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Defense Budgeting Dynamics: The Relationships Among Late Budgets and Late Appropriations and the Content of Continuing Resolutions

December 2022

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Prepared for the Naval Postgraduate School, Monterey, CA 93943.

ACQUISITION RESEARCH PROGRAM
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ABSTRACT

To better prepare the Department of Defense (DOD) against the negative effects of late appropriations and their resultant continuing resolutions (CRs), our research covers three primary areas: 50 years of Presidential Budget (PB) submissions, Congressional Budget Resolutions (BR), and DOD Authorization and Appropriation Act data. First, our research conducts a historical trend analysis intended to highlight positive, negative, and neutral tendencies. Second, our research aims to determine which federal budgetary deliverable has the strongest correlation to appropriation timeliness. Finally, our research examines how CRs have evolved over time across six basic characteristics: frequency of CRs, CR anomalies, supplemental appropriations and anomalies, CR duration, CR page length, and funding rates. Our research indicated significant evidence to support that budgetary deliverable timeliness is getting worse, that political variables are both strongly correlated and highly influential throughout the data, and that CRs have dynamically shifted in funding structure, length, and frequency throughout the years covered by this research.

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To the fallen. You are not forgotten. We would like to thank Professor Candreva and Professor Armey for their compassionate help as we navigated this process. Our work would have been a garbled mess without the direction and guidance of our expert advisors. Finally, we would also like to thank our families for being understanding and supportive during the thesis research and writing process. Nothing would have been accomplished without the love and support of our families. Onward.

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LIST OF ACRONYMS AND ABBREVIATIONS

B3P	Building Better Budget Process
BR	Budget Resolution
CBO	Congressional Budget Office
CR	continuing resolution
CRS	Congressional Research Service
DOD	Department of Defense
FAR	Federal Acquisition Regulation
GAO	Government Accountability Office
HAC	House Appropriations Committee
HASC	House Armed Services Committee
HBC	House Budget Committee
MDAP	Major Defense Acquisition Program
MILPERS	Military Personnel
NDAA	National Defense Authorization Act
OMB	Office of Management and Budget
O&M	Operations and Maintenance
PB	President's Budget
SAC	Senate Appropriations Committee
SASC	Senate Armed Services Committee
SBC	Senate Budget Committee

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I. INTRODUCTION

A. MOTIVATION

To better prepare the Department of Defense (DOD) against the negative effects of late appropriations and their resultant continuing resolutions (CRs), our research covers three primary areas: 50 years of Presidential Budget (PB) submissions, Congressional Budget Resolutions (BR), and DOD Authorization and Appropriation Act data. First, our research conducts a historical trend analysis intended to highlight both positive, negative, and neutral tendencies. Secondly, our research aims to determine which federal budgetary deliverable has the strongest correlation to appropriation timeliness. Finally, our research examines how CRs have evolved over time across six basic characteristics: frequency of CRs, CR anomalies, supplemental appropriations and anomalies, CR duration, CR page length, and funding rates. The intention is to learn how the characteristics have changed over time so DOD can proactively adjust business practices to minimize waste and maximize efficiencies across budgetary functions.

The United States government routinely operates under restrictive funding laws, colloquially known as continuing resolutions, to avoid a shutdown of the government. Ideally, the federal government follows their established budgetary framework: the President submits a budget not later than the first Monday in February and Congress passes regular appropriation acts for the President to sign into law before the start of the new fiscal year on 1 October. However, in practice, this happens less than idealistically. When the budgetary process breaks down and the appropriation bills are not signed by the President before the start of the fiscal year, a CR must be passed to provide interim funding, or the government must shut down.

Although this research is focused on DOD appropriations, it is important to note there have been only two years where all 12 regular appropriation acts passed on time in the past 15 years. In that same timeframe, there have been three lapses in appropriations that necessitated a partial shutdown of the federal government (Arkin, 2022). Clearly, there is a problem within the current structure of the federal budget process. It is possible that a late President's Budget may cause Congress to submit late appropriation acts for the President to sign. Conversely, it is possible that the previous year's late appropriation acts may cause the PB to be submitted late; thus, causing the

current year's appropriation to be signed later into the fiscal year. Specifically for the DOD, when the appropriation act is not passed before the start of the fiscal year, the DOD must either swiftly curtail operations or, if an interim CR is passed, operate within the constraints of the CR.

CRs provide stop-gap funding, prevent government shutdown, and enable the DOD to continue to operate our vital military capabilities. However, CRs lead to funding uncertainty which is extremely detrimental to organizational efficiencies. The uncertainty of future funding leads to a hesitancy toward hiring new personnel and negatively impacts morale, recruitment, and retention (Joyce, 2012). Additionally, agencies operating under interim funding uncertainty tend to manage their budget inefficiently through short-term contracting, paying higher costs for services, continuing ineffective services, and delaying maintenance activities (Joyce, 2012). Further, the DOD is often negatively impacted by CRs and their restriction on new activities, meaning the DOD must delay important new programs (Williams & Roscoe, 2012). Admiral Gilday, speaking before the United States House Appropriations Subcommittee on Defense put it most eloquently, "CRs remove predictable funding levels that allow us to spend taxpayer dollars as efficiently as possible and deprive us of executing program line-items and new starts. They disrupt operational readiness, slow development of critical new capabilities, impede acquisition…and create business process inefficiencies" (Gilday, 2022, p. 3).

As the agency tasked to deter war and ensure our nation's security, the ability to have both reactive and proactive war-ready forces is paramount to our success and subsequently dependent on predictable funding. The DOD is required to always be prepared for conflict, so a government shutdown drastically lowers military readiness. Lower military readiness means our warships, planes, tanks, and people not performing as they should. Taken to the extreme, a government shutdown essentially takes our military out of the fight and the people of the United States lose their protection from all enemies, foreign and domestic. A government shutdown, which inherently threatens predicable funding, in turn, is catastrophic to our national security. Government shutdowns and stop-gap CR funding impose unnecessary risk upon the DOD. Our research aims to address several questions that may help better understand the current federal budgetary environment by contextualizing the past in order to eventually help further mitigate and/or eliminate the effects of funding uncertainty.

B. RESEARCH QUESTIONS

1. Within the current statutory federal budgeting framework, is there an event or deliverable that causes the other deliverables to be submitted late? Specifically, do late PBs cause late regular appropriations? Or, do the previous year's late appropriations cause the PB to be submitted late? And do other deliverables, like the Budget Resolution, affect the timeliness of the process?

2. How have DOD CRs changed over time? Specifically, has language changed within the CRs that imposed more restrictions and uncertainty? Has the use of anomalies increased? Have funding rates changed over time? Has the complexity of the CR changed? Increased page length? More frequent, but shorter duration CRs?

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II. BACKGROUND

This section provides a background on the federal budget process, timeline, and the impact of tardy budgets and/or late appropriations requiring stop-gap appropriations, commonly referred to as continuing resolutions (CR).

The Constitution, specifically Article 1, Sections 7, 8, and 9, provides Congress with the responsibility for revenue generation, borrowing, and spending decisions. However, the Constitution does not indicate a specific timeline for making budget decisions. The contemporary budget process aligns with the Congressional Budget Act of 1974 (the Budget Act) which marked major reform in the federal budget process. The Budget Act created a timeline for important budget decisions, to include the budget submission from the president, the Budget Resolution, and the regular appropriation bills (Aherne, 2022).

A. PROCESS AS DESIGNED

The budget process begins with the submission of the President's Budget. The Budget and Accounting Act of 1921 established "for the first time the requirement that the President annually submit a budget proposal to Congress…[by] 'the first day of each regular session' of Congress" (Yinug & Burgat, 2016, p. 1). The deadline for submission of the PB has been modified over the years, but always remained either in January or February. Currently, the PB is required to be submitted "on or after the first Monday in January, but not later than the first Monday in February" (Yinug & Burgat, 2016, p. 1). However, in practice, the President's Budget is often submitted late, especially during the first year of a newly elected president.

Historically, during years of presidential transition, the outgoing President would submit the budget and the incoming President would make modifications. Since 1990, when the law extended the due date for the President's Budget into February, every outgoing President has opted not to submit a budget (Riccard, 2021). Consequently, each incoming President after 1990 has submitted their first budget after the statutory deadline (Riccard, 2021). In order to submit detailed budgets, the office of the President works closely with the Office of Management and Budget (OMB) and the departments within the executive agency throughout the budgeting process.

After submission of the President's Budget, the Budget Act established for Congress to begin its budgetary procedures with a concurrent Budget Resolution. The BR provides a framework for and "represents a budget plan for the upcoming fiscal year and at least the following four fiscal years" (Heniff, 2015, p. 1). The House Budget Committee (HBC) and Senate Budget Committee (SBC), through the Budget Resolution, allocate the total budget authority to the respective Appropriations and Authorizations committees within each chamber of Congress. The Budget Act requires the Budget Resolution to be completed by 15 April; however, Congress has only passed a BR on time in six out of the past 41 years (Heniff, 2015).

If included in the Budget Resolution, the next step in the budget process is reconciliation legislation, which is to be completed by 15 June. Reconciliation is used to change current revenue, spending, and/or debt limit levels to align with current policies and priorities within the BR (Lynch, 2016). After the Budget Resolution, or reconciliation if required, Congress then begins work on the next steps: development and consideration of twelve regular appropriation bills and the National Defense Authorization Act (NDAA).

Specifically, for the Department of Defense, the House Armed Services Committee (HASC) and Senate Armed Services Committee (SASC) must pass the NDAA to approve programs and new starts within the defense budget. The NDAA "establishes and organizes the agencies responsible for national defense, sets policies for the department [of defense], and authorizes the appropriations of funds in accordance with 10 U.S.C. §114" (Torreon & Plagakis, 2021, p. 1). Simply put, the NDAA is another means for which Congress can provide oversight and influence the DOD's programs and activities.

Concurrently, the appropriation bills drafted by the House Appropriations Committee (HAC) and Senate Appropriations Committee (SAC), to include Department of Defense appropriation, must be passed before the start of the new fiscal year, 1 October. The Defense appropriation bill establishes budget authority for the DOD. Budget authority provides the ability for the DOD to obligate the government to withdraw funds from the Treasury to pay its bills (Torreon & Plagakis, 2021). Therefore, the appropriation bill is important to the DOD because it provides the necessary legal authority to finance its activities. Without legal budget authority the DOD must cease most activities until an appropriation is passed.

B. LATENESS AND INVERSIONS

Ideally, the budgeting process is sequential with Congress first passing a NDAA for all DOD programs and then Congress considers the appropriation bill; however, in practice the entire budget process is fluid with Congress most often working simultaneously on all aspects of the budget process. For example, sometimes an inversion occurs when the appropriation is passed before the NDAA (Torreon & Plagakis, 2021). Nevertheless, the two bills, NDAA and DOD appropriation, depend on one another—an appropriation should fund only authorized activities and an authorization should have a corresponding appropriation to provide budget authority. Consequently, if the appropriation bills are not passed, then Congress must either provide stop-gap funding through a CR or the government agencies associated with unpassed appropriations must shut down. Further, regular appropriation bills which are passed late into the fiscal year decreases the time available to formulate next year's budget and can potentially lead to late budget submissions in the following fiscal year.

Conversely, late President's Budget submissions decrease the time available for Congress to pass a Budget Resolution, authorizations, and appropriations which can potentially lead to the need for stop-gap CR appropriations and partial-or-full government shutdowns. Our research hopes to determine which of these milestones within the budget process—President's Budget, Budget Resolution, regular appropriation—is causing appropriations to be passed late or budgets to be submitted late. Does the submission of a late President's Budget affect the timeliness of the BR and/or regular appropriations? Or does the date of the Budget Resolution passage cause the regular appropriations to be passed late? Moreover, does the previous fiscal year's late appropriation drive the need for the President to submit their budget late?

C. CHARACTERISTICS OF CONTINUING RESOLUTIONS

Timeliness throughout the budget process is important because CRs are used to avoid government shutdowns and can negatively impact agency operations. There are two types of CRs, interim and full-year, which are used to "preserve congressional prerogatives to make final decisions on full-year funding and [to] prevent a funding gap and corresponding government shutdown" (Brass, 2012, p. 3). Typically, interim CRs impose restrictive funding levels, restrict new programs from initiation, create added levels of paperwork, complexity, and uncertainty.

Testimony before Congress from General Martin, Vice Chief of Staff, United States Army, echoed the negative sentiment surrounding operating within the constraints of a CR. General Martin, speaking before the United States House Appropriations Subcommittee on Defense, quipped, "when you combine the delays in procurement and prototype advancement on top of the disruption in timelines for construction and development of critical Army and Joint technologies, there is a compounding effect which will likely disrupt the Army's ability to sustain readiness and achieve modernization goals" (Martin, 2022, p. 3). Further, there is no standard format for a CR as they have evolved over time, so it will be interesting to compare them and review if/how they have changed. There are, however, some general characteristics that comprise most CRs: coverage, duration, text length, funding rate, purpose, and anomalies (McClanahan et al., 2019).

Coverage determines which activities the CR is applicable to. Coverage is important because a CR might only apply to some activities within DOD, but not all activities in which a certain program requires (McClanahan et al., 2019). Our research will help to determine if coverage of CRs has changed over time or if coverage has remained somewhat stable and standardized.

Duration is the period for which budget authority is provided for covered activities and is classified as either interim or full-year (McClanahan et al., 2019). Interim duration are CRs that provide temporary, stopgap funding, until a regular appropriation or subsequent CR is passed. Full-year CRs cover the entirety remaining of the fiscal year in lieu of regular appropriations and end on 30 September (Brass, 2012). Our research will determine if the duration of a CR has changed over the course of time. Specifically, we will look at each fiscal year with respect to how long and how many CRs were enacted each year. Similarly, we will examine the page length of each CR. There is concern that increased page length could be correlated to a CR that assimilates too closely to an appropriation. The higher the number of pages a CR has could potentially lead to higher complexity and decrease DOD efficiency when executing under a CR.

Funding rate is another characteristic of a CR and is either determined by a specified rate, which can be derived formulaically, or specifically mentioned from actual text of a regular appropriation (McClanahan et al., 2019). Therefore, we will classify CR funding rates over time as either formulaic, full-text, or a hybrid of both. Full-text CRs incorporate the text of one or more regular appropriations bills for the current fiscal year whereas formulaic CRs utilize a formula to

set a funding rate (Towell et al., 2019). Identifying trends for the funding rate of CRs over time will help to provide more clarity and increase assumptions made during the previous years' budgeting process.

The purpose component of CRs is another important characteristic to be tested. Generally, CRs have had provisions that included language prohibiting new activities or programs (new starts) and prohibitions on avoiding limitations imposed by previous appropriations (McClanahan et al., 2019).

Lastly, anomalies, which incorporate exceptions to the characteristics of coverage, duration, text length, funding rate, and purpose, are often used by Congress to maneuver around the restrictions imposed by a CR (McClanahan et al., 2019). Additionally, supplemental appropriations function as a quasi-anomaly by providing additional budget authority which circumvent the regular or continuing appropriation (Lynch & Saturno, 2022). Supplemental appropriations are important for our research because they are used frequently to provide funding for contingency operations and natural disasters. Furthermore, similar to CR anomalies, supplemental appropriations are "introduced without being first marked up or otherwise considered by the Appropriations Committees" which provides Congress another means for which to circumvent the restrictions imposed by a CR (Lynch & Saturno, 2022).

Our research will account for CR anomalies and supplemental appropriations to determine if there has been a pattern developed over time. Specifically, we will account for whether there has been an increase in the use of anomalies or supplemental appropriations over time. Has there been a recent increase in use of DOD anomalies and supplemental appropriations to circumvent CR restrictions? Has there been a pattern by Congress of allowing for the purpose of CR funds to be exempted? Has the use of supplemental appropriations or CR anomalies increased over time? Our research will attempt to quantify the use of anomalies and supplemental appropriations and provide historical trend analysis.

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III. LITERATURE REVIEW

Punctual passage of annual appropriations bills is more of the exception rather than the norm. For that reason, there is ample discussion on the effects late appropriations have on Department of Defense (DOD) purchasing power. With respect to budget reform, history along with a growing deficit suggests there are many options and unlimited opinions to improve this process. This review will cover a snapshot of each budgetary deliverable, complications that come along with serving the public interest. Additionally, we will cover the specific DOD business practices that are affected by late appropriations and how we attenuate our business practices to manage within the constraints of these late appropriations. Finally, this review will cover budgetary reform recommendations. This review sets the foundation for our research and follow-on discussion that investigates the struggles and delays from the flow up of budget requests from the programmatic level to the service, to the department, to the Office of Management and Budget (OMB) and the President, across to Congress and then the flow-back down in the form of funding (appropriations) and authority to establish, continue or modify federal programs (authorizations).

There is a notion that the reason the deficit is so large and that appropriations are always late is because Congress is under resourced, or simply, they do not work hard enough. This notion certainly is controversial. However, for every principal decision-maker in Congress there is an army of highly proficient, trained, and educated economists and budget analysists by their side. These teams' aggregate, forecast, and analyze an astonishing amount of information in an effort to best inform these decision makers. In her article, "The Political Economy of Budget Deficits: Reform of the Budget Process," Rivlin puts it best: "Everyone works very hard. No government in the world devotes as much, time, energy, and talent to budget decision making as ours does…nevertheless, almost everyone is unhappy" (Rivlin, 1984). So, the question is, why? Rivlin argues that the issues surrounding our federal budget do not stem from the process, but rather from the sheer size and complexity of the government, and that Congress's time and energy is misaligned. Her stance is that Congress is too focused on the details that should be left to the executive departments, state, and local government and reluctant to focus on major direction in policy (Rivlin, 1984). Her solutions, with respect to time management, include two parts:

- Make decisions less often (i.e., every two years vs. annually)

- Eliminate/combine some of the budgetary stages and/or deliverables (i.e., combine authorizations and appropriations).

The obvious problem with reform that stands to simplify a process is the inherent reduction in checks and balances. However, Rivlin's stance is that the simplification is not a reduction in checks and balances, but more of a reinvigoration of governmental responsibility back to their core function. Simply realigning the limited resources of time and decision-making bandwidth back to their appropriate levels will allow deliverables to move more swiftly through the approval process.

As a citizen, we may condemn Congress for our dissatisfaction with their appetite for deadlines. However, it important to appreciate one of the perspectives on the primary objective of good stewardship of public funds. The primary objective is to authorize, appropriate, apportion and obligate funds in ways that are most aligned with serving the public interest (Cohen & Eimicke, 2008). This is the common theme throughout their book, The Responsible Contract Manager. This does not necessarily mean the least expensive or the quickest good or service to fulfil the mission, but the good or service that is most suited to serve public interest. On a small scale this dynamic is insignificant, but on the programmatic level it is exacerbated and speaks volumes. And so deadlines may come and go, but the appreciation that Congress's inaction may in fact be in the best interest of the public interest should not be understated.

There are two primary goals in federal acquisitions which help amplify the complexity of deadline punctuality within our federal budgetary process: procurement-type goals and non-procurement type goals. "Procurement-type goals address the efficiency, timeliness, and effectiveness of the system to acquire the goods and services required by government programs while non-procurement type goals reflect the variety of ways procurement systems are used to influence other policy objectives" (Brien et al., 2022, p. 3). An example of these policy objectives is highlighted within our Federal Acquisition Regulations (FAR) socioeconomic programs which include Small Business Set-Asides, Small Disadvantaged Business Program, 8(a) Program, Woman-Owned Small Business Program, Service-Disabled Veteran Owned Small Business Program, and the HubZone Program. While this may seem trivial, consider the Congressional subcommittee inaction that could stem from partisan disagreements between specific authorization

bill verbiage that may affect their constituents and the appropriations to fund major programs – these non-procurement type goals play a significant effect on decision making.

As continuing resolutions continue to solidify as the norm rather than the exception, there are both behavioral and procedural changes that take place across the government and specifically within the DOD that result from the uncertainty and the increased administrative burden caused by late appropriations. The DOD has evolved business practices to cope with these burdens. For example, the DOD routinely initiates service contracts far into the fiscal year to avoid CR impacts (Field, 2021). Similarly, the DOD shifts nonessential purchases and training outside of the first quarter to circumvent CR restrictions (Field, 2021).

As outlined by the Government Accountability Office (GAO), there are nine standard continuing resolution provisions and the three that most impact the DOD are limited funding actions, no new starts, nor any production rate increases (Field, 2021). First, we discuss the complications that the DOD faces with respect to the Limited Funding Actions provisions. One of the primary solutions the military services utilize to mitigate the risk of over-obligating is to constrain their obligation rate to the most restrictive rate during a continuing resolution. This procedural change ensures that they do not incur an Anti-deficiency Act violation. These restrictions have significant effects across the operational spectrum. From the strategic level all the way down to the tactical level, operating with the most restrictive obligation rate effects planned training, deployment workups and underway time (fuel consumption).

Next, we discuss the complications that the DOD faces with respect to the No New Starts and Production Rate Increases provisions. For example, our most visible, expensive, and public interest major defense acquisition programs (MDAPs) are heavily strained by these restrictive provisions. The GAO outlines the specific issues with these provisions which can "delay the initiation of new acquisition programs, the transition of existing acquisitions programs from the research and development phase into the procurement phase, and the increase of an acquisition program's production rate, which may result in cost increases to those programs" (Field, 2021). If not properly managed, this constraint can very quickly violate the Purpose Statute and have an even more tangible effect on the defense industrial base.

Another detrimental effect of late appropriations and their resultant continuing resolutions is the hinderance to hiring of DOD civilians. DOD civilian salaries are chargeable to Operation & Maintenance (O&M) accounts versus the Military Personnel (MILPERS) for uniformed personnel. This dynamic, the fact that DOD civilians are paid from O&M, enables agency to mitigate some risk to operational units worldwide by implementing immediate hiring freezes and or to consider dismissal of temporary employees (Belasco, 2013). This temporary preservation of O&M funds reserved for personnel can then be reapportioned to more near-term mission essential needs, while not violating fiscal law under the conservative continuing resolution spend rate.

The DOD has adopted multiple business practices to operate amidst continuing resolution pressures and to move forward smartly amongst these constraints. The GAO identified the following business practices as practical solutions to mitigate disruptions while operating in a continuing resolution:

- Initiate service contract start dates after the first quarter of the fiscal year.
- Postpone nonessential purchases and training until later in the fiscal year.
- Develop legislative anomaly proposals.
- Creating spend plans: required by all the military services to provide spend plans in the event of a 30-day, 60-day, and 90-day continuing resolutions for the upcoming fiscal year.
- Adjusting contracts to reflect funding availability (Field, 2021, p. 3).

While this is not an all-inclusive list, it does illustrate the procedural changes and administrative burdens the DOD faces, and the value that targeted budgetary reform could help resolve.

The most comprehensive and non-partisan federal budget reform discussion came out of the 501(c)(3) non-profit Convergence Center for Policy Resolution and their Building a Better Budget Process Project (B3P) initiative. This initiative brought together twenty-three (23) ideologically diverse subject matter experts from across both government and industry to identify "practical, politically realistic proposals to improve the often dysfunctional federal budget process" (Convergence Center for Policy Resolution [Convergence], 2018, p. 5). After nearly sixteen (16) months of valuable collaboration, the Convergence Center for Policy Resolution delivered five primary recommendations:

- Budget Action Plan - negotiated by the President and Congress at the beginning of a new Congress and enacted into law—to synchronize the budget cycle with the electoral cycle and to change expectations for the process. The plan would make certain key fiscal decisions – setting discretionary funding levels and adjusting the debt limit, for example – for a two-year period.
- A Fiscal State of the Nation Report - published every four years at a key point in the national election cycle, to make the federal budget more accessible to the American public and elevate the discourse about the country's finances.
- A review of the performance of portfolios of federal programs that involve long-term or inter-generational commitments (e.g., retirement security, health coverage, education or national security). This review conducted by Congress, through the Government Accountability Office, would reinforce the importance of the long-term effects of budget decisions.
- Strengthening the Budget Committees by revising the membership rules and assigning responsibility to create new expectations for the budget process so that Congress and the public can expect more timely action on budget decisions.
- Investment in agencies that support the congressional budget process, including the Congressional Budget Office (CBO) and the Joint Committee on Taxation (JCT), so these institutions can continue to provide high-quality and independent information the nation relies on in making budgetary choices (Convergence, 2018, p. 5).

An alternative perspective to the construct of the Budget Act of 1974 is to eliminate the Budget Resolution entirely. Fisher argues that it is not necessary nor possible to place total fault, and conversely, not appropriate to absolve all responsibility from the Budget Act for budgetary shortfalls (Fisher, 1985). He contends the Budget Act has made a difference, but to what extent is in the eye of the beholder. Originally, the BR was intended to establish macroeconomic policy and for Congress to agree on broad issues around budgetary policy. It was specifically intended to not be overly detail oriented. Congressman Richard Bolling, while speaking about budget reform, said the Budget Resolution "does not get into particular programs, agencies, appropriations, or projects. To do so would destroy the utility of the congressional budget process as in instrument for making national economic policy" (Fisher, 1985). However, as time passed, the BR has morphed into a document with increasingly more detail than intended, and today's resolutions include discussions down to the programmatic level, which was never the intent.

These increasingly detailed resolutions move the pendulum from a macroeconomic budgeting tool to more of a political instrument to protect and promote intra-jurisdiction programs, which is a far stretch from the Budget Resolution's original core identity. A detailed BR wastes limited Congressional resources of time and money and takes away from the ultimate goal of a timely appropriations bill that is in line with national priorities. Additionally, Fisher argues that a more detailed Budget Resolution causes confusion on the budget, "as matters stand now, there is chronic confusion about which budget is the budget: the president's, the first budget resolution, the second budget resolution, the second budget resolution revised, or a succession of re-estimates, updates, and revised baselines." This confusion resonates with both law makers and the public and retracts from the reform objectives of the Budget Act. For this reason, Fisher takes the stance that an elimination of the Budget Resolution might reinvigorate the President's Budget. Additionally, removing the BR allows more time for Congress to debate and deliberate the contents of the President's Budget, down to the granularity desired, allowing more time to pass the appropriations bill on time.

In an effort to make a recommendation that can have actionable effect, this research needed to be targeted due to the sheer scope of the federal budget and all stakeholders involved. This research aimed to tackle where (by quantifiable data) the best place to direct personnel and resources to begin budget reform. This research will determine whether early, on time or late submissions/adoptions/enactments of each individual budgetary deliverable has the strongest correlation to the next chronological event. The intent is to identify which event has the most impact on appropriation timeliness so that further research can work to identify which organizations and inputs into that deliverable are liable for that event to be tardy. While there is a potential there is no significant correlation amongst each event, this will suggest that a more holistic approach to budget reform may be required (i.e., cultural change, leadership, discipline, etc.).

IV. METHODOLOGY

A. APPROPRIATION TIMELINESS DATA

The appropriation timeliness data for this research was aggregated from numerous sources to build one comprehensive data set. Data collection came primarily from Congressional Research Service (CRS) reports and then was supplemented by each deliverable's source document for the years that were not covered by the reports. The President's Budget data was pulled from CRS for years 1976 through 2017 (Yinug & Burgat, 2016) and the remaining Presidential budget submission dates were pulled directly from their source reports (GovInfo, n.d.). The Congressional Budget Resolution data came from CRS for years 1976 through 2016 (Heniff, 2015) and the remaining Congressional Budget Resolution dates were pulled from the CRS Appropriation Status Table database (CRS, n.d.). The Authorization and Appropriation data was pulled from CRS which included all years (Salazar & Plagakiz, 2021).

Throughout this research we referenced our appropriations timeliness data around five common descriptors: *statutory days*, *workable days*, *real workability ratio*, *actual days*, and *days late*. Each of these descriptors has subtle but important nuances which are outlined as follows.

First, *statutory days* is the time (number of days) as allotted by regulation or statute between deliverables. For example, from PB to BR, this is the count of days from the 1st Monday in February to the 15th of April. Statutory days gives the count of days organizations should have, by statute, to complete deliverables.

Second, *workable days* is the amount of time between when a previous deliverable was submitted (for a PB), adopted (for a BR), or enacted (for authorization & appropriations), which could be early or late, to the statutory deadline of the deliverable being assessed. For example, if the PB was submitted seven days after the first Monday in February, then *workable days* would be seven days less than *statutory days* in the same fiscal year. *Workable days* gives the count of days organization do have, in practice, to complete deliverables.

Third, *real workability ratio* is simply the ratio between *workable days* and *statutory days* which is *workable days* divided by *statutory days*. This ratio tells us the percentage of time organizations do have in practice compared to the amount of time they should have by statute. Any

number less than 100 percent means an organization has less time than designed to complete their deliverable.

Fourth, *actual days* is the amount of time between when a previous deliverable was submitted, adopted, or enacted, which could be early or late, to when the deliverable that is being assessed was submitted, adopted, or enacted which could also be early or late. This descriptor tells us the amount of time the organization actually took to complete the deliverable.

Finally, *days late* is the amount of time between when a deliverable was submitted, adopted, or enacted to its corresponding original statutory deadline. Of note, the statutory deadlines have subtle changes over the course of history (for example, the first Monday in February could be as early as the first or as late as the seventh) and our data set accounts for these subtleties.

The primary objective when organizing our appropriation timeliness data (PB, BR, authorization & appropriation) was to be able to analyze it quantitatively. Our analysis is focused around two complementary elements, *real workability ratio* compared to *days late* and then *days late* compared to *days late* between deliverables. To do this, we compared all deliverables to a preceding event or anchor. Depending on our analytic problem statement these anchors differ but include either the statutory or the actual submission, adoption, or enactment date of one of the deliverables. By comparing our data between deliverables and anchors we were able to convert the unit from calendar dates to numeric days, which made follow on quantitative analysis more constructive.

B. CONTINUING RESOLUTION DATA

The CR data used in this project was collected to identify if, and how, CRs have changed over time. The Congressional Research Service has a website that includes an appropriations status table which provides the full text of all CRs dating back to 1999 (CRS, n.d.). The CRs are arranged chronologically by fiscal year and include all supplementals in PDF format.

The data was extracted from the full-text CR and placed into a Microsoft Excel file in order to better analyze how CRs may have changed over time. The data is compiled by fiscal year, with each CR as a line item. Specifically, the data was broken down into the important characteristics of CRs and placed into columns.

First, there are the number of CRs that occurred during each *fiscal year*. Next is the *coverage* of the CR—is it covered by a previous appropriation or a specific draft? Following coverage is the beginning and ending date of the CR. Upon identifying the beginning and end date, the total *duration* of each CR can be identified and compared across fiscal years. Additionally, a simple average, the mean, can be computed and compared as well. Further, *page length* is recorded for each CR and the mean is calculated to compare across time.

Next, the *funding rate* is identified as *formulaic*, *full-text*, or a *hybrid*. The number of *purpose* clauses, the corresponding section number, and description of each is also ascertained. Next, the number of DOD CR *anomalies* are identified, along with a description and the corresponding section number. Lastly, the number of DOD *supplementals* in each CR are identified and a description of each provided.

The primary objective when organizing our CR data was to be able to analyze it both quantitatively and qualitatively. Our quantitative analysis is focused around two complementary elements: *anomalies* compared to *fiscal year* and *supplementals* compared to *fiscal year*. To do this, we compared the frequency and length of CR characteristics horizontally across time and noted the rate of increase or decrease in each characteristic. Furthermore, qualitatively, our research compared the content of each CR with respect to the funding rate, anomalies and supplemental appropriations to determine if the language was similar across time, or if the content changed significantly over time.

Due to time constraints, and in order to better compare CRs across time, two CRs were selected from the 1960s, 1970s, and 1980s. Specifically, 1964 and 1965 for the 1960s, 1974 and 1975 for the 1970s, and 1984 and 1985 to represent the 1980s. All other methodology and procedures remained the same.

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V. PRESENTATION OF RESULTS

A. HISTORICAL TREND ANALYSIS OF FEDERAL BUDGETARY DELIVERABLES

Prior to any serious analysis into the correlation amongst the federal budgetary deliverables, a historical trend analysis of each individual deliverable needed to be studied for foundational context. The intention was to graph the data in a distinctive way to see if there were any visual cues which constituted further analysis. This more holistic perspective confirmed our bias that these deliverables are in fact more so late than on time, that they are steadily getting tardier over time, and finally that there are some political patterns.

1. Distribution of President's Budget Timeliness

a. Question

Through simple visual analysis we looked for outliers. Are there any noteworthy patterns within President's Budget trend analysis? How have President's Budgets timeliness evolved over time? Was there a period or Presidential term year that was timelier? Are presidential inauguration years different?

b. Data Manipulation

Data was organized by fiscal year and count of days the President's budget was late. Then, data was graphed into a bar chart with Tableau and manipulated via Excel's data analysis tool pack descriptive statistics feature.

c. Presentation

The President's Budgets count of days late by fiscal years is presented graphically in Figures 1 and 2. Number of days late (or early) is represented on the vertical axis while fiscal years are represented on the horizontal axis. Average and trend lines were added to the bar charts. Additionally, Table 1 shows the summary statistics to include central tendency of the distribution, spread of data, and skewness for both number of days President's budget was late and then controlled for and excluding Presidential inauguration years.

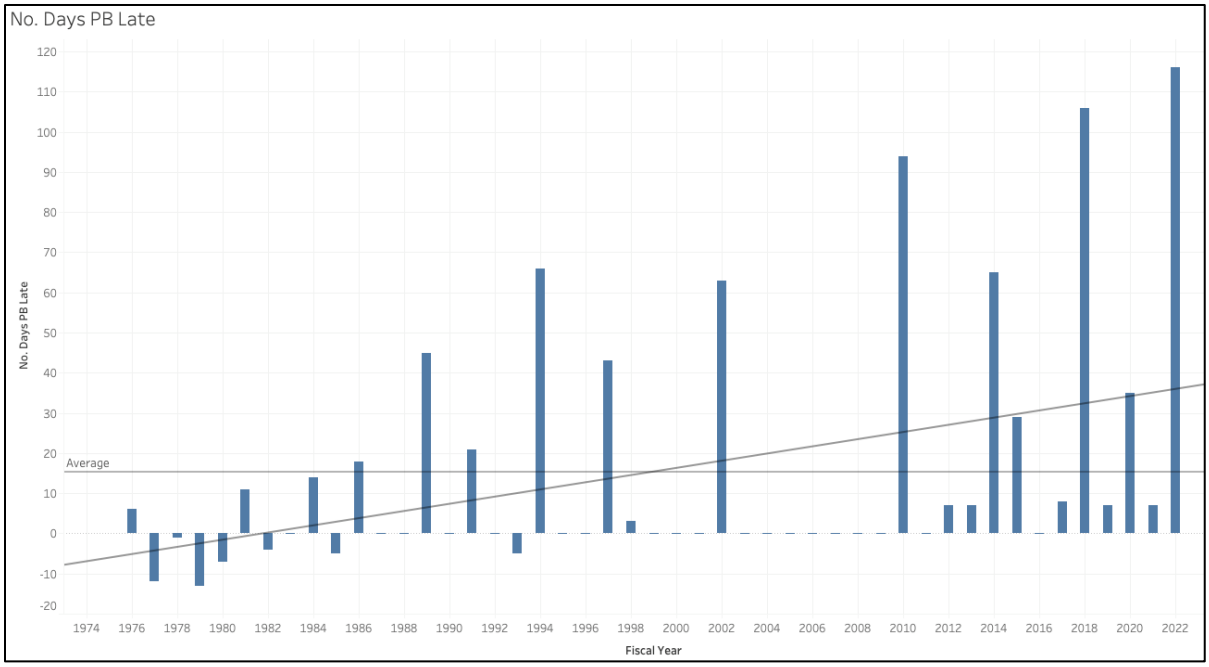

Figure 1. Number of Days President's Budget Late

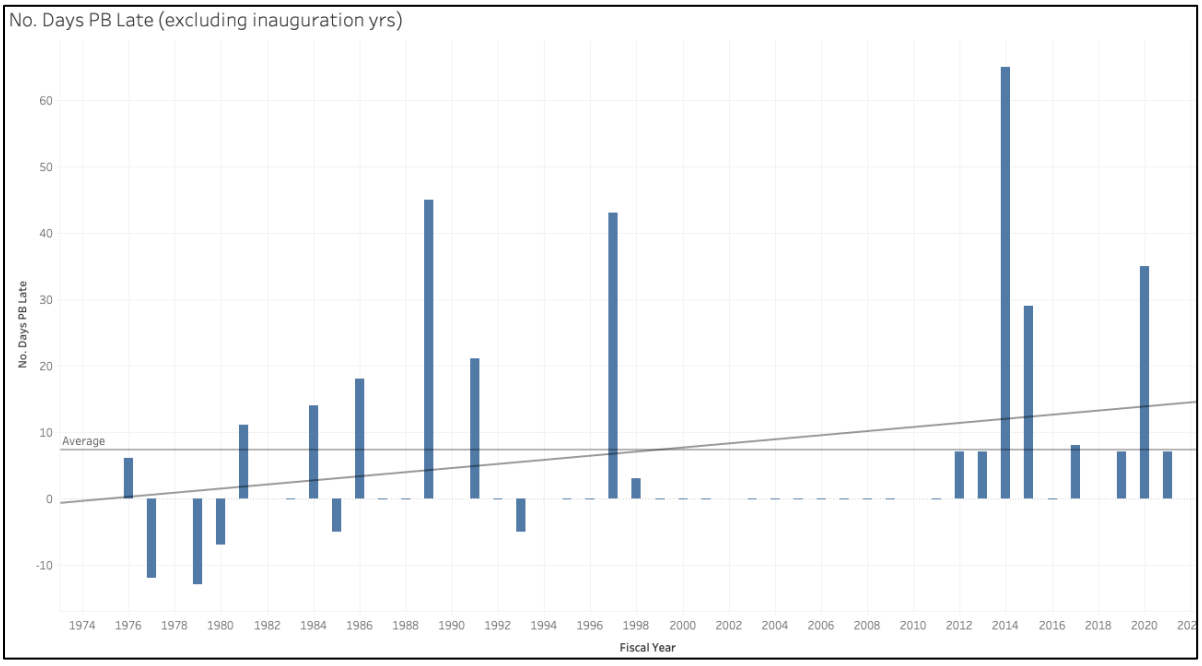

Figure 2. Number of Days President's Budget Late (Excluding Inauguration Years)

Table 1. Summary Statistics Number of Days President's Budget Late

No. Days PB Late		*No. Days PB Late (Excluding Inauguration Yrs)*	
Mean	15.40425532	Mean	7.282051282
Standard Error	4.443150991	Standard Error	2.58406534
Median	0	Median	0
Mode	0	Mode	0
Standard Deviation	30.46070853	Standard Deviation	16.13748288
Sample Variance	927.8547641	Sample Variance	260.4183536
Kurtosis	3.421222714	Kurtosis	4.045692119
Skewness	2.012445642	Skewness	1.967261126
Range	129	Range	78
Minimum	-13	Minimum	-13
Maximum	116	Maximum	65
Sum	724	Sum	284
Count	47	Count	39
Confidence Level (95.0%)	8.943599074	Confidence Level (95.0%)	5.231166793

d. Description

As the chronological first step in the annual federal budgeting process, one could argue that a timely and robust President's Budget is the most pivotal deliverable for a smooth and efficient fiscal cycle. In the last 47 years, there has been tremendous ebbs and flows with respect to timeliness of the President's Budget. The President's Budget was delivered to Congress either on time or early on 26 occasions, with it being submitted exactly on the deadline on 19 occasions. The President's Budget was submitted late the remaining 21 occasions with an average tardiness of 14 days. These simple statistics speak only toward the timeliness; however, the content is the contentious aspect as it moves along in the federal budgeting process.

Visually, there are three noteworthy highlights to point out. First, you can see that in the early years between 1976 and 1990 Presidential administrations were more consistent. In those 15 years only two President's budgets were submitted in excess of the 47-year average. Secondly, the 2000s were near flawless. Apart from fiscal year 2002, every single other President's budget was submitted exactly on deadline. Finally, between 2010 and current, six of the last 13 years were

submitted in excess of the 47 years average. Moreover, the first, second and third most tardy President's budgets in this data set occurred since 2010.

Statistically, the full data set shows a very loose collection of data with a predictable mean, large standard deviation, wide range, leptokurtic distribution, and a positive right-side skew. Of note, Presidential Budget submissions were delivered to Congress as early as 13 days (Pres. Carter) before the deadline to as late as 116 days (Pres. Biden) with the average at 14 days late. While these numbers are alarming, the fact that both median and mode are zero, and that the President's Budget was delivered on time or early more frequently than it was late, 26 versus 21 years respectively, indicates that the significant spike years were skewing this data. Additionally, the leptokurtic distribution (kurtosis > 3), corroborates this assessment that the data is skewed by significant outliers.

When we controlled for Presidential inauguration year (removed the first term of a new President from the data set) there are three noteworthy highlights. First and visually, because the scale on the vertical axis has a smaller range, you can see the data set is much tighter and more consistent across the board. Additionally, the summary statistics shows a much tighter range as indicated by Presidential Budget submissions were delivered to Congress as early as 13 days (Pres. Carter) before the deadline to as late as 65 days (Pres. Obama in his 5th term year) with the average at 7 days late. Secondly, both the mean and standard deviation are roughly half that of the full data set. Lastly, the slightly larger kurtosis (4.05 vs 3.42) shows a steeper peak in the distribution and the smaller skew (1.97 vs. 2.01) show a tighter right-sided tale. Both descriptors indicate a tighter data set when we control for Presidential inauguration year.

2. Distribution of Budget Resolution Timeliness

a. Question

Through simple visual analysis we looked for outliers. Are there any noteworthy patterns within Budget Resolution trend analysis? How have Budget Resolution timeliness evolved over time? Was there a decade that got it right? Are there significant differences between the full data and the data controlled for Presidential inauguration years?

b. Data Manipulation

Data was organized by fiscal year and count of days the Budget Resolution was late. Then, data was graphed into a bar chart with Tableau and manipulated via Excel's data analysis tool pack descriptive statistics feature.

c. Presentation

The Budget Resolution count of days late by fiscal years is presented graphically in Figure 3. Number of days late (or early) is represented on the vertical axis while fiscal years are represented on the horizontal axis. Average and trend lines were added to the bar charts. Additionally, Table 2 shows the summary statistics to include central tendency of the distribution, spread of data, and skewness for both number of days the Budget Resolution was late and then controlled for and excluding Presidential inauguration years.

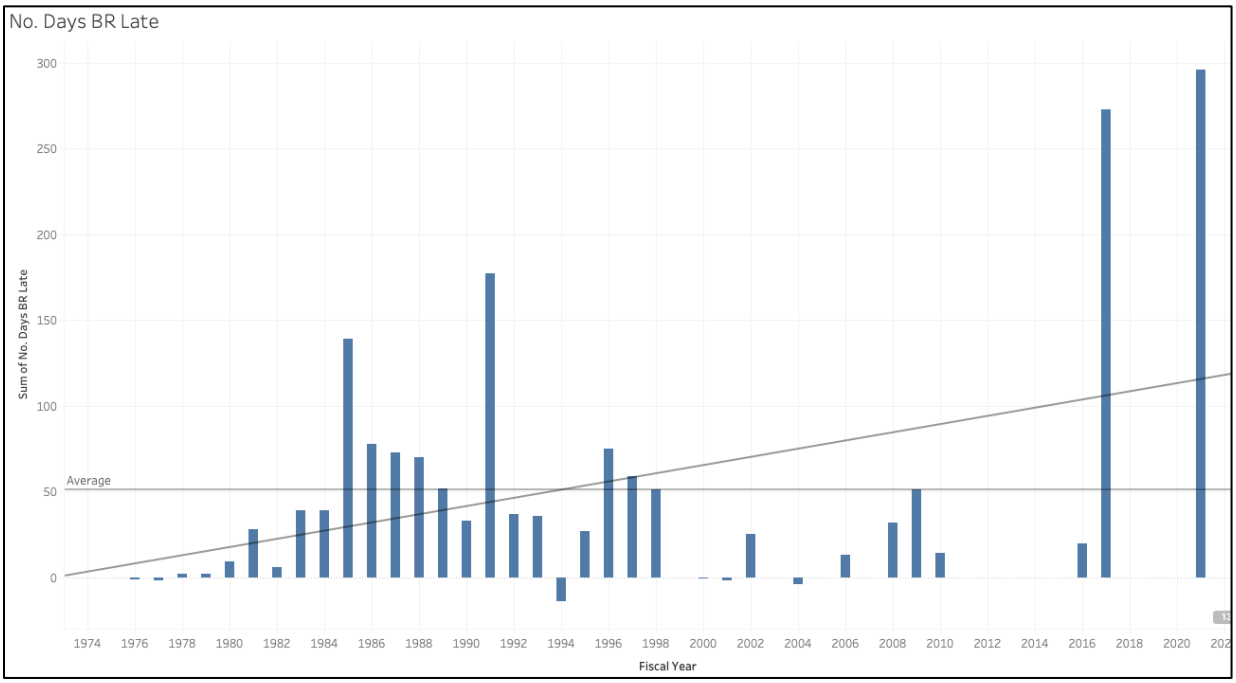

Figure 3. Number of Days Budget Resolution Late

Table 2. Summary Statistics Number of Days Budget Resolution Late

No. Days BR Late		*No. Days BR Late (Excluding Inauguration Yrs)*	
Mean	50.97058824	Mean	59.53571429
Standard Error	12.26769778	Standard Error	14.35550907
Median	32.5	Median	38
Mode	-2	Mode	-2
Standard Deviation	71.53235559	Standard Deviation	75.96221387
Sample Variance	5116.877897	Sample Variance	5770.257937
Kurtosis	5.634315676	Kurtosis	4.323391971
Skewness	2.355845263	Skewness	2.121818964
Range	310	Range	300
Minimum	-14	Minimum	-4
Maximum	296	Maximum	296
Sum	1733	Sum	1667
Count	34	Count	28
Confidence Level (95.0%)	24.95881879	Confidence Level (95.0%)	29.45507158

d. Description

The Congressional Budget Resolution is the overall budget plan for the following fiscal years. It serves as an agreement between the House and the Senate on the budget framework for the country so that subsequent legislation and discussions during Congressional sessions are aligned. It holds the upper and lower boundaries in which each subcommittee operate and without it each subcommittee is strained for proper direction. This deliverable never crosses the President's desk. In the last 47 years, the Congressional Budget Resolution was adopted either on time or early on six occasions, with it being submitted exactly on the deadline on one occasion. The Budget Resolution was submitted late the remaining 28 occasions with an average tardiness of 50 days. Additionally, Congress omitted adopting a Budget Resolution 13 times.

Visually, there is one noteworthy highlight to point out. There is a clear shift in congressional priorities with respect to budget resolutions. From 1976 through and including 1998 there was a budget resolution submitted for every fiscal cycle albeit still primarily late. However, from 1999 through current, 13 of those 24 years no budget resolution was submitted by congress at all.

Statistically, the full data set shows another loose collection of data with a predictable mean where median may be a better measure of central tendency, inflated standard deviation, huge range, highly leptokurtic distribution, and a highly positive right-side skew. Of note, Budget Resolutions were adopted by Congress as early as 14 days before the deadline to as late as 296 days for a range of 310 days with the average at 51 days late. This statistic alone sheds light on the unreliability of a timely budget resolution. Additionally, this data set is highly leptokurtic as indicated by a value greater than 3 (actual 5.63) which signifies the data is steeply distributed around the central tendency with heavy tales (significant outliers). Additionally, in conjunction with the high kurtosis the data also has a highly positive right-side skew, which indicates the data is heavily influenced by the four significant outliers (1985, 1991, 2017, and 2021).

When we controlled for Presidential inauguration year there is one noteworthy highlight. Unlike the President's budget, both the mean (59.54 vs. 50.97) and the standard deviation (75.96 vs. 71.53) are larger in the control group versus the full data set.

3. Distribution of Appropriation Timeliness

a. Question

Through simple visual analysis we looked for outliers. Are there any noteworthy patterns within Appropriation Act trend analysis? How has Appropriation timeliness evolved over time? Was there a decade that got it right? Are there significant differences between the full data and the data controlled for Presidential inauguration years?

b. Data Manipulation

Data was organized by fiscal year and count of days the Appropriation was late. Then, data was graphed into a bar chart with Tableau and manipulated via Excel's data analysis tool pack descriptive statistics feature.

c. Presentation

The Appropriation Act count of days late by fiscal years is presented graphically in Figure 4. Number of days late (or early) is represented on the vertical axis while fiscal years are represented on the horizontal axis. Average and trend lines were added to the bar charts.

Additionally, Table 3 shows the summary statistics to include central tendency of the distribution, spread of data, and skewness for both number of days Appropriations were late and then controlled for and excluding Presidential inauguration years.

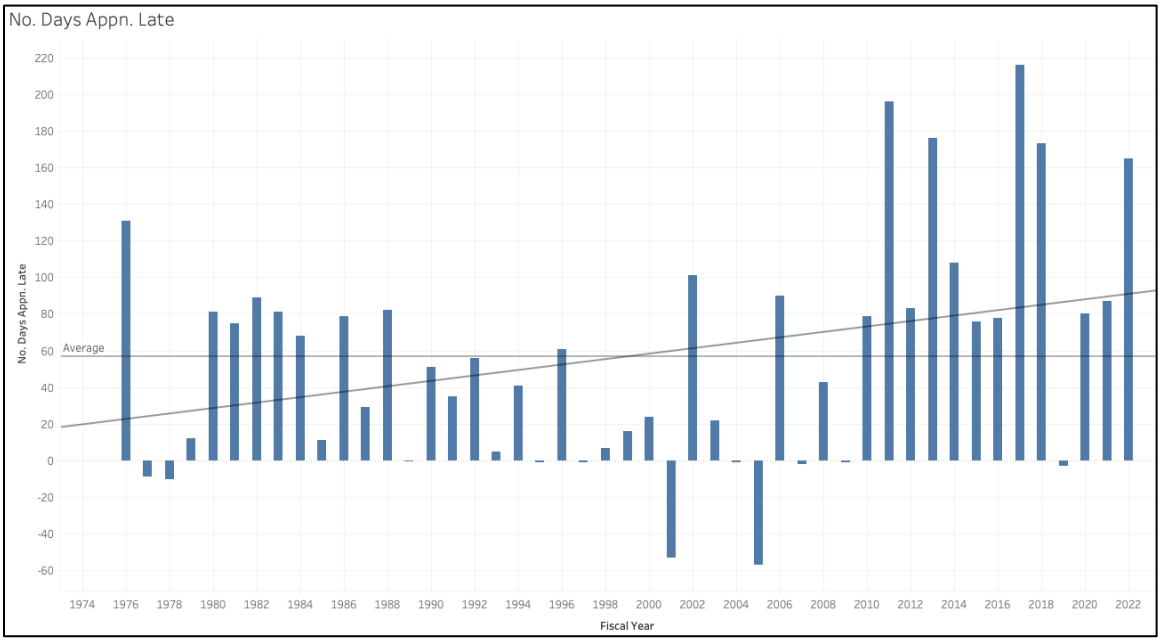

Figure 4. Number of Days Defense Appropriations Act Late

Table 3. Summary Statistics Number of Days Defense Appropriations Act Late

No. Days Appn. Late	
Mean	56.78723404
Standard Error	8.995421601
Median	56
Mode	-1
Standard Deviation	61.66950348
Sample Variance	3803.12766
Kurtosis	0.297646045
Skewness	0.651512886
Range	273
Minimum	-57
Maximum	216
Sum	2669
Count	47
Confidence Level (95.0%)	18.10684455

No. Days Appn. Late (Excluding Inauguration Yrs)	
Mean	50.76923077
Standard Error	9.722427121
Median	43
Mode	-1
Standard Deviation	60.71653791
Sample Variance	3686.497976
Kurtosis	0.897303655
Skewness	0.818158426
Range	273
Minimum	-57
Maximum	216
Sum	1980
Count	39
Confidence Level (95.0%)	19.68202472

d. Description

Finally, the enactment of authorizations and appropriations allows the government to operate with lawful obligations and expenditures from the Treasury. Specifically, within the DOD, Congress oversees the defense budget mainly through two yearly bills: the defense authorization and defense appropriations bills. Though there are legislative procedures in place, the flow throughout the federal budgeting process does not always follow the idealistic path. In the last 47 years, the defense appropriation bill was enacted either on time or early on 11 occasions, with it being submitted exactly on the deadline on one occasion. The defense appropriation act was signed late the remaining 36 occasions with an average tardiness of 57 days.

Visually, there are two noteworthy highlights to point out. Firstly, in an otherwise gloomy representation of timeliness, there was a relatively positive stretch of time from 1989 through and including 2009 where there were only three years (1996, 2002, 2006) above the 47-year average. Additionally, during this same period there were two years (2001 and 2005) where the Defense Appropriations Act was signed appreciably earlier than the October 1st deadline. Secondly and on a more negative note, five of the six most significant negative outliers have occurred recently since 2010.

Statistically, the full data set shows a relatively tighter collection of data when compared to the President's budget and budget resolution data. Here, the mean and median are equally valuable as measures of central tendency, standard deviation is only slightly greater than the mean, nevertheless a huge range, platykurtic distribution, and a slightly positive right-side skew. Of note, Appropriation Acts were signed by the President as early as 57 days before the deadline to as late as 216 days for a range of 273 days with the average at 57 days late. Additionally, this data set is highly platykurtic (kurtosis < 3) which indicates thinner tails in the distribution and therefore less outliers.

When we controlled for Presidential inauguration year there are two noteworthy highlights. First, visually, and similarly to budget resolutions, the appropriations data appears to be relatively unchanged between full and controlled for data sets so the graph was omitted. Secondly, both the mean (50.77 vs. 56.79) and the standard deviation (60.72 vs. 61.67) are smaller in the control group versus the full data set.

4. Budgetary Deliverable Trends across Decade

a. Question

Through simple visual analysis we looked for general trends across each budgetary deliverable. Are there any noteworthy patterns across decades?

b. Data Manipulation

Data was organized by fiscal year then grouped into decades (1970s, 80's, 90's, 00's, 10's) and average count of days each budgetary deliverable was late. Then, data was graphed into a bar chart with Tableau.

c. Presentation

The President's budget, budget resolution, and appropriation average count of days late by decade is presented graphically in Figure 5. Average number of days late (or early) is represented on the vertical axis while decade is represented on the horizontal axis (left to right: 1970s, 80's, 90's, 00's, 10's). Average lines were added to the bar charts.

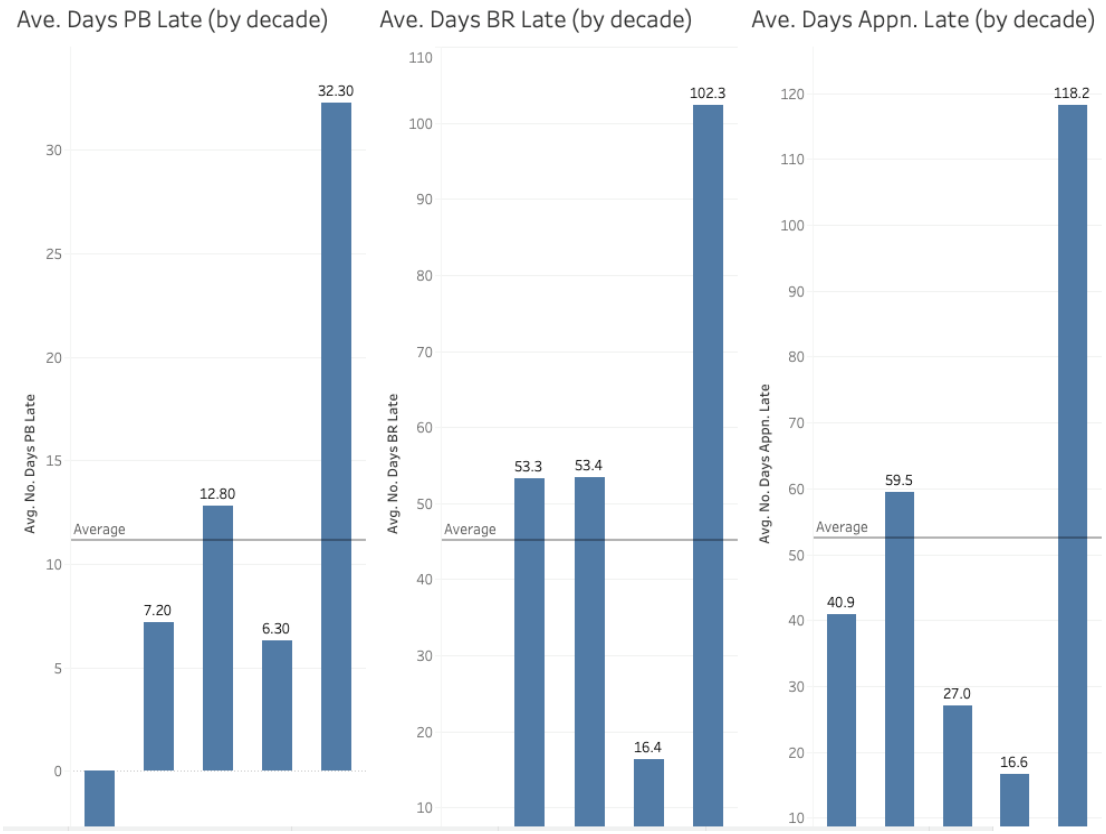

Figure 5. Average Number of Days Budgetary Deliverables Late by Decade

d. Description

Visually, there are two noteworthy highlights to point out. First, on a positive note, across all three deliverables, the 2000s are leading or nearly leading (PB: 1970s are 1st and 2000s are 2nd) in budgetary timeliness. Secondly and conversely, the 2010s are lagging in timeliness across all deliverables. Additionally, each deliverable from the 2010s was nearly twice as late as the second worst decade.

5. Budgetary Deliverable Trends across Presidential Term Year

a. Question

Through simple visual analysis we looked for general trends across each budgetary deliverable. Are there any noteworthy patterns across Presidential term year?

b. Data Manipulation

Data was organized by fiscal year then grouped into presidential term year (1st, 2nd, 3rd, 4th) and average count of days each budgetary deliverable was late. Then, data was graphed into a bar chart with Tableau.

c. Presentation

The President's budget, budget resolution, and appropriation average count of days late by presidential term year is presented graphically in Figure 6. Average number of days late (or early) is represented on the vertical axis while term year is represented on the horizontal axis (left to right: 1st, 2nd, 3rd, 4th presidential term year). Average lines were added to the bar charts.

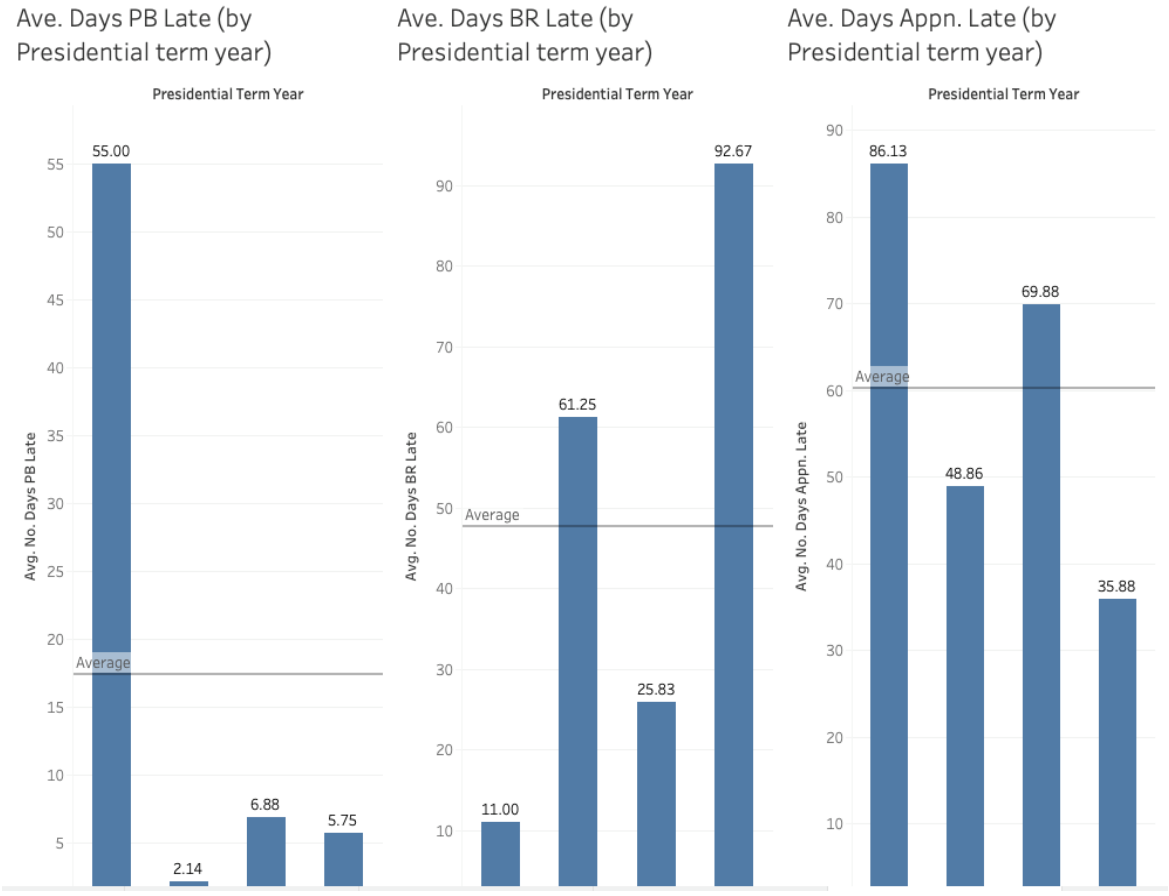

Figure 6. Average Number of Days Budgetary Deliverables Late by Presidential Term

d. Description

Visually, there are two noteworthy highlights to point out. First, Presidential budget submissions are drastically later (on average) in their presidential inauguration years. They are nearly 10 times as late as the second worst presidential term year. Second, there appears to be an inverse relationship between budget resolutions and appropriations when we grouped fiscal years by presidential term year. For a budget resolution that was submitted relatively early (when compared to the other grouped presidential term years), the corresponding appropriation was submitted relatively later (when compared to the other grouped presidential term years). Alternatively, for a budget resolution that was submitted relatively later (when compared to the other grouped presidential term years), the corresponding appropriation was submitted relatively earlier (when compared to the other grouped presidential term years).

B. CORRELATION OF REAL WORKABILITY RATIOS AND VARIABLE INPUTS TO BUDGETARY DELIVERABLE TIMELINESS

With the historical visual trend analysis complete, our next objective was to conduct a more serious analysis into the correlation and timeliness of budgetary deliverables. The intention was to thoroughly model the association between time series and budgetary deliverable timeliness and identify any cause-and-effect relationships. This more pointed analysis confirmed both linear and significant relationships exist, however, the majority of the relationships require additional research to determine the causes.

1. Correlation of Real Workability Ratios to Budgetary Deliverable Timeliness

a. Question

Through correlation analysis we worked to identify the relationship between numerous *real workability ratios* (see Chapter IV for *real workability ratio* description) and each budgetary deliverable. Is there a relationship between the amount of time organizations have to work each deliverable to budgetary deliverable timeliness? If a relationship exists, is it cause to adjust the federal budgetary deliverable timeline to allow for a fairer spread of workable days?

b. Data Manipulation

Data was organized by each *real workability ratio* and *days late* per budgetary deliverable. Then, data was manipulated using Excel's data analysis tool pack correlation feature.

c. Presentation

The correlation analysis matrix output for each *real workability ratio* to *days late* budgetary deliverables is presented in Table 4. With respect to the correlation coefficients, we assign adjective descriptors for absolute values that range from 0–0.19, 0.2-0.39, 0.40-0.59, 0.6-0.79, and 0.8-1 which associate with very weak, weak, moderate, strong, and very strong respectively. While these values are arbitrary, they will allow for consistent analysis.

Table 4. Correlation Matrix Real Workability Ratios to Budgetary Deliverables Timeliness

	1.	*2.*	*3.*	*4.*	*5.*	*6.*
1. R.W. Ratio: FY-1 Appn. to PB	---	---	---	---	---	---
2. R.W. Ratio: FY-1 Appn. to BR	---	---	---	---	---	---
3. R.W. Ratio: FY-1 Appn. to Auth. & Appn.	---	---	---	---	---	---
4. R.W. Ratio: PB to BR	---	---	---	---	---	---
5. R.W. Ratio: PB to Auth. & Appn.	---	---	---	---	---	---
6. R.W. Ratio: BR to Auth. & Appn.	---	---	---	---	---	---
7. No. Days PB Late	-0.21	---	---	---	---	---
8. No. Days BR Late	---	-0.37	---	0.05	---	---
9. No. Days Auth. Late	---	---	0.09	---	-0.22	-0.29
10. No. Days Appn. Late	---	---	-0.23	---	-0.38	-0.39

d. Description

Statistically, there are two noteworthy highlights to point out. First, though weak, we find evidence that six of the strongest correlations presented in this matrix are all negative linear correlations. As each *real workability ratio* increases, the corresponding deliverable lateness decreases. Alternatively, as each *real workability ratio* decreases, the corresponding deliverable lateness increases. Put differently, the more workable time organizations have between submission, adoption, or enactment of the previous chronological deliverable, the less late the subsequent deliverable will be. Second, there is nearly no, or at best a very weak, correlation

between the *real workability ratio* (President's budget to budget resolution) and budget resolution timeliness. This indicates there is limited cause and effect of when the President submits their budget and the timeliness of budget resolutions.

2. Time Series and Determinants Analysis of Late Budgetary Deliverables

a. Question

Through regression analysis we worked to identify the association between time series and each budgetary deliverable. Is time series a reasonable indicator for budgetary timeliness? Can we predict future years budgetary deliverables within valuable statistical significance?

b. Data Manipulation

Regression data was organized by fiscal year and count of days each budgetary deliverable was late. Then, data was manipulated using Excel's data analysis tool pack regression feature. The dependent/response variable (Y) in each model is the budgetary deliverable count of days late and the independent/explanatory variable (X) is fiscal years.

Correlation data was organized by fiscal year and lag year (FY-1) for President's budget, budget resolution, and appropriation then *days late* per budgetary deliverable. Then, data was manipulated using Excel's data analysis tool pack correlation feature.

c. Presentation

The regression analysis summary output for each budgetary deliverable is presented in Tables 5, 6, 7, 8 and 9. Additionally, the President's budget and appropriation tables are presented to include the full data set and then partial data only from Presidential inauguration years. Our primary focus is on if there is a linear relationship, and if so, how strong? All results will be described through multiple R (i.e., correlation coefficient), standard error, regression coefficients, and P-value.

The regression matrix output to analyze the determinants of late President's budgets and late appropriations is presented in Table 10.

The correlation analysis matrix output for fiscal year and lag year (FY-1) to *days late* per budgetary deliverables is presented in Table 11. With respect to the multiple R and correlation coefficients, we assign adjective descriptors for absolute values that range from 0–0.19, 0.2-0.39, 0.40-0.59, 0.6-0.79, and 0.8-1 which associate with very weak, weak, moderate, strong, and very strong respectively. While these values are arbitrary, they will allow for consistent analysis.

Table 5. Summary Output Number of Days President's Budget Late

Regression Statistics	
Multiple R	0.403
R Square	0.162
Adjusted R Square	0.143
Standard Error	28.191
Observations	47.000

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1.000	6918.389	6918.389	8.705	0.005
Residual	45.000	35762.931	794.732		
Total	46.000	42681.319			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-1772.554	606.004	-2.925	0.005	-2993.108	-552.000
Fiscal Year	0.894	0.303	2.950	0.005	0.284	1.505

Table 6. Summary Output Number of Days President's Budget Late (President's Inauguration Year Only)

Regression Statistics	
Multiple R	0.951
R Square	0.905
Adjusted R Square	0.889
Standard Error	16.756
Observations	8.000

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1.000	15985.510	15985.510	56.939	0.000
Residual	6.000	1684.490	280.748		
Total	7.000	17670.000			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-5816.239	778.104	-7.475	0.000	-7720.192	-3912.287
Fiscal Year	2.936	0.389	7.546	0.000	1.984	3.889

Table 7. Summary Output Number of Days Budget Resolution Late

Regression Statistics	
Multiple R	0.409
R Square	0.167
Adjusted R Square	0.141
Standard Error	66.284
Observations	34.000

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1.000	28262.043	28262.043	6.433	0.016
Residual	32.000	140594.927	4393.591		
Total	33.000	168856.971			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-4713.069	1878.414	-2.509	0.017	-8539.273	-886.864
Fiscal Year	2.389	0.942	2.536	0.016	0.470	4.308

Table 8. Summary Output Number of Days Defense Appropriations Act Late

Regression Statistics	
Multiple R	0.330
R Square	0.109
Adjusted R Square	0.089
Standard Error	58.856
Observations	47.000

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1.000	19061.045	19061.045	5.503	0.023
Residual	45.000	155882.827	3464.063		
Total	46.000	174943.872			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-2910.970	1265.196	-2.301	0.026	-5459.205	-362.734
Fiscal Year	1.485	0.633	2.346	0.023	0.210	2.759

Table 9. Summary Output Number of Days Defense Appropriation Late (President's Inauguration Year Only)

Regression Statistics	
Multiple R	0.847
R Square	0.717
Adjusted R Square	0.670
Standard Error	35.383
Observations	8.000

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1.000	19047.091	19047.091	15.214	0.008
Residual	6.000	7511.784	1251.964		
Total	7.000	26558.875			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-6322.736	1643.142	-3.848	0.008	-10343.360	-2302.113
Fiscal Year	3.205	0.822	3.900	0.008	1.194	5.216

Table 10. Regression Matrix for Determinants of Late President's Budgets and Late Appropriations

VARIABLES	(5) Number of Days President's Budget Late	(6) Number of Days Appropriation Late	(7) Number of Days Appropriation Late	(8) Number of Days Appropriation Late
One party in power	-9.037	-18.49	-19.51	-3.167
	(9.505)	(16.64)	(17.30)	(26.71)
Democrats in power	35.88***	43.09	44.45	17.58
	(11.33)	(26.66)	(27.89)	(37.57)
Inauguration year	34.26***	7.611	4.313	14.38
	(6.387)	(16.63)	(16.89)	(23.04)
Fiscal year	0.759***			
	(0.248)			
Lag Number of Days President's Budget Late	-0.391***			
	(0.111)			
Lag Number of Days Authorization Late	0.0702			
	(0.118)			
Lag Number of Days Appropriation Late	0.158*	0.262**	0.254*	0.189
	(0.0822)	(0.122)	(0.132)	(0.355)
Number of Days President's Budget Late		0.291	0.304	0.167
		(0.321)	(0.333)	(0.390)
Number of Days Budget Resolution Late				0.221
				(0.191)
Number of Days Authorization Late		0.878***	0.858***	0.567**
		(0.208)	(0.207)	(0.226)
Budget Resolution Yes/No			-3.869	
			(23.75)	
Constant	-1,520***	456.4	426.6	1,047
	(491.9)	(1,343)	(1,949)	(1,936)
Observations	50	50	47	34
R-squared	0.660	0.480	0.474	0.303

Note: Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 11. Correlation Matrix Fiscal Year and Lag Years to Budgetary Deliverable Timeliness

	1.	2.	3.	4.	5.	6.	7.
1. Fiscal Year	---	---	---	---	---	---	---
2. FY-1 No. Days PB Late (lag year)	---	---	---	---	---	---	---
3. FY-1 No. Days BR Late (lag year)	---	---	---	---	---	---	---
4. FY-1 No. Days Appn. Late (lag year)	---	---	---	---	---	---	---
5. No. Days PB Late	0.40	-0.12	---	0.21	---	---	---
6. No. Days BR Late	0.41	---	0.15	0.33	-0.03	---	---
7. No. Days Auth. Late	0.53	---	---	-0.09	0.21	0.31	---
8. No. Days Appn. Late	0.33	---	---	0.23	0.38	0.40	0.54

d. Description

In Table 5, summary output number of days President's budget late, we find evidence that there is a moderately positive linear relationship between President's budget number of days late and fiscal year as seen by the correlation coefficient of .403. Additionally, we find that budgets are, on average, later by about .894 days per fiscal year. This evidence is statistically significant at the 1% level (P-value of .005).

In Table 6, summary output number of days President's budget late (only President's inauguration years), we find evidence that there is a very strong positive linear relationship between President's budget number of days late and fiscal year as seen by the correlation coefficient of .951. Additionally, we find that budgets are, on average, later by about 2.936 days per fiscal year (roughly 12 days per election cycle). This evidence is statistically significant at the 1% level (P-value of .000).

In Table 7, summary output number of days budget resolution late, we find evidence that there is a moderately positive linear relationship between budget resolution number of days late and fiscal year as seen by the correlation coefficient of .409. Additionally, we find that resolutions are, on average, later by about 2.389 days per fiscal year. This evidence is statistically significant at the 5% level (P-value of .016).

In Table 8, summary output number of days defense appropriations act late, we find evidence that there is a weak positive linear relationship between appropriations number of days late and fiscal year as seen by the correlation coefficient of .330. Additionally, we find that appropriations are, on average, later by about 1.485 days per fiscal year. This evidence is statistically significant at the 5% level (P-value of .023).

In Table 9, summary output number of days defense appropriations act late (only President's inauguration years), we find evidence that there is a very strong positive linear relationship between appropriations number of days late and fiscal year as seen by the correlation coefficient of .847. Additionally, we find that appropriations are, on average, later by about 3.205 days per fiscal year (roughly 13 days per election cycle). This evidence is statistically significant at the 1% level (P-value of .008).

In Table 10, regression matrix for determinants of late President's budgets and late appropriations, there are numerous highlights. In Model 5, we look at the drivers of late budgets. First, we look at political variables. One party being in power has no significant effect, however, when Democrats are the party in control of the House, Senate, and Presidency, budgets are significantly later (significant at the 1% level) by an average of about 36 days. Additionally, we find that in inauguration years President's budgets are later by an average of 34 days (significant at the 1% level).

Further, we examined whether past delays, described as lag years, were an important driver. For President's budgets, there seems to be a slight tendency towards corrections. Where for every day late a budget is in the preceding year, it tends to be 0.39 days less late in the current fiscal year (significant at the 1% level). Conversely, late appropriations in the previous year drive slightly later budgets. For every day the appropriations were late in the preceding year, budgets are later by about 0.158 days (significant at the 10% level).

In Models 6–8 (Table 10), we looked at the drivers of late appropriations. Of note, Models 7 and 8 include the presence of budget resolutions. Model 7 includes a dummy variable for whether or not there was a budget resolution (many years there was no resolution adopted at all) and Model 8 includes the lateness of budget resolutions in years that had them adopted. Here, none of the

political variables whether one party in power, a particular party in power, or inauguration have any statistically significant impact. In Models 7 and 8, neither whether or not there is a budget resolution, nor the lateness of those resolutions, has any significant impact on late appropriations.

The lateness of past appropriations (lag years) and current authorizations have significance to appropriation timeliness. Oddly, late budgets do not statistically significantly drive late appropriations. Within Model 6, for every day an authorization is late appropriations are late 0.878 days (significant at the 1% level).

In Table 11, fiscal year and lag years are measured against budgetary deliverable timeliness, there are three noteworthy highlights. First, we find evidence that there is a moderately strong positive linear relationship between fiscal year and authorizations number of days late as seen by the correlation coefficient of 0.531. Second, we find evidence that there is a moderately strong positive linear relationship between authorizations and appropriations as seen by the correlation coefficient of .540. Lastly, we find evidence that though weak, there is a negative linear relationship between the lag year of President's budget submission and current year President's budget. This is to say, a late budget last year may indicate a less late budget this year. Although the correlation coefficient alone is not enough to fully substantiate these relationships, it is enough to warrant further research.

C. EVOLUTION OF DOD CONTINUING RESOLUTIONS

This section provides a simple analysis of DOD CRs across time, organized by fiscal years. Data was compiled from continuing resolutions across six decades. There were random samples taken from the 1960s, 1970s, 1980s, and then sequential for each year starting from 2009 up to 2022. The research and subsequent raw data required reading through and extracting pertinent data from each continuing resolution passed during each fiscal year analyzed. By quantifying and visually graphing changes to CRs over time we can better contextualize the associated impacts of CRs on the DOD. First, utilizing a wide lens, a simple table displaying the complete overall picture of DOD CRs is presented. Following the overarching table are bar graphs which drill down into each component: number of CRs, number of anomalies, number of supplemental appropriations,

number of supplemental anomalies, average duration, total page length, and the type of funding rate used.

1. The Big Picture

a. Question

A broad visual analysis of tabular data extracted from the raw data was performed to identify any significant outliers before drilling down into more detailed analysis. Are there any noteworthy patterns within the table? Specifically, has there been any notable changes to the CR characteristic over time?

b. Data Manipulation

The data was organized by rows of fiscal years and columns of CR values. The CR values included, from left to right, the total number of CRs for each fiscal year, the total number of CR anomalies, the total supplemental appropriations, and number of anomalies within the supplemental appropriations, the average duration of CRs as measured in days (total duration/number of CRs), the total page length of each CR, and the type of funding rate (proxy variables of 1=full text, 2=hybrid, 3=formulaic). Anomalies within the supplemental appropriation are defined as a specific purpose clause embedded within the supplemental. For example, within the FY2022 Afghanistan supplemental appropriation, $2.2 billion was appropriated to the DOD for humanitarian aid. We define this as an anomaly because the appropriated funds are a way to circumvent the existing CR. Further, of note, during fiscal years 2009 and 2019 the DOD appropriation was passed on time; thus, there were no CRs covering the DOD.

c. Presentation

Table 12 shows the summary statistics for CRs across fiscal years. The fiscal years are sequential from 2009 through 2022 and then two-year samples from the 1960s, 1970s, and 1980s.

Table 12. CR Summary Statistics

Fiscal Year	# of CRs	# of CR Anomalies	# of Supplementals	# of Supplemental Anomalies	Avg Duration	# of Pages	Type of Funding Rate 1=Full Text 2=Hybrid 3=Formulaic
1964	2		0	0	64	3	1
1965	1		0	0	62	2	1
1974	3	3	0	0	60	7	2
1975	1	4	0	0	92	5	2
1984	2	5	0	0	181	30	2
1985	4	3	0	0	3	6	3
2009			1	1			
2010	2	5	0	0	40	14	3
2011	7	11	0	0	46	34	3
2012	5	10	0	0	17	15	3
2013	2	6	0	0	183	252	3
2014	4	2	0	0	34	19	3
2015	3	10	0	0	31	15	3
2016	3		0	0	28	13	3
2017	3	6	2	43	72	93	3
2018	5	3	2	24	35	295	3
2019			0	0			
2020	2	2	0	0	41	29	3
2021	5	2	0	0	18	54	3
2022	4	8	3	20	42	50	3
Grand Total	**58**	**80**	**8**	**88**	**46.38**	**936.00**	**2.64**

2. Examining the Number of CRs across Fiscal Years

a. Question

It is important to remember that CRs are appropriation laws which are passed by Congress. The more CRs that are used during a fiscal year means the more laws in which the DOD has to abide by. Moreover, an increase in the frequency of CRs typically leads to a shorter duration which increases the uncertainty as the DOD has to operate under short, incremental appropriations. Has there been a noticeable increase or decrease in the use of frequent, short duration CRs over time?

b. Data Manipulation

The data was organized by rows of fiscal years and values as the count of the number of CRs during each fiscal year.

c. Presentation

Figure 7 shows a bar graph with the X-axis comprised of fiscal years and the Y-axis totaling the number of continuing resolutions. The trendline illustrates an upward trend in use and frequency of CRs throughout the fiscal years analyzed.

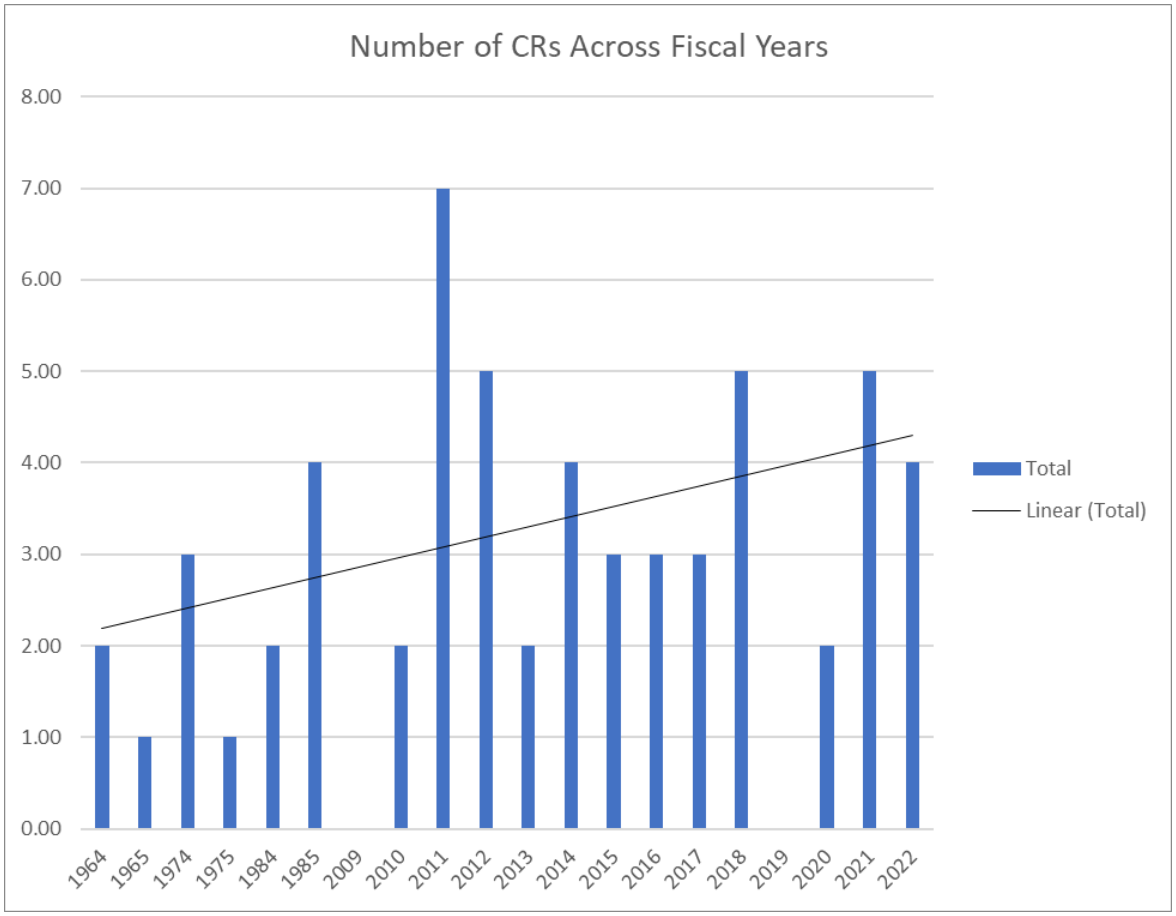

Figure 7. CR Frequency

3. Examining the Number of Anomalies across Fiscal Years

a. Question

Anomalies are used as exceptions to duration, amount, and/or purpose. It is important to examine the use of anomalies to determine if there has been any pattern or trend. Anomalies are essentially a separate appropriation with separate rules and allows Congress great flexibility

around existing spending caps. Further, excessive anomalies can complicate operations within the DOD as some programs may be partially affected by an anomaly. Has there been an increase in the use of anomalies over time?

b. Data Manipulation

The data was organized by rows of fiscal years and values as the sum of total anomalies during each fiscal year.

c. Presentation

Figure 8 shows a bar graph with the X-axis comprised of fiscal years and the Y-axis totaling the number of anomalies.

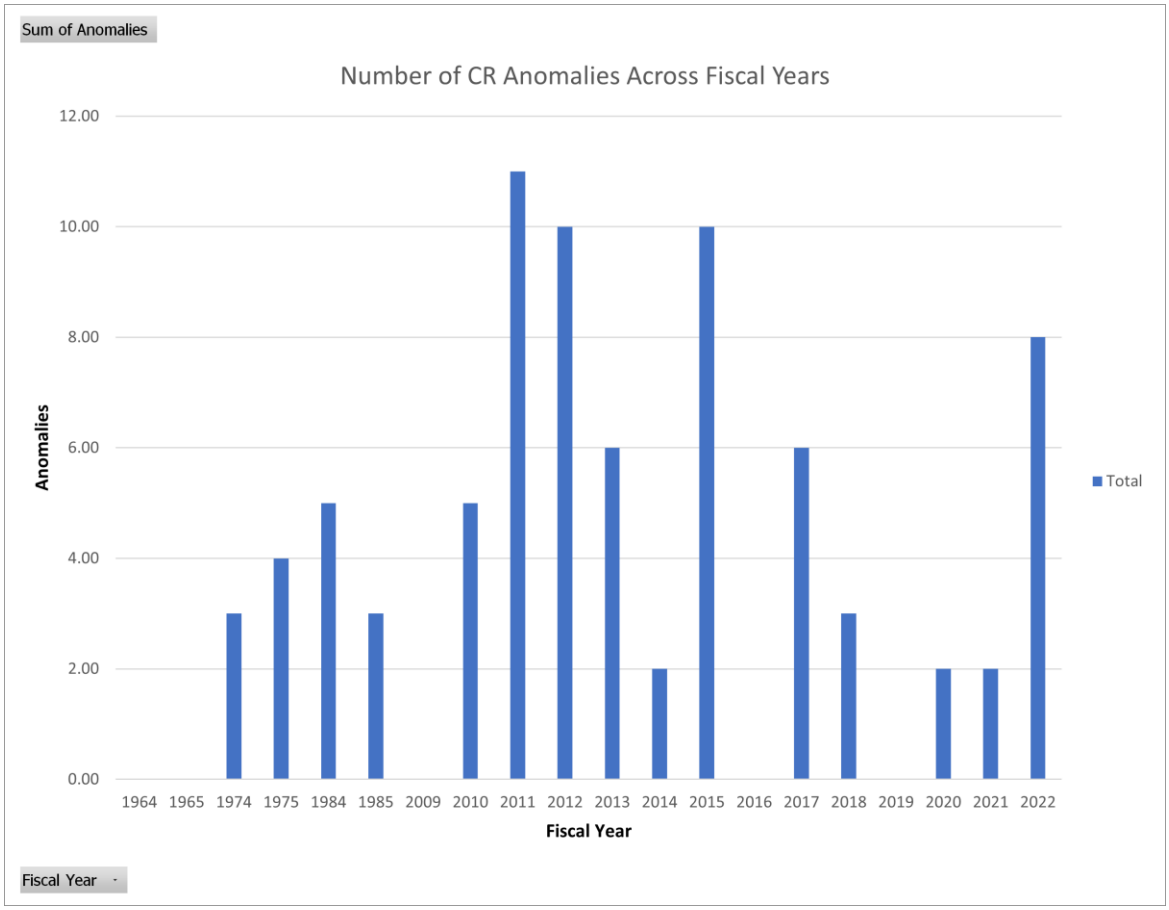

Figure 8. CR Anomalies

4. Examining the Number of Supplementals across Fiscal Years

a. Question

Supplementals are emergency appropriations and are used when funding is needed before a regular appropriation can be passed. It is important to examine the use of supplementals to determine if there has been any pattern or trend. Supplementals are, like anomalies, essentially a separate appropriation with separate rules and allows Congress great flexibility around existing spending caps. Further, excessive use of supplementals can complicate operations within the DOD as some programs may be partially affected by a supplemental. Has there been an increase in the use of supplementals over time?

b. Data Manipulation

The data was organized by rows of fiscal years and values as the sum of total supplemental appropriations during each fiscal year and the total supplemental anomalies within the supplemental appropriation. The anomalies are recorded in the raw data with a section number associated with each supplemental anomaly.

c. Presentation

Figures 9 and 10 show a bar graph with the X-axis comprised of fiscal year and the Y-axis totaling the number of supplemental appropriations and the number of supplemental anomalies, respectively. Supplemental appropriations and supplemental anomalies are shown as a relatively recent phenomenon.

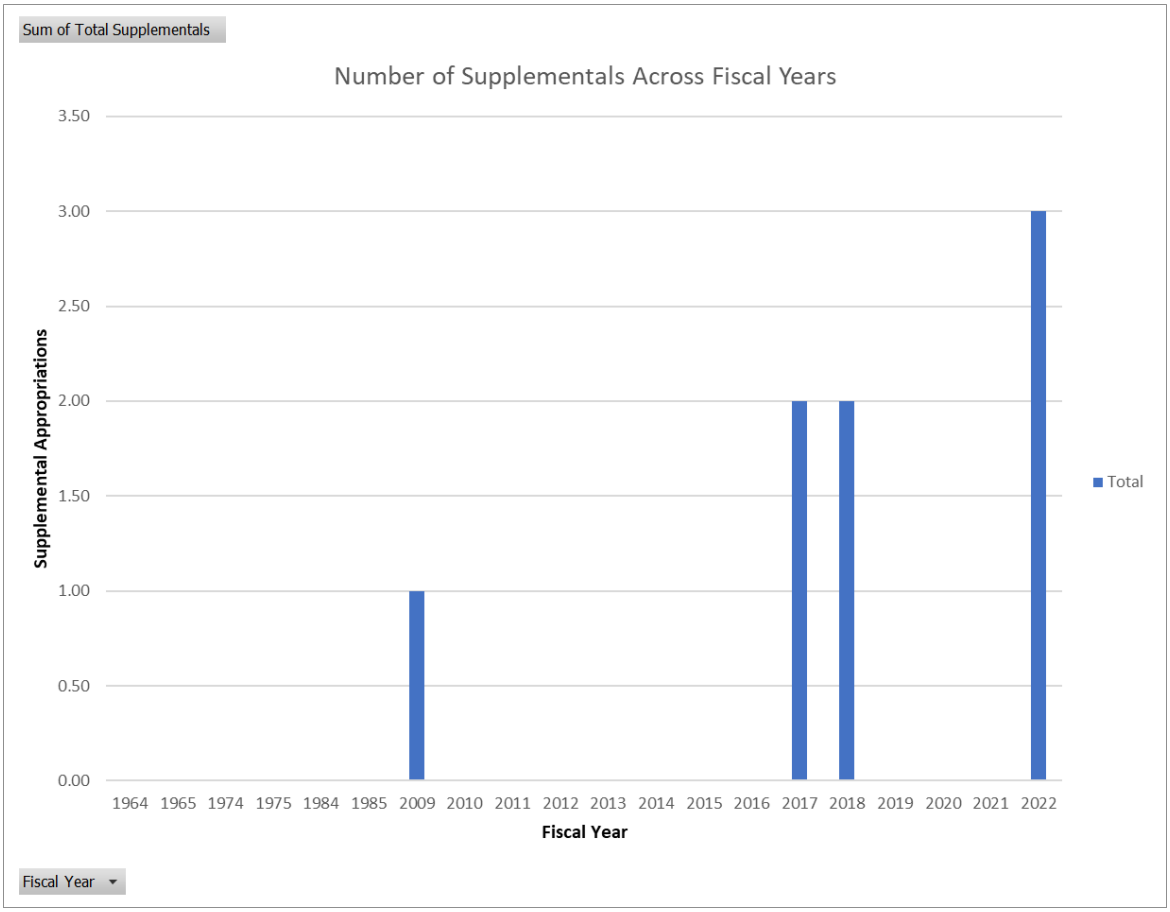

Figure 9. Supplemental Appropriations

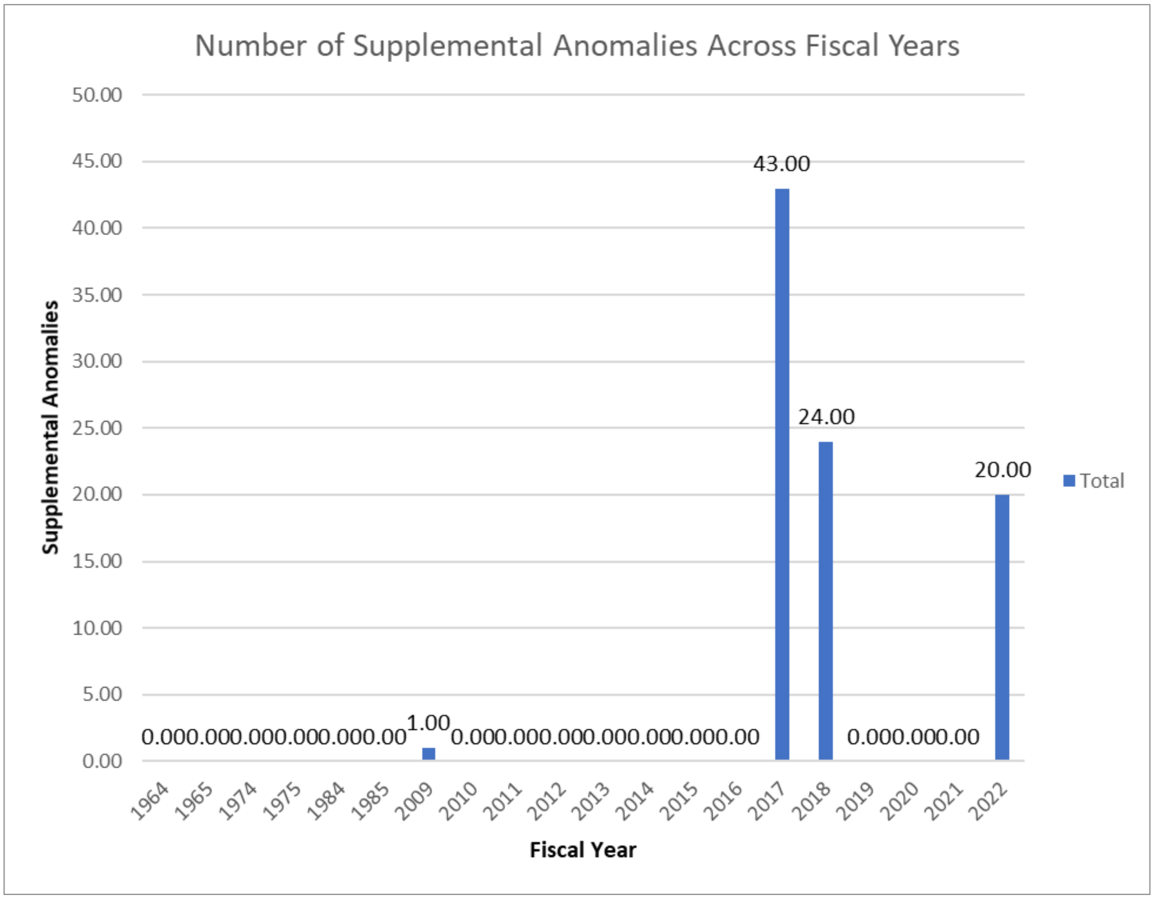

Figure 10. Supplemental Anomalies

5. Examining the Total and Average Duration of CRs across Fiscal Years

a. Question

The duration, or length in days, of a CR is important because the shorter the average duration the more uncertainty within the DOD. Short duration CRs typically means larger frequency of CRs needed before a regular appropriation can be passed. Further, the total duration of CRs illustrates the impact each year that CRs consistently have. Has there been a time period where the duration of CRs was somewhat static and predictable? How, if at all, has the duration of CRs changed over time?

b. Data Manipulation

The data was organized by rows of fiscal years and values as the total and average duration of CRs during each fiscal year. For example, during FY2010 there were two CRs with durations of 48 and 31 days, so the average is computed as (48+31)/2=39.5 and rounded to 40 days.

c. Presentation

Figures 11 and 12 show bar graphs with the X-axis comprised of fiscal years and the Y-axis displaying the total and average duration of CRs (in days) respectively. Total duration of CRs remained elevated consistently across the fiscal years sampled, with the notable exceptions of the 1984 full-year CR and 2009 where the DOD did not operate under a CR. The trendline for average duration illustrates that over time CRs have become shorter in duration.

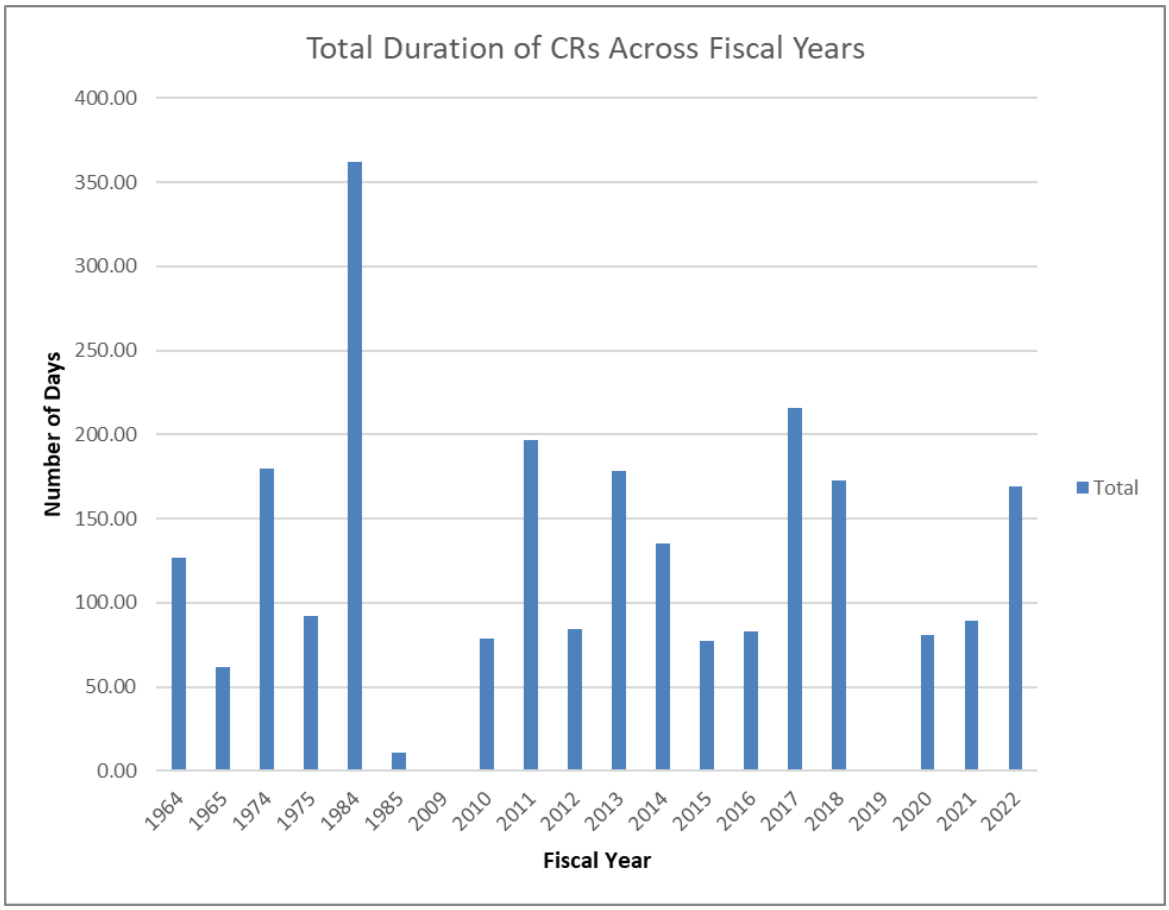

Figure 11. Total CR Duration

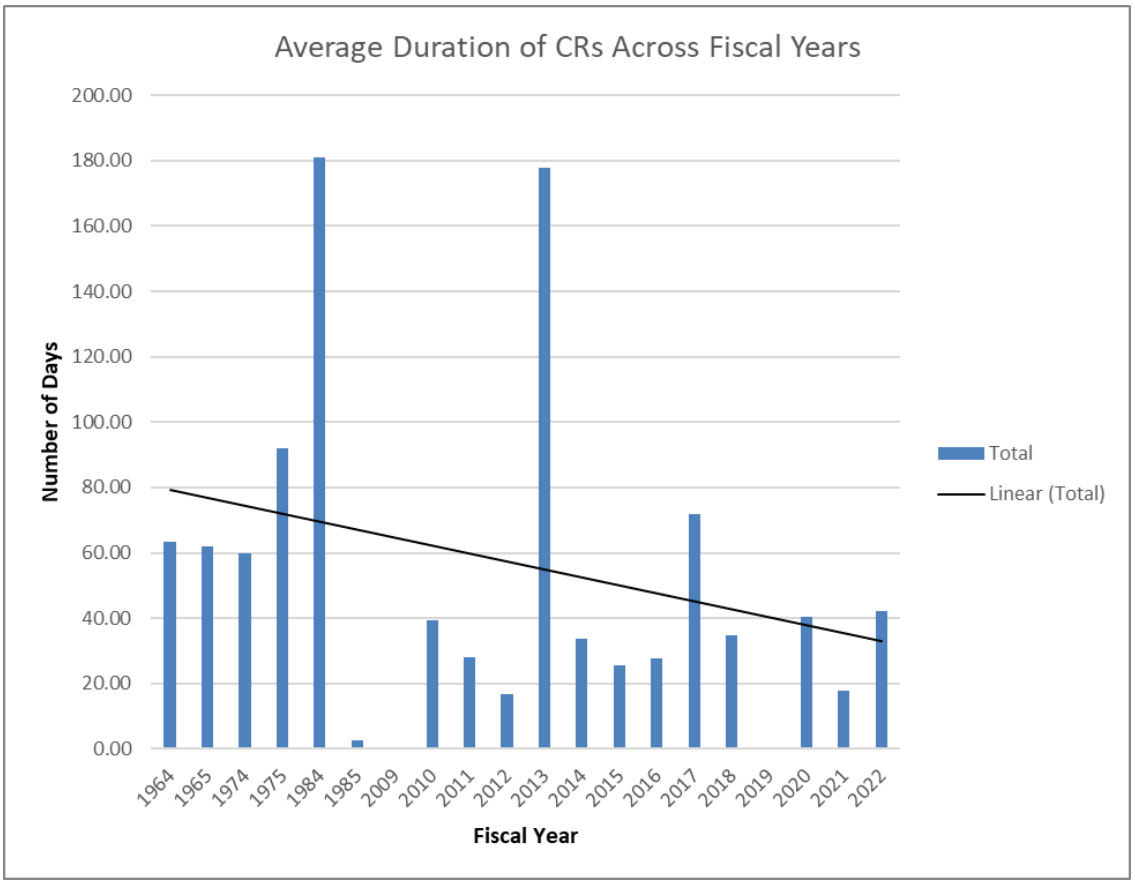

Figure 12. Average CR Duration

6. Examining the Average Page Length of CRs across Fiscal Years

a. Question

The number of pages in a CR can be important because an increase in page length could mean an increase in complexity. At the very least, an increase in page length requires more time for the DOD to read through the CR and gain an understanding of its contents. Has the length, as measured in pages, of CRs increased or decreased over time?

b. Data Manipulation

The data was organized by rows of fiscal years and values as the total page length of CRs during each fiscal year, calculated as the sum of all pages of all CRs.

c. Presentation

Figure 13 shows a bar graph with the X-axis comprised of fiscal years and the Y-axis displaying the total page length of CRs (in days). The trendline illustrates that CRs have become lengthier over time.

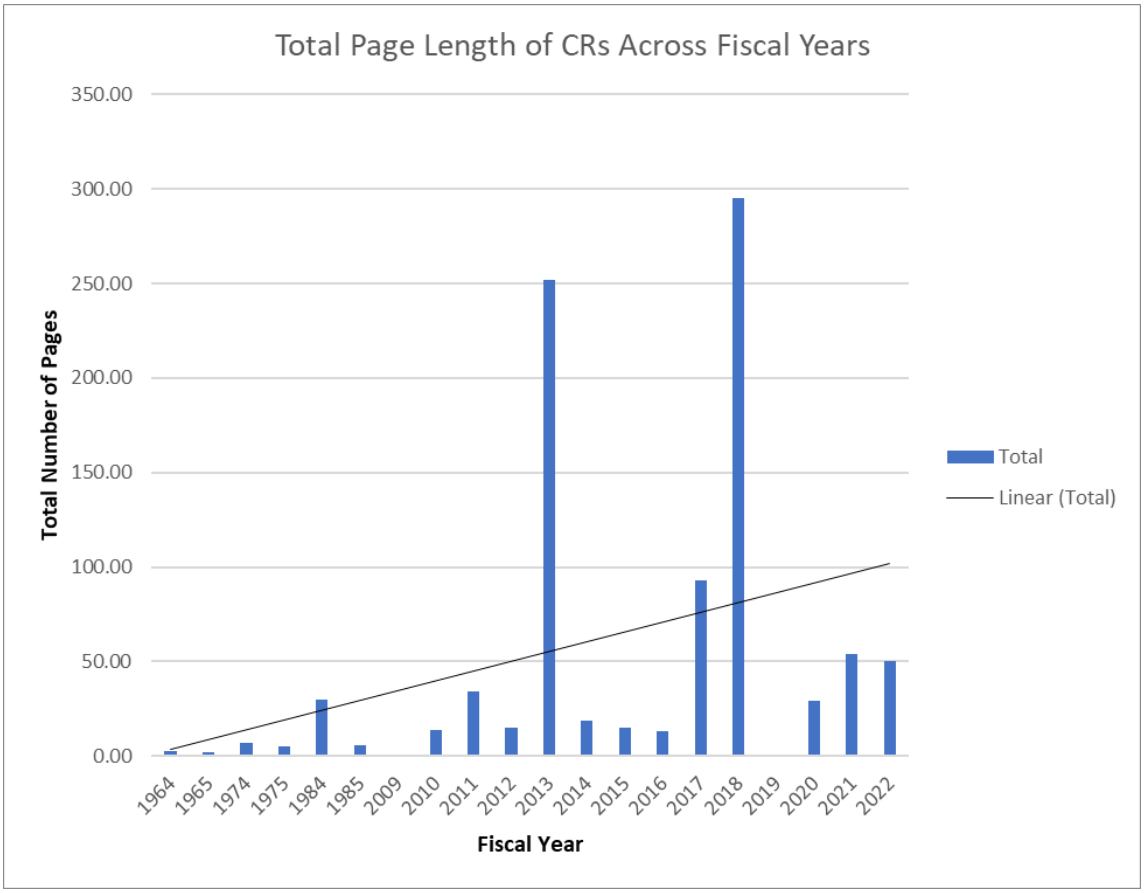

Figure 13. Total CR Page Length

7. Examining the Type of Funding Rate of CRs across Fiscal Years

a. Question

The type of funding rate is important because it sets the pace of operations within the DOD during a CR. Full-text funding rates can allow for the greatest flexibility because they set a rate of operations equal to a draft text of the current FY appropriation. Conversely, a formulaic funding

rate provides the least flexibility because the rate of operations is set to the previous years' rate, to include no new projects or multiyear procurement. Hybrid funding rates allow for a combination of full-text and formulaic, typically providing the most restrictive rate between the two. Has the type of funding rate changed over time?

b. Data Manipulation

The data was organized by rows of fiscal years and values as the type of CR funding rate during each fiscal year. Full text funding rate is represented by the number one. Hybrid funding rate is represented by the number two. Formulaic funding rate is represented by the number three.

c. Discussion

The two fiscal years selected for the 1960s contained CRs with full text funding rates. Funding was available to the extent and manner which would have been provided by the DOD Appropriation Act. If the HAC and SAC had differing versions then the lesser, or more restrictive, version would take effect. The two fiscal years sampled from the 1970s contained CRs with hybrid funding rates. For example, funding was provided at the previous fiscal year's rate of operations (formulaic) or the rate at which was provided in the PB (full text). The more restrictive of the two would take effect; however, it is worth noting that the PB rate of operations, if lower than the previous rate, would allow for new starts and multiyear procurements.

The two fiscal years selected for the 1980s contained CRs with hybrid and formulaic funding rates. Fiscal year 1984 used a hybrid funding rate whereas fiscal year 1985 stipulated a formulaic rate of operations at the current rate—the current rate defined as the rate of operations set to the previous fiscal year. The 1984 CRs funded activities from the previous fiscal year, but at a higher rate of operations based on and distributed on a pro rata basis utilizing the President's Budget for 1984. Funding was available for activities conducted during the previous fiscal year and funded at a rate distributed on pro rata basis utilizing the current fiscal year's PB as the base. Finally, the CRs from fiscal year 2009 through fiscal year 2022 were all formulaic and set at last fiscal year's rate of operations, known as the current rate. However, during Sequestration, fiscal years 2012–2018 were funded at the current rate plus a percentage reduction.

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VI. CONCLUSION

A. HISTORICAL TREND ANALYSIS OF FEDERAL BUDGETARY DELIVERABLES

There are some exceptions, but overall, the budgetary deliverable timeliness is getting worse. Throughout history, there were spells of success where the federal budgeting process worked. For example, the 2000s were across the board more on time than any other point in our analysis. This is likely attributed to the influx of nationalism after September 11th, where priorities shifted to supporting the war efforts at-home and abroad without the need for excessive political handlings. However, the spells of failure are more frequent, of greater magnitude, and cast a shadow over the hard work of countless organizations and personnel who get it right.

B. CORRELATION OF REAL WORKABILITY RATIOS AND VARIABLE INPUTS TO BUDGETARY DELIVERABLE TIMELINESS

There is correlation amongst real workability rations, i.e., the amount of workable time each responsible party has to produce their budgetary deliverables (assuming deliverables are worked consecutively), and deliverable timeliness. Since there is correlation, this suggests that there is value in seriously considering adjusting the federal budgetary schedule to allow for equitable time between deliverables. Or, at the very least, cause for additional research to deep-dive into the dynamics of the budgetary schedule.

Statistically, and with significance, each budgetary deliverable is getting later as each fiscal year passes, however, there is no one event that causes the other deliverables to be late. If there were a singular event, it would have made making a recommendation easier. Our most significant findings all had political flavor whether it was the influence of Presidential term-year, inauguration year, one party power, or specifically Democrats in power. These findings suggest that the process may not be the problem but rather the complexities of competing priorities in politics.

C. EVOLUTION OF DOD CONTINUING RESOLUTIONS

1. Big Picture

Based on the initial research in this paper, it is clear that the type of funding rate has changed over time. The most recent 15 years have all used the current rate of operations, formulaic funding rate, while the samples from the 1960s and 1970s used full text and hybrid respectively. Furthermore, Table 12 illustrates the use of anomalies has increased from the 1960s, peaking in the 2010s, before decreasing in use through 2022. Lastly, the overarching table illustrates that the use of supplemental appropriations is a recent trend, only occurring in fiscal years 2017, 2018, and 2022.

2. Frequency of CRs

Based on the research conducted so far, there has been an increase in the number of CRs passed each fiscal year. The frequency of CRs peaked in 2010–2011 before decreasing back to 1980s level. Operating under frequent CRs increases the uncertainty of future funding for the DOD and complicates the day-to-day operations. However, further research is needed to develop more data for a more detailed comparison across fiscal years.

3. Anomalies

The research shows that the use of anomalies increased over the fiscal years, peaking during fiscal years 2010–2013 before decreasing back to levels lower than the 1970s. It is possible that the use of anomalies increased due to Sequestration and the wars in Afghanistan and Iraq. Anomalies allowed Congress to exempt funding for the Global War on Terrorism (GWOT) from mandatory budget cuts.

4. Supplementals

The research illustrates that the use of supplemental appropriations in conjunction with a CR has occurred relatively recently. Supplemental appropriations were passed in 2009, 2017, 2018, and 2022. The supplementals issued funding for disaster relief, construction, weapons procurement, and GWOT activities. Supplementals, like anomalies, offered a way for Congress to circumvent mandatory spending caps.

5. Duration

The data in this research shows that the duration of individual CRs has declined over time; however, total duration remained steadily high. Duration of CRs has an inverse relationship with frequency of CRs – the more CRs passed during a fiscal year reduces the average duration of each CR. Therefore, during the 1960s-1980s, the average duration of a CR was over 60 days. However, more recently, 2014–2021 the average duration of a CR was fewer than 30 days. The shorter duration further complicates the operations of the DOD by adding to the uncertainty of future funding.

6. Page Length

Page length can be a proxy for complexity. Our research notes that the average page length from 1960s-2011 was less than 10 pages. More recently, the average page length has increased, topping an average of 50 pages during 2018–2019. At a minimum, the longer the page length equates to an increased time burden to read through the CR and develop an understanding. However, it is possible that the increased page length provides better detail leading to greater certainty and increased efficiency of operations. Nonetheless, page length appears to be increasing over time. Intuitively, page length increased as the use of anomalies and supplementals increase.

7. Funding Rate

It appears as if CRs have become more restrictive over time. The 1960s through 1980s offered the ability for the DOD to be more flexible through the use of draft appropriations or President's Budget. The increased flexibility enabled the DOD to start new programs and engage in multiyear procurement. More recently, from 2009 to 2022, the DOD has had to operate within a more restrictive environment, prohibiting the start of new programs and engaging in economically efficient multiyear procurement.

D. RECOMMENDATIONS FOR FURTHER RESEARCH

While this research was thorough, it was not exhaustive. We recommend further research into the leading indicators of late budgetary deliverables. While we were able to identify general trends and significant outliers, further research should control for these outliers and focus effort on the reason traditional years are still late. Additionally, for every deliverable, there are many

inputs from different organizations, and it would be useful to determine if those inputs were produced on time, or if the deliverables of this research were prone to lateness from the start. Moreover, we recommend further research into the root causes and recommending process recommendations.

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