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An Assessment of the Impact of Federal Continuing Resolutions on the Preapproval Stage of Defense Acquisition

January 18, 2022

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Naval Postgraduate School

ACQUISITION RESEARCH PROGRAM
NAVAL POSTGRADUATE SCHOOL

Executive Summary

This study is an analysis of the impact of federal continuing resolutions (CRs) on defense acquisitions. It focuses on the early stage of the acquisitions life cycle when purchase requests are prepared and submitted to the acquisitions system. The research objective is to quantify the impacts of CRs on the number of purchase requests created, the processing period for acceptance of purchase requests into the acquisition system, and the total dollar amount of purchase requests.

The analysis used data taken from the United States Marine Corps Purchase Request Builder system, a database for purchase order creation prior to a request's acceptance into the acquisitions system. The sample obtained is made up of over 1,000 unique purchase requests generated between Fiscal Year (FY) 2016 and FY2019. The results of the analysis revealed strong impacts of CRs on the number of purchase requests initiated per week and on the total price of individual purchase requests. The results show that the weekly average number of requests generated is reduced by nearly half during a CR. The regressions using the count of purchase requests per week also revealed strong impacts on purchase requests for both goods and services, though the impact may be greater on service requests.

The estimates of the impact of CRs on the total price of individual requests revealed a significant impact on service requests. The results showed that the lack of budget authority is associated with a reduction in the size of individual requests and that this effect disproportionately affects service requests.

All of the estimations described in this report are designed to separate the effects of CRs from the underlying seasonal trend in government purchasing that is often aligned with "use it or lose it" behaviors. Both the count of purchase request initiation and the total purchase price effects persisted after including these seasonal controls. The analysis of purchase request acceptance lead time (PRALT) length, the time required for a request to advance from initial creation to acceptance in the procurement system, was initially significant but ultimately could not be distinguished from the seasonal trends.

Overall, this study is one of the few empirical exercises to date that measure the impact of CRs on defense procurement. The estimates generated from this analysis identify clear impacts on procurement activity that result from the uncertainty and increased administrative burden that is triggered by the lack of full budget authority.

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Introduction

Purpose

This study is an analysis of the impact of federal continuing resolutions (CRs) on defense acquisitions. It focuses on the early stage of the acquisitions life cycle when purchase requests are prepared and submitted to the acquisitions system. The research objective is to quantify the impacts of CRs on the number of purchase requests created, the processing period for acceptance of purchase requests into the acquisition system, and the total dollar amount of purchase requests. This research is sponsored by the Acquisition Research Program at the Naval Postgraduate School.

This research contributes to the broader field investigating the administrative responses to the politics of federal budgeting. While there are numerous studies examining the effects of CRs, these studies primarily rely on interviews to generate a narrative approach to how federal employees are impacted. To date there have been almost no studies that have quantified the administrative impacts of CRs on government performance. This study will help identify how the defense procurement system is impacted by the lack of full budget authority. The results of this analysis may help impact perceptions and understandings of the administrative costs of CRs. It can also help federal agencies proactively plan for the impacts of CRs in their acquisition plans.

This study also provides direct benefits for the Department of Defense (DoD) by identifying the magnitude of the disruptions created by CRs for defense acquisitions. Although these estimates are obtained from United States Marine Corps (USMC) data, it is likely that these results could be extended to the other services for similar procurement actions also below the acquisitions threshold. Understanding these disruptions may help the DoD develop a more forward-looking strategy to anticipate the formal and informal restrictions that are imposed during CRs.

Background

This project is a continuation of a multiyear investigation of the impact of federal CRs on defense acquisitions. This project is central to the ongoing research program of

Dr. Spencer T. Brien. The research has been supported with the efforts of three separate thesis projects. Two theses have already been published and a third is in its final stages of completion. Dr. Brien has presented findings from this research at the Association of Budgeting and Financial Management and has an academic manuscript describing some of the results currently under peer review in the *American Review of Public Administration* (Brien et al., 2020).

The graduate students affiliated with this project are

- Korey Letterle, MBA, GSDM, December 2019
- Paul Kantner, MBA, GSDM, December 2019
- Samuel Perrine, MBA, GSDM, December 2020
- John Murphy, MBA, GSDM, December 2020
- Spencer Preston, MBA, GSDM, Expected December 2021
- Justin Moore, MBA, GSDM, Expected December 2021

Scope

The objective of this study is to quantify the impact of CRs on DoD procurement. It does so by examining outcomes for purchase request initiation within the USMC Purchase Request Builder (PR Builder) system. A sample of 1,074 unique purchase requests distributed over the 2016–2019 time period was obtained from the USMC PR Builder office. This sample is used to examine how CRs impact three aspects of purchase requests initiation. The study examines the count of purchase requests initiated per week, the length of the processing period from initial submission to acceptance into the procurement system, and the dollar amount of individual requests.

The theoretical framework used to examine the interaction between CRs and public procurement is rooted in organizational publicness theory. This theory rejects the simple division of governmental versus private organizational structure in favor of the multidimensional concept of organizational publicness. One of these dimensions is political control, meaning the degree that politicians exert control or ownership over the environment an organization operates within and its allowable actions. The politicization of the federal budgetary process has delated budget authorization legislation for most

years in recent history. These delays result in CRs, which trigger a variety of formal and informal constraints on defense procurement and financial management. This study applies this theory of dimensional publicness to explore how political budgetary dysfunction constrains agency level behavior.

The thesis students that supported this work contributed by developing a more detailed classification of procured services than the binary "good versus service" indicator that is included in the PR Builder database. Students individually reviewed the 1,074 procurement items and categorized the services into the categories identified in the DoD Wide Acquisition of Services Taxonomy (Assad 2012). This work facilitated a more detailed analysis of CR impacts across the type of procurement action.

The analysis produces several important findings on CR impacts. The strongest result is the reduction in the number of CRs initiated per week when a CR is in effect. Using a Poisson regression estimation strategy, the analysis revealed a strong negative impact that persisted even when controlling for seasonal effects. Because procurement and budget execution in the DoD exhibits a high degree of seasonality, and CRs always happen in the early part of the fiscal year, it was important to rule out seasonal effects producing a false result. Another important result showed that the dollar amount of purchase requests for services diminished during a CR.

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Literature Review

This section provides a background on CRs and the literature exploring how they impact the operations of the federal government.

The federal budget process of the U.S. government is structured around the fiscal year, which begins on October 1st and ends on September 30th of the following year. The authority to devise and implement a budget for the operation of the national government originates in the Legislative branch of the federal government, as established in the Constitution. Article 1, Section 9 of the U.S. Constitution affirms, "No money shall be drawn from the Treasury but in Consequence of Appropriations made by Law." This is the origin for the budgetary structure of the U.S. government; Congress must pass an appropriations bill that grants authority to entities within the federal government that obligate the Treasury to pay out funds. This authority is required for all uses of the U.S. Treasury. Funding payroll to both civilian and military personnel, paying businesses for goods and services—all are applications of this authority. Congress's power to both enable and restrict federal spending is one of its greatest tools for pursuing policy. The fact that congressional budget authorizations are structured around the fiscal year, however, means that this power is exercised in discrete intervals. The annual renewal of budget authorization is a venue for political conflict because the determination of the budget is an expression of the policy direction of the federal government for the coming year.

When Congress fails to pass appropriations legislation prior to the start of the fiscal year, there are two possible outcomes. The first option is that spending authority expires and the government is forced to shut down. With a few exceptions for critical occupations necessary for public safety and national security (consider the officers responsible for maintaining and operating the nuclear reactors aboard naval submarines), federal employees and contractors are sent home and government facilities are closed.

The second option is for Congress to pass legislation that grants limited spending authority that enables the federal government to continue operating until a full budget

bill is passed. This stopgap legislation is known as a CR. It grants the government authority to spend on programs that were authorized under the previous year's budget at levels similar to the prior rate of federal spending.

Prior analyses of CRs have identified their disruptions on federal agency operations in general as well as their specific impacts on procurement. Joyce (2008) demonstrated that starting the fiscal year with a CR is the rule, rather than the exception, as appropriation legislation was passed on time only a handful of times over the last several decades. Rubin (2007) identified from a series of interviews the ways that CRs create uncertainty for federal administrators regarding their final budget authority. This uncertainty induces federal agencies to spend conservatively in order to mitigate the risk that their final authority will be less than the expected spending requested in the president's budgetary proposal to Congress.

CRs do not put a specific cap on the level of spending, but instead control the rate of spending by limiting it to a given percentage of the prior year's rate (Government Accountability Office [GAO], 2006; Young & Gilmore, 2019). While federal agencies are able to petition Congress for exemptions that allow them to exceed the CR spending rate, Young & Gilmore (2019) found that Congress grants less than 3% of these requests.

CRs impact procurement in a variety of ways. CRs contain prohibitions on starting new programs that were not covered by the prior year's budget authorization. Additionally, new multiyear procurement actions are forbidden. In addition to the legislative restrictions, agencies may implement internal controls during CRs, which minimize spending and defer activities until full budget authority is granted (Herrmann, 2017). Agencies may need to engage in additional review activities for spending that does occur during a CR to ensure that it is in compliance with the added regulations implemented during this time period. This added administrative burden may even cause some officials to defer procurement and the associated operational activities enabled by federal purchasing until the administrative burden is lifted (Williams & Wees, 2016).

Kasdin (2021) found that CRs may even impact the structure of procurement contracts for agencies that primarily administer discretionary spending programs.[1]

The Antideficiency Act prohibits federal officials from obligating spending authority before funds have been appropriated for the underlying purpose (Candreva, 2017; GAO, 2006; Limitations on Expending and Obligating Amounts, 2011). This prohibition includes entering into service contracts. For years where there are multiple back-to-back CRs, officials have to generate multiple contracts for the same service in order to maintain continued operational capacity over the fiscal year. For example, vehicle maintenance performed under contract will require procurement professionals to create repeated contracts for the same task, while if full budget authority had been granted at the beginning of the year, the services would have been procured with a single contract. The increased administrative overhead increases costs and inefficiencies for federal programs (Bartels, 2018).

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[1] In contrast, Kasdin (2021) also found that agencies that primarily administer mandatory spending programs, such as Social Security or other entitlement spending, do not appear to adjust their procurement contract structure in response to CRs.

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Methodology and Data

Data

The following description of the data collection process is an extended excerpt from the working paper by Brien et al. (2021). Letterle and Kantner were Naval Postgraduate School graduate students that assisted in initial round of data collection for this study and also contributed to the conceptual framework describing the PRALT phase of the purchase request process. That paper was written in conjunction with this technical report and uses the same data and data cleaning methodology. The manuscript was also written as part of this Acquisition Research Program–funded project. This excerpt is included in this technical report rather than rewriting the description of the identical procedure.

The[2] data for this analysis are obtained from the USMC PR Builder office, which manages the USMC's procurement record keeping system. The PR Builder office provided a randomly selected sample of purchase request records approved during the 4 fiscal years spanning 2016 to 2019. Individual purchase requests are identified with a standard documents number (SDN). The transaction history of each purchase request, including the initial creation and submission, the final acceptance, and each intermediate determination and revision are described in the data. The records also contain details about the purchase, including price and quantity information, and a descriptive field identifying whether the request is for a good or service. Additionally, the records identify the supply officer responsible for entering the purchase request into the system as well as the reviewing official that makes the determination of whether to accept or return the purchase request for revision. The names identifying individual DoD personnel were recoded with numeric identifiers and then restructured as a series of binary indicator variables identifying the supply officer and the reviewing official that processed each individual purchase request.

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[2] Beginning of excerpt.

Defense acquisition regulations impose increased evaluation requirements for purchase requests that exceed the simplified acquisition threshold, established at $250,000. For the sake of comparison, this analysis focuses exclusively on requests that fall below that threshold. The first step in data cleaning was to identify and exclude all requests that exceeded that level. Additional records were excluded that had a total purchase value that was either set to 0 or was negative.[3] After removing other records that had missing or incomplete data, the remaining sample comprised 1,074 distinct purchase requests.

The identification codes for the individual supply officers and reviewing officials control for a variety of unobserved effects. Individual performance may influence the time required to process purchase requests. Additionally, the purchase request system may route specific kinds of purchase requests to individual supply officers. For example, there are different regulations governing the procurement of commercial items versus negotiated contracts for services.[4] Different types of purchase order requests can be routed based on the expertise and the training of the supply officer for the specific kind of procurement activity. This specialization could help improve the efficiency of the purchase order review process. Controlling for the personnel involved in the review process may help identify both the content of the purchase requests and personnel efficiency effects. If present, this effect would be consistent with the findings of Decarolis et al. (2018), which explored the relationship between bureaucratic competence and procurement outcomes. A total of 28 supply officers and 13 reviewing officials were identified in the data, and a corresponding number of identifying indicator variables are included in the model.

Individual purchase requests are first identified by a "date created" field. For the purposes of this analysis, this date is used as the starting point for purchase request acceptance lead time (PRALT). Ideally, PRALT would start earlier than this, at the point

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[3] The unit price and total order line amount that make up the total purchase value for individual requests in the data are entered into the system by the end user and supply officers that initially communicate purchase requests to the acquisitions system. These amounts may be subject to change during the contracting process.

[4] Commercial items are covered under FAR 12 (2020), while negotiated contracts are covered under FAR 15 (2020).

that a need for a new resource is identified by the end user. There is no standardized process across government entities for recognizing requirements, however, and the speed with which different organizations identify their needs may also vary considerably. Given this limitation, this analysis uses the "date created" field as the initial point that a purchase request is made known to the acquisitions system. The final purchase request acceptance date is used to identify the end of the PRALT period and the start of procurement acquisition lead time (PALT). Taking the difference between these two dates generates a count of the number of days that the PRALT period lasts for the purchase request.

In addition to the initiation and final acceptance dates, the purchase records include fields indicating a required date of delivery (RDD) and the start and end to a period of performance (POP). Purchase requests have either an RDD date or a POP range. Inspection of the descriptive fields indicates that the requests with RDD dates are goods, while the requests with POP ranges are services. Additional manual inspection of the purchase request descriptive fields was conducted to generate an indicator variable (GOOD) that differentiates between goods and services. This indicator is then used to examine whether the responses to CRs vary for the two types of resources.

Theoretically, goods and services may fare differently under CRs if government officials are less tolerant of risk and uncertainty in their public procurement activities. Service contracts that require the development of performance-based metrics for complex activities may be perceived as higher risk (Brown et al., 2009; Martin, 2002). This perceived risk may cause service contracts to undergo additional scrutiny that extends the PRALT and PALT periods. Additionally, the transaction costs arising from recreating these complex contracts multiple times for each successive CR may induce officials to delay procurement of complex services until full budget authority is granted. Conservative managers may also reduce the size and scope of contracted services to reduce costs.

Many services, however, are associated with the fixed costs of operating government facilities. Utility contracts, facility maintenance and sanitation contracts, and

other regular and reoccurring functions would be easily associated with prior budgetary authority. Military facilities are unlikely to reduce power or water consumption during a CR. The predicted impacts of CRs on the quantity, size, and length of the review period would likely have little impact on contracts for these fixed costs. To better distinguish between service types, the descriptive fields for all service purchase requests were reviewed and subsequently classified into eleven categories. Distinguishing between service types may help reveal the services that are most susceptible to politically induced controls.[5]

Descriptive Analysis

This section provides a description of the overall characteristics of the sample of procurement requests obtained from the PR Builder system. The sample consists of 1,074 unique purchase requests. Table 1 presents the distribution of observations across the 4 fiscal years of the sample (2016–2019) and identifies the number of days in each year funded by a CR. The years 2016–2018 each had CRs of varying length. In 2019, the defense budget appropriation was passed on time so there was no CR for DoD programs.[6] The variation of the length of the CRs and the absence of a CR in 2019 provide control data for the analysis of defense procurement activity.

Table 1. Sample Observations by Fiscal Year and CR Length

Fiscal Year	Observation Count	CR Length in Days
2016	212	79
2017	296	217
2018	325	174
2019	241	0

Figure 1 depicts the count of purchase orders generated per month in each fiscal year. This graph visualizes the seasonality of the early stage of the procurement life

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[5] End of Excerpt that began on page 9. Source: Brien et al. (2021, pp. 11–15).

[6] That year was also accompanied by one of the longest government shutdowns in recent history (35 days) for the non–defense related discretionary programs.

cycle. For FY2017 and FY2018, there is a strong peak of purchase order creation towards the middle of the fiscal year. FY2019, which had no CR, has a broader plateau of purchase order creation that spans half the year from December through June. FY2016, which had a shorter CR, had an earlier spike in purchase order creation that ran from December through March. Each of the 4 years demonstrated an uptick in purchase order creation in either August or September, which would be consistent with end of year pressures to obligate remaining funds. This "use it or lose it" pattern of obligations shows a final effort to obligate spending authority before it expires (Candreva, 2021; Hurley et al., 2014). This pressure may create a surge in procurement activity at the end of the fiscal year (Liebman & Mahoney, 2017).
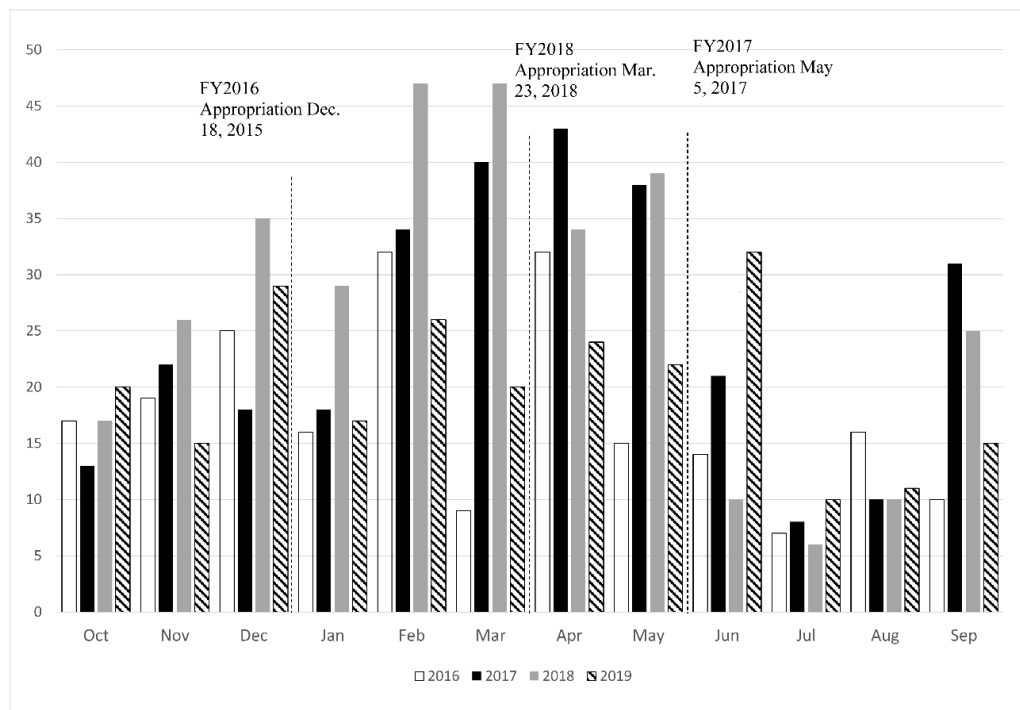
Figure 1. Distribution of Purchase Requests Initiated by Month. Source: Brien et al. (2020).

The seasonal pattern of purchase order creation, with fewer purchases at the beginning of the year and an upward overall trend, is reinforced by the impact of CRs. Efforts to empirically measure the effect of a CR on public procurement my separate it out from the underlying seasonal pattern (Fichtner, 2014; Hurley et al., 2014).

Continuing resolutions, by definition, start at the beginning of the fiscal year and continue, with the exception of full government shutdowns, until a budget authorization bill has been enacted. Under perfect experimental conditions, it would be possible to randomly distribute periods of CR status throughout the year. Instead, the earlier parts of the year are more likely to be exposed to CR status. (Brien et al., 2020, p. 15)

Indicator variables are created for the quarter of the fiscal year that each purchase order is created in, in an attempt to disentangle the CR effect from the underlying seasonal pattern. The inclusion of FY2019 also introduces a control year that exhibits the seasonal pattern of procurement but is not impacted by CR spending restrictions. A combination of these quarterly time period variables and a control year are used to overcome the simultaneous seasonality problem.

Table 2 provides several summary statistics for the features of the purchase requests identified in the sample. The following excerpt from Brien et al. (2021) describes these statistics.

Summary statistics of the purchase order data are depicted in Table 1. Of the 1,074 purchase order requests identified in the data, 396 are for goods, and 678 are for services. When full budget authority is present, the average PRALT pre-approval period lasts 65.2 days for services and 30.9 days for goods. For purchase requests initiated during continuing resolutions, this period lengthens to 101 days for services and 47.1 days for goods. The average total price of purchase requests initiated during full budget authority periods is $57,544 for Services and $31,618 for goods. During continuing resolutions, the average price for services drops to $39,281, while the average price for commodities rises to $45,917. (Brien et al., 2020, p. 15)

The data also include a count of the number of adjustments made to each purchase request prior to its final acceptance. These adjustments reflect iterative changes to a given purchase request. They may be due to the initial rejection of the purchase request by the reviewing official until the requesting official provides additional documentation or detail in the purchase request. Both Letterle and Kantner (2019) and Murphy and Perrine (2020) identified the relative lack of training that many end users have in identifying and documenting requirements as they enter purchase requests into the PR Builder system and that this may lead to errors that subsequently require

revision and resubmission of purchase requests prior to final acceptance. Adjustments also reflect an increase or some other adjustment to the quantity or quality of the requested good or service. Table 2 shows that, while services, on average, appear to have more adjustments than goods, there does not appear to be a difference in the number of adjustments during CRs.

Table 2. Summary Statistics of PRALT Length and Total Price, Differentiated by Good/Service and Continuing Resolution Status. Source: Brien et al. (2020).

		Continuing Resolution		Full Budget Authority		Overall	
		Service	Good	Service	Good		
Number of Purchase Orders		148	80	530	316	Total 1074 Goods 396 Services 678	
PRALT Length in Days	Mean	101	47.1	65.2	30.9	58.7	
	Std Dev	(173.5)	(76.3)	(119.1)	(50.1)	(113)	
Total Price	Mean	$39,281	$45,917	$57,544	$31,618	$46,533	
	Std Dev	($53,990.7)	($75,002.4)	($63,626.5)	($50,148.2)	($60,665)	
Adjustments	Mean	4.8	3.3	5.1	3.3	4.4	
	Std Dev	(3.8)	(3.7)	(5.4)	(3.9)	(4.7)	

Methodology

This section describes the empirical methods used to estimate the impact of CRs on purchase order initiation. Three dependent variables are examined: (1) the count of purchase orders created per week, (2) the length of the PRALT period prior to purchase order acceptance, and (3) the dollar amount of purchase orders. Because the Count analysis uses a different methodology from the PRALT Length and Total Price analyses, the methodologies are described separately. Both methodology descriptions are excerpted from the Brien et al. (2021) manuscript.

Count of Purchase Orders Initiated

The units of observation in the model of purchase order initiation are structured as weeks of the year, which generates 208 observations over the 4-year period. The dependent variable in the model describes the count of the number of purchase orders initiated in a given week. Figure 3 depicts a histogram of the number of weekly

purchase orders. The average number of purchase orders created per week over the 4-year period was 5.16, with a variance of 15.37. Only 9 of the 208 weeks in the sample had zero purchase requests initiated, and the highest count of requests in a single week was 23.
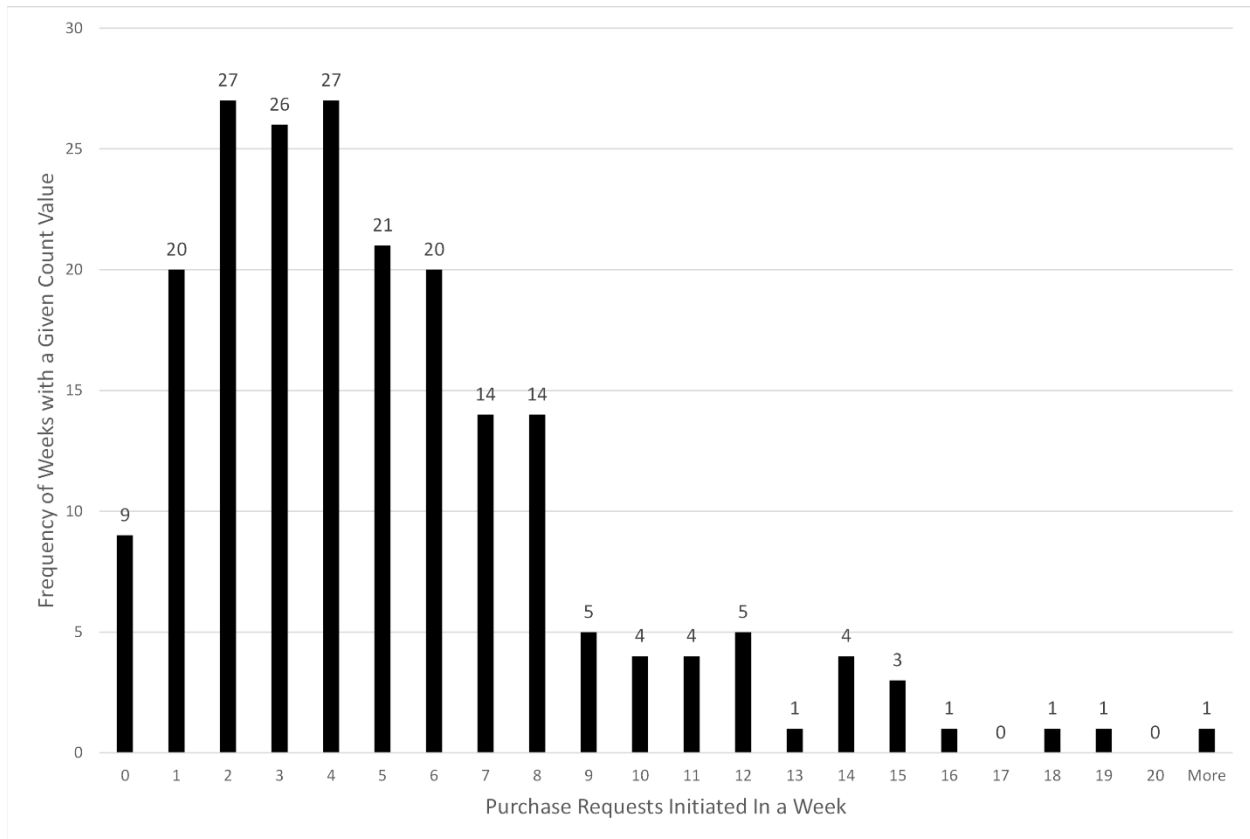
Figure 3. Histogram of the Count of Purchase Requests Initiated by Week (2016–2019)

The primary explanatory variable is an indicator that identifies whether each week occurs within that fiscal year's CR period. Control variables include indicators for the fiscal year and the quarter of the fiscal year, the latter included to control for seasonality in procurement activity. The count model is estimated for the total data set and then for the goods and services separately. This approach depicts whether CRs have a differential effect on the number of purchase orders for goods versus services.

The model is estimated using the linear ordinary least squares (OLS) estimator and the Poisson estimator. Both sets of estimates are obtained with robust standard

errors. In some literatures, a negative binomial estimator is preferred when the variance is greater than the mean, a condition known as "over-dispersion" (Cameron & Trivedi, 2013). However, the robust Poisson estimator requires fewer restrictions[7] and is more consistent than the negative binomial estimator (Wooldridge 2021a, 2021b).[8]

PRALT Duration Analysis

The PRALT length model is estimated using OLS regression. The unit of observation for this model is the individual purchase request, yielding 1,074 total records. The dependent variable is the number of days from the initial purchase request creation to its ultimate acceptance in the procurement system. The primary explanatory variable is an indicator for whether the purchase request was initiated during a CR. The control variables describe whether the request is for a good, rather than a service, the number of adjustments made to the purchase request, and indicators for the fiscal year and the quarter of the fiscal year at the time of order creation. Additionally, the model includes a series of indicator variables that control for identity of the supply officers and the reviewing officials involved in processing each individual purchase request. These indicators are not displayed in the results but can be made available upon request. The model also includes an interaction term between CR status and the goods indicator to test whether federal budget dysfunction has a differential impact on separate classes of procurement activities.[9]

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[7] Wooldridge (2021b) clarifies that the negative binomial estimator is more efficient in the case of overdispersion only when the entire negative binomial distribution is correctly specified, which is a strong restriction that should not be universally assumed.
[8] End of Excerpt from Brien et al. (2021, pp. 17–18)
[9] End of Excerpt from Brien et. al. (2021, pp. 19)

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Findings

Count of Purchase Orders Initiated

Table 3 displays the results from the OLS and Poisson regressions on the number of purchase orders created per week from FY2016 through FY2019. For comparison purposes, the coefficients from the Poisson regressions have been converted to their average partial effects. The results are structured according to purchase request type. Columns 1 and 4 depict total purchase requests, Columns 2 and 5 depict the results for just the service orders, and Columns 3 and 6 depict the counts of commodity purchase requests.

> The key explanatory variable, the indicator for whether the week occurred during a continuing resolution is statistically significant and of the predicted sign in all variants of the model. The OLS and Poisson estimates are also nearly identical. When examining total purchase requests, continuing resolution status is associated with a little more than two fewer purchase requests being initiated per week. The Column 1 OLS estimate of CR status on total orders of −2.324 is very close to the Average Partial Effect reported in Column 4 of −2.238. This is a large reduction given the average weekly number of purchase requests initiated was 5.06. The effect on the number of purchase orders initiated appears to be nearly evenly split between goods and services, though the Poisson regression indicates that service orders may be slightly more impacted by CR status than orders for goods. (Brien et al., 2021 p. 18)

Another important result displayed in Table 3 is that the estimates of the CR indicator are statistically significant even after controlling for year fixed-effects and the quarterly effects. These time period controls capture both annual shocks to the federal budget and the seasonal pattern of defense procurement. The observed outcome that both the CR variable and the FYQ1 indicator are statistically significant means that this estimation strategy has successfully separated the CR effects from the seasonality effects.

Table 3. Results of OLS and Poisson Regression Analyses of Continuing Resolution Status on Purchase Requests Initiated per Week. Source: Brien et al. (2021).

Count of Purchase Orders	OLS Regressions			Average Partial Effects from Poisson Regression		
	(1) Total Orders	(2) Service Orders	(3) Goods Orders	(4) Total Orders	(5) Service Orders	(6) Goods Orders
Indicator of Continuing Resolution (CR)	-2.324***	-1.200**	-1.125**	-2.238***	-1.237**	-0.952**
	(0.793)	(0.545)	(0.449)	(0.781)	(0.539)	(0.456)
Fiscal Year 2017	2.465***	1.400**	1.065**	2.447***	1.409**	1.024**
	(0.780)	(0.569)	(0.427)	(0.776)	(0.562)	(0.445)
Fiscal Year 2018	2.620***	1.365**	1.255***	2.542***	1.328**	1.207***
	(0.766)	(0.569)	(0.431)	(0.722)	(0.538)	(0.415)
Fiscal Year 2019	0.066	0.535	-0.469	0.299	0.593	-0.278
	(0.621)	(0.471)	(0.328)	(0.530)	(0.417)	(0.276)
FYQ1 (Oct.−Dec.)	-1.577*	-0.589	-0.988**	-2.143**	-0.792	-1.452**
	(0.823)	(0.535)	(0.478)	(0.903)	(0.569)	(0.574)
FYQ2 (Jan.−Mar.)	-0.311	-0.112	-0.200	-0.172	-0.0625	-0.103
	(0.759)	(0.488)	(0.471)	(0.706)	(0.471)	(0.427)
FYQ3 (Apr.−June)	0.390	0.708	-0.317	0.345	0.607	-0.244
	(0.838)	(0.620)	(0.449)	(0.667)	(0.501)	(0.353)
Constant	4.943***	2.790***	2.153***			
	(0.622)	(0.443)	(0.384)			
Observations	208	208	208	208	208	208
R-Squared	0.199	0.118	0.183			
Psedudo R-Squared from Poisson				0.102	0.0580	0.105

Note. Robust standard errors in parentheses.

*** p<0.01. ** p<0.05. * p<0.1.

PRALT Length

The PRALT length model is estimated using the individual purchase request as the unit of observation. The PRALT length estimations use the number of days between the creation of a purchase request until its final acceptance into the acquisitions system. The CR indicator variable is used as the primary measure of the impact of CRs on PRALT length. Unlike the Count of Purchase Order Creation model described in the prior section, the PRALT model includes a series of control variables for the features of the individual requests. The Count model did not include these controls because its unit of observation was the aggregated number of requests initiated per week. The controls included in the PRALT length model include an indicator for whether the request is a service or a commodity, the number of adjustments made to the purchase request

during the PRALT period, and both the time and seasonal controls. The models also include controls for the individual identities of the supply officers and the reviewing officials that were involved in processing the purchase request. These personnel controls are a series of dummy variables for each acquisitions personnel and are used to code which requests were handled by which individuals. Finally, the model also includes interaction terms between the CR variable and the good/service indicator. OLS regression is used to estimate the impact of CR status on the length of the PRALT period.

The results from the PRALT length estimation are displayed in Table 4. The following description of the results depicted in Table 4 is excerpted from the Brien et al. (2021) paper.

Table 4. OLS Regression Estimates of the Time From Initial Purchase Request Submission to Acceptance in the PR Builder System

Days to Purchase Request Acceptance	(1) Base Model	(2) Goods Interaction	(3) Seasonal Controls	(4) Seasonal Controls and Goods Interaction
Indicator of Continuing Resolution (CR)	23.918**	32.741**	5.617	15.416
	(10.170)	(14.389)	(11.749)	(15.890)
Purchase Order for Goods (GOOD)	-9.736*	-4.508	-9.349*	-3.666
	(4.964)	(5.643)	(4.890)	(5.462)
Interaction CR*GOOD		-24.831*		-27.165*
		(14.966)		(15.542)
Count of Adjustments Made to the PR	8.390***	8.386***	8.365***	8.366***
	(1.136)	(1.139)	(1.138)	(1.142)
Fiscal Year 2017	19.121	20.292	25.497**	26.791**
	(12.411)	(12.338)	(12.644)	(12.586)
Fiscal Year 2018	26.975**	27.291**	28.350***	28.645***
	(10.826)	(10.768)	(10.654)	(10.603)
Fiscal Year 2019	2.367	3.410	-1.530	-0.383
	(9.584)	(9.539)	(9.281)	(9.241)
FYQ1 (Oct.−Dec.)			29.823**	29.330**
			(12.026)	(12.109)
FYQ2 (Jan.−Mar.)			30.780***	31.654***
			(7.720)	(7.843)
FYQ3 (Apr.−June)			16.113**	16.489**
			(7.644)	(7.616)
Constant	-27.712***	-30.105***	-42.415***	-45.358***
	(10.492)	(10.384)	(12.505)	(12.378)
Observations	1,074	1,074	1,074	1,074
R-squared	0.275	0.277	0.282	0.285
Linear combination of CR and CR*GOOD		7.909		-11.749
		(7.689)		(9.360)

Note. Robust standard errors in parentheses. A series of dummy variables controlling for the unique identities of the supply officers and reviewing officials involved in processing the purchase requests were also included in the model. Twenty-seven dummies for the supply officers and 12 dummies for the reviewing officials were included. The estimates of these control variables are not included in the table but are available upon request. *** $p<0.01$. ** $p<0.05$. * $p<0.1$.

There are four columns in the results table. The first two columns omit the seasonal controls that are included in Columns 3 and 4. Columns 2 and 4 include the

interaction term between the CR indicator and the indicator that the purchase order is for a GOOD. In the first column, which excludes the seasonal controls, CR status is estimated to increase PRALT duration by approximately 24 days. In Column 2, which adds the interaction term, the CR coefficient estimate increases to 32.7 days, but the interaction term is negative and marginally significant. This suggests that the effect of CRs is smaller and even statistically insignificant for goods, while it remains a large effect for services. The linear combination between the CR variable and the interaction term is displayed at the bottom of the table. The combination is not statistically significant, indicating the effect of the CR on lengthening PRALT times is concentrated on service procurement actions.

The results depicted in Columns 3 and 4 show that including the seasonal controls largely eliminates the effect of CR on PRALT duration. In both columns, the coefficient estimate on the CR indicator is statistically insignificant. The linear combination of the CR and the interaction term's effect is likewise insignificant. Although the estimates in Columns 3 and 4 depict effects that are in the same direction in the first two columns, they have a smaller magnitude overall. If there is an effect of CR status on PRALT length, then it is not large enough to identify it separately from the seasonality effect. The purchase order processing times for requests initiated in the first two quarters take approximately 30 days longer to complete than those initiated in the 4th quarter of the year. Those initiated in the 3rd quarter take a little more than 16 additional days than those initiated in the 4th quarter. The inclusion of control data from 2019, which did not have a CR for defense-related spending, suggests that the variation in PRALT length is more attributable to seasonal variation in defense procurement rather than a direct impact of CR status. While the two effects appeared to be separately identified in the analysis of the count of purchase orders created, the CR effect and the seasonality effect are not separated in the PRALT length analysis

The count of adjustments made to purchase requests is significant in all models, and the estimate indicates that each modification increases the length of the preapproval period by approximately 8 days. This result is not surprising, but it is

interesting to quantify how iterations and adjustments to procurement actions in the preapproval period lengthen this stage of the process.[10]

Total Purchase Price

This section describes the results from estimating a model of the impact of CRs on the Total Purchase Price of new requests. The dependent variable for this model is the inflation-adjusted total dollar amount for each purchase request. Similar to the PRALT length model, the unit of observation is the individual purchase request. Additionally, the Purchase Price model uses all of the same control variables as the PRALT length model. The results from the OLS estimates of this model are displayed in Table 5. The following excerpt from Brien et al. (2021) describes the results depicted in Table 5.

Column 1 is a base model. Column 2 includes the interaction between the CR variable and the indicator that the purchase request is for a good rather than a service. Column 3 includes the seasonal controls, and Column 4 includes both seasonal controls and the interaction. The only variant where the base CR variable is statistically significant is Column 2, which indicates that purchase requests initiated during CR status have a lower price value, suggesting that orders are smaller than they would have otherwise been with full budget authority.

The coefficient on the GOOD indicator variable is negative and statistically significant in all variants of the model, suggesting that the purchase value of requests for commodities average several thousand dollars less than requests for services. The interaction term between the CR indicator and GOOD, however, is positive and statistically significant. The opposing estimates of the interaction term and the base CR indicator cause the linear combination of the two variables to be statistically insignificant, with a *p* value of 0.125. This indicates that the dollar amount of purchase requests widens between goods and services during CRs. The negative value of the base CR variable only holds for services once the interaction terms are fully taken into account.

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[10] End of excerpt from Brien et. al. (2021, pp. 19-21)

In Column 4, which includes the seasonal controls, the CR indicator is no longer statistically significant, but the interaction between the CR variable and the GOOD variable remains significant. The linear combination of the two in Column 4 is also significant, with a p value of 0.043. This is notable because, even controlling for the seasonality effect, the differential in ordering value between goods and services associated with CRs remains.

It makes sense that services would experience a differential impact under CRs. One of the important restrictions on defense procurement triggered by a CR is that service contracts may only last for the duration of budget authority. In recent history, Congress has produced multiple consecutive CRs within a single budget year prior to the enactment of full budget authority. Procurement officers may seek to minimize or simplify service requests from end users during this period in order to reduce anticipated replication of contracting work for each subsequent CR.

One potential criticism of this analysis is that smaller value purchase requests may be less likely to be impacted by CRs. As a robustness test, the analysis in Column 4 of Table 4 was rerun but excluded all purchase requests with a value less than $10,000. This restriction dropped 602 of the 1,074 observations from the estimation. The results were comfortingly similar to the full analysis. The pattern of statistical significance in the CR control, the commodity indicator (GOOD), and the interaction term between GOOD and CR was unchanged and the magnitude of the coefficients on both the interaction term and the linear combination of CR and the interaction term increased. This test confirms that the main results hold for the purchase requests most likely to be influenced by the CR restrictions.[11]

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[11] End of excerpt from (Brien et. al. 2021. Pp. 21-23)

Table 5. OLS Regression Estimates of the Real Dollar Amount for PR Builder Purchase Requests

Real Dollar Amount Per Purchase Request	(1) Base Model	(2) Goods Interaction	(3) Seasonal Controls	(4) Seasonal Controls and Goods Interaction
Indicator of Continuing Resolution (CR)	-2,238.1	-6,712.8***	557.9	-4,016.2
	(2,023.7)	(2,187.5)	(2,825.2)	(2,952.4)
Purchase Order for Goods (GOOD)	-5,189.9***	-7,841.5***	-5,082.0***	-7,734.7***
	(1,641.5)	(1,822.1)	(1,637.9)	(1,821.3)
Interaction CR*GOOD		12,594.1***		12,680.4***
		(4,336.1)		(4,363.9)
Count of Adjustments Made to PR	444.5**	446.6**	461.4**	460.9**
	(213.5)	(211.2)	(214.6)	(211.9)
Fiscal Year 2017	4,471.7	3,877.8	3,574.1	2,970.1
	(2,748.9)	(2,714.8)	(2,822.3)	(2,793.1)
Fiscal Year 2018	1,257.8	1,097.6	821.2	683.4
	(2,546.7)	(2,528.8)	(2,560.6)	(2,540.9)
Fiscal Year 2019	2,462.4	1,933.4	3,049.5	2,514.5
	(2,848.4)	(2,826.2)	(2,881.5)	(2,860.8)
FYQ1 (Oct.−Dec.)			-2,702.8	-2,472.5
			(3,310.3)	(3,275.7)
FYQ2 (Jan.−Mar.)			-2,171.7	-2,579.5
			(2,297.3)	(2,306.2)
FYQ3 (Apr.−June)			2,361.8	2,186.0
			(1,982.1)	(1,977.4)
Constant	16,061.1***	17,274.5***	14,952.9***	16,326.4***
	(3,931.5)	(3,940.9)	(4,158.9)	(4,172.6)
Observations	1,074	1,074	1,074	1,074
R-squared	0.096	0.105	0.010	0.109
Linear combination of CR and CR*GOOD		5881.2		8664.3**
		(3826.8)		(4285.2)

Note. Robust standard errors in parentheses. Dollar amounts normalized using Annual Average CPI index for urban consumers. A series of dummy variables controlling for the unique identities of the supply officers and reviewing officials involved in processing the purchase requests were also included in the model. 27 dummies for the supply officers and 12 dummies for the reviewing officials were included. The estimates of these control variables are not included in the table, but available upon request.
*** $p<0.01$. ** $p<0.05$. * $p<0.1$.

Discussion

The following discussion is an extended excerpt from the Brien et al. (2020) manuscript. It describes the implications of these findings, limitations of the analytical approach, and final conclusions on the impact of the research for a broader research program into the study of CRs and public procurement.

This analysis has examined the impact of CRs on three different aspects of purchase request development. The strongest effects were observed on the count of requests initiated per week and the total dollar amount per purchase request. The regressions on the count data revealed relatively similar effects on both goods and services, though the Poisson regressions suggested a marginally larger reduction on the number of service requests initiated per week during CR status. The count regressions also produced estimates of the CR effect that were the most clearly differentiated from seasonality effects that are inherent to federal budget execution.

The estimates of CR impact on the dollar amounts per purchase request also showed significant impacts that persisted after controlling for seasonality. The results showed a widening of the differential between goods and services during CR status that suggests that the dollar amount of service requests is suppressed relative to requests for commodities when the government is operating without full budget authority. The results from analyzing PRALT length were initially suggestive of a strong CR impact, but the statistical significance of that set of findings diminished after controlling for seasonality.

What do these findings indicate for the study of publicness and how political control over the budget impacts agency procurement and administration? It is important to recognize that the political decision to enter into a CR is not an attempt to intentionally exert control over procurement behavior. The concept of the control dimension of publicness theory may need to be adapted to differentiate between intentional and unintentional control. Unintentional control would encompass the legal and administrative regulations that are triggered by political action. These restraints may not be part of the explicit goal of high-level policy action, but organizations that suffer

resource restrictions or other administrative burdens because of the resulting policy outcomes are experiencing the consequences of publicness.

This may be better understood by applying Moulton's (2009) framework for understanding the components of publicness. The public value dominating CR policy is that elected officials want to avoid a full government shutdown in the event that a budgetary compromise has not been achieved. Any interim spending by federal agencies, however, must be controlled so that the executive branch does not usurp power from Congress over the determination of the budget. The restrictions and mechanism of CRs maintain spending allocations that Congress had previously authorized until a new budget is enacted. The conservative responses to executing budget authority at the agency level, however, are expected given the increased administrative burden CRs impose. They are natural responses to the risk and uncertainty Rubin (2007) identified that pervades financial management when full budget authority is absent. The realization of publicness is manifested in the worsening performance of organizations that are impacted by these restraints.

Organizations outside of the federal government may also experience impacts of this form of unintentional control. Certainly, federal contractors are impacted by federal budgetary instability. Additionally, restrictions caused by CRs on the release of federal grants to nonprofit organizations that are engaged in research, health, and other public enterprises would also be a manifestation of this form of publicness. The degree of disruption to organizational health and operations caused by CRs is another way to understand the publicness of non-government organizations, both in the private and non-profit sectors.

The implications for this analysis for agencies outside of the USMC are subject to a few limitations. First, the period of time observed in this study is affected by the Budget Control Act caps on defense spending, commonly known as sequestration. The year fixed effects included in the model can control for some of the average impact of the reduced spending in those years. Amendments to the Budget Control Act raised the defense spending caps and largely restored the level of spending in 2018 and 2019 to the pre-sequestration trajectory, so the effect in those years would be smaller than the

effect in 2016 and 2017 (McGarry, 2019). Repeating the analysis over a more extended time period that surpasses the Budget Control Act limitations would provide additional information regarding the relationship between CR status and procurement activity. As an added benefit, a longer period of analysis would also increase the variation in CR status across the observed years.

A second limitation of this study is that the detail in the data describing the actual services provided is relatively limited. The categorization of individual purchase orders as goods or services is a useful distinction, but more controls for different types of goods and services may help increase the explanatory power of the model. For example, it would be helpful to be able to differentiate utilities from other service contracts that are more tied to operational activities rather than the fixed costs of operating federal facilities. For both goods and services, controls that help separate out the complexity of the product requested may help explain variation in the length of time required to process requests prior to acceptance.

A third limitation of this paper is that the purchase orders identified in the data were all orders that were ultimately accepted for procurement. This study does not have data covering requests that were rejected and then never resubmitted. Omitting these records means that these results may underestimate the full impact of CRs on federal procurement activity.

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Conclusion

Irene Rubin (2007) concluded her assessment of the "Great Unravelling" of federal budgeting norms with the lament that "it is not so much that we do not know what reforms are likely to work, but that we do not know how to motivate those who benefit from the status quo to adopt and implement the necessary reforms" (p. 615). It would be grossly naïve to assume that this study will provide that motivation, but efforts to quantify the administrative burden of CRs may help influence budgetary deliberations. Providing lawmakers, agency officials, and congressional staff with evidence of the erosion of agency performance caused by the lack of full budget authority may help shift the calculus of using budget delays as a political tool.

Consider how private businesses would perform if they spent the first quarter of every year in stasis. What would be the outcome if no new products were ever introduced and no efforts to modernize were implemented during this period? What if firms made no responses to changes in market conditions during the first quarter? How would competitors react if they knew this behavior was repeated year after year? This is the current state of the federal government. This analysis explores a narrow slice of behavior in the DoD, but other federal agencies fall under the same restrictions. National security is affected, but also policy towards education, housing and urban development, and national health. The impact of reduced agency performance under CRs is felt across society.

There are many anecdotes, news stories, and personal interviews describing the impact of CRs. This study, to the knowledge of the researchers, is the first to quantify the impact of these restrictions on agency behavior and the first to explore the interaction between CRs and public procurement. Further studies that explore the behavioral responses to the uncertainties created by CRs and to the heightened regulatory framework are needed to give a more complete accounting of the costs of Congress's failing to enact a budget bill on time.[12]

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[12] End of excerpt from Brien et al. (2021, pp. 23-27)

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