department of Commerce, 1990) and the National Income and Product Tables of the *Survey of Current Business* (Washington: U.S. Department of Commerce) [serial].

Subfunctions: The primary sources of the current subfunction categorization were the *Budget of the United States Government for Fiscal Year 1995* and OMB technical staff paper FAB 79-1, *The Functional Classification in the Budget*, dated February 22, 1979. Criteria for functional classification may be found in "The Budget System and Concepts of the United States Government" in the *FY 1995 BUSG* and from the *Budget of the United States Government* [serial, fiscal year 1948 through 1997].

Macrofunctions: We further assigned the data captured in these budget subfunctions to macrofunctions of mandatory domestic spending, discretionary domestic spending, national security spending, and financial aggregates. These macrofunction aggregations parallel but do not exactly duplicate the definitions outlined in the Budget Enforcement Act of 1990. Subfunction categorization was based on our analysis of Table 8-5, “Outlays for Mandatory and Related Programs: 1962-2002,” in the *Budgets* for FY 1995, 1996, and 1997. Financial functions and subfunctions were excluded from these analyses because they consist mainly of net, rather than complete, transactions. The domestic category consists of all of the subfunctions in the mandatory and discretionary macrofunctions as explained below.

Domestic Mandatory Spending: OMB defines mandatory spending or direct spending as a category of budget authority and outlays provided for in entitlement authority, law other than appropriations acts, and budget authority for the food stamp program. We have operationalized that definition to capture whole subfunctions associated primarily with direct spending programs. The subfunctions herein included in the domestic mandatory macrofunction are:

- 351 Farm Income Security
- 502 Higher Education
- 551 Health Care Services
- 571 Medicare
- 601 General Retirement and Disability
- 602 Federal Employee Retirement and Disability
- 603 Unemployment Compensation
- 605 Food and Nutrition Assistance
- 609 Other Income Security
- 651 Social Security
- 701 Income Security for Veterans
- 702 Veterans Education, Training, and Rehabilitation
- 901 Interest on the Public Debt

Domestic Discretionary Spending: This macrofunction contains budget authority which is usually provided in annual appropriations acts. The domestic discretionary macrofunction excludes subfunctions assigned to the mandatory, national security, and financial macrofunctions. The subfunctions included in the domestic discretionary macrofunction are:

- 251 General science and basic research

- 252 Space flight, research, and supporting activities
- 271 Energy supply
- 272 Energy conservation
- 274 Emergency energy preparedness
- 276 Energy information, policy, and regulation
- 301 Water resources
- 302 Conservation and land management
- 303 Recreational resources
- 304 Pollution control and abatement
- 306 Other natural resources
- 352 Agricultural research and services
- 372 Postal Service
- 376 Other advancement of commerce
- 401 Ground transportation
- 402 Air transportation
- 403 Water transportation
- 407 Other transportation
- 451 Community development
- 452 Area and regional development
- 453 Disaster relief and insurance
- 501 Elementary, secondary, and vocational education
- 503 Research and general education aids
- 504 Training and employment
- 505 Other labor services
- 506 Social services
- 552 Health research and training
- 554 Consumer and occupational health and safety
- 604 Housing assistance
- 703 Hospital and medical care for veterans
- 705 Other veterans benefits and services
- 751 Federal law enforcement activities
- 752 Federal litigative and judicial activities
- 753 Federal correctional activities
- 754 Criminal justice assistance
- 801 Legislative functions
- 802 Executive direction and management
- 803 Central fiscal operations
- 804 General property and records management
- 805 Central personnel management
- 806 General purpose fiscal assistance
- 808 Other general government

National Security Spending: This macrofunction consists of spending associated with national defense (function 050) and international affairs (function

150), except for the financial subfunction 155 (International financial programs). The subfunctions included in the national security macrofunction are:

- 051 Department of Defense-Military
- 053 Atomic energy defense activities
- 054 Defense-related activities
- 151 International development and humanitarian assistance
- 152 International security assistance
- 153 Conduct of foreign affairs
- 154 Foreign information and exchange activities

Financial Subfunctions: These subfunctions reflect large amounts of credit activity, offsetting receipts, or government-wide contra-accounts. Such subfunctions were excluded from programmatic analyses because of their broad use of net, rather than complete, transactions and offsetting receipts. The subfunctions included in the financial macrofunction are:

- 155 International financial programs
- 371 Mortgage credit
- 373 Deposit insurance
- 704 Veterans Housing
- 809 Deductions for offsetting receipts
- 902 Interest received by on-budget trust funds
- 903 Interest received by off-budget trust funds
- 908 Other interest
- 951Employer share, employee retirement (on-budget)
- 952 Employer share, employee retirement (off-budget)
- 953 Rents and royalties on the outer continental shelf
- 954 Sale of major assets