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ACQUISITION RESEARCH PROGRAM
DEPARTMENT OF DEFENSE MANAGEMENT
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Measuring the Effects of Federal Budget Dysfunction: Impacts of Continuing Resolutions on Public Procurement

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Abstract

This study measures the behavioral effects of continuing resolutions by examining their impact on federal procurement activities. The restrictions imposed by continuing resolutions are explored as an example of political control over a public organization. The analysis employs a dataset describing the timing of U.S. Marine Corps purchase orders for goods and services. Individual purchase orders were sampled over a four-year period (2016–2019) that endured continuing resolutions of different lengths. The analysis examines the impact of continuing resolutions on the number of purchase orders initiated, the duration of their review period, and the dollar amount per request. The results depict multiple impacts that appear to concentrate on requests for services rather than commodities. These findings help quantify the magnitude of the disruptions caused by federal budgetary dysfunction.

Introduction

In the ideal budgetary process, the U.S. Congress passes a budget appropriation act that is signed into law by the president prior to the start of the new fiscal year. This act provides federal agencies with the legal authority to obligate funds from the U.S. Treasury to pay for labor, goods, and services. Unfortunately, timely passage of the appropriation bill is the exception rather than the norm; between 2003 and 2018 the budget was passed on time in only four years. Looking even further back, Joyce (2008, p. 954) reported that in the 32-year period ending with FY2008, the budget was passed on time only four times.

When the U.S. Congress fails to pass a spending authorization prior to the start of the fiscal year, it avoids a government shutdown by enacting a continuing resolution. This provides a temporary stopgap by authorizing federal agencies to continue to operate under significant restrictions. These restrictions include a prohibition on starting any new programs that were not authorized in the previous year's budget bill as well as blocking any new multi-year procurements (Herrmann, 2017).

In addition to these formal legal restrictions, activities by federal agencies change in a variety of subtler ways when they operate under continuing resolution authority. "Agency managers may not know their budget levels from week to week—sometimes even from day to day—and this process may go on for months" (Rubin, 2007, p. 612). Uncertainty on current and future budget authority can cause managers to behave more conservatively in their spending and operational activities than they would otherwise. This may manifest as an informal hesitancy or formal directives from agency leadership to minimize spending (Herrmann, 2017).

Public procurement is one setting that may be particularly disrupted by continuing resolution status. Agencies regularly need to purchase goods and services from the private sector to complete their organizational objectives. Continuing resolutions can put formal restrictions on procurement by prohibiting new line items that were not authorized in the previous year's budget. Even if spending on goods or services is permitted, agencies may give proposed purchases additional scrutiny to ensure that they comply with legal requirements. Additionally, the risk that when full budget authority materializes it is less than expected can create further hesitation before spending. The increased administrative burden may cause some



managers to simply forgo procuring resources and instead try to operate without them (Williams & Wees, 2017). Actively planning and preparing for future periods of fiscal constraint is an important part of strategic public financial management (Brien et al., 2020).

This study seeks to measure the behavioral effects of continuing resolutions on agency procurement behavior by examining a dataset describing the approval of U.S. Marine Corps purchase requests for goods and services. The data describe the time from the initial request for a good or service by the end user to the point that the request is approved by the procurement system. The individual purchase orders are spread over three years (2016–2018) that endured continuing resolutions of different lengths and an additional fourth year (2019) that had no continuing resolution for the defense portion of the federal budget. Our analysis examines several impacts of continuing resolutions on these purchase orders. The data describe the overall quantity of purchase orders, the monetary value of each individual request, and the processing time associated with each order. Weekly variations in each of these measures are compared over the four-year observation period.

The results depict significant impacts on both the count of requests initiated and the dollar amount per request. The analysis of the length of the purchase request review period was suggestive of a CR impact, but it could not be fully differentiated from seasonal effects.

Agency Responses to Continuing Resolutions

The interaction between continuing resolutions and government acquisition is one of many settings where the tension between budgetary politics and procurement implementation plays out. Thai (2001) describes how the administration of public procurement systems is guided by two types of goals that frequently come into conflict. Procurement-type goals address the efficiency, timeliness, and effectiveness of the system to acquire the goods and services required by governmental programs. Non-procurement type goals reflect the variety of ways procurement systems are used to influence other policy objectives, such as stimulating regional economies (Preuss, 2011), protecting the environment (Palmujoki et al., 2010), encouraging small businesses (Loader, 2013; Nakabayashi, 2013), or promoting social goals such as providing economic opportunities to minority or women-owned businesses (McCrudden, 2004; Myers & Chan, 1996). Developing a procurement system that tries to optimize across these various goals will require trade-offs given the limited resources and administrative capacity available to procurement professionals.

One way to frame this tension between procurement and non-procurement goals is to view it as a defining feature of the “publicness” in governmental procurement systems. Publicness theory explores the essential differences between public and private organizations and specifically examines how political influence both imposes constraints and creates opportunities for public entities (Bozeman, 1987; Pandey, 2010; Rainey 2009). Public procurement systems are different from private-sector procurement systems because of the political influences that they are subject to. These influences include the non-procurement goals that guide many of the policies and structures of acquisition systems as well as the larger structural factors arising from the political process such as continuing resolutions. Exploring agency responses to continuing resolutions is a way to understand how the realities of publicness influence administrative practice.

Dimensional publicness theory identifies four attributes that categorize forms of political and economic influence over organizations: ownership, funding, goal setting, and control (Bozeman, 1987; Fottler, 1981; Goldstein & Naor, 2005; Perry & Rainey, 1988). The last attribute, control, is of particular relevance to the study of continuing resolutions. Control refers to the influence of government-established rules and laws over an organization’s operational activities. As more of an organization’s activity is subject to and constrained by government-



imposed rules, the organization exhibits a greater degree of publicness within the control dimension. Continuing resolutions add rules and restrictions to procurement activity and are a manifestation of political control over the budget.

Continuing resolutions occur when the two political parties in Congress are unable to come to agreement over budgetary legislation. The minority party or a faction within the majority may withhold support needed to achieve a sufficient number of votes. Preventing the passage of the budget is a way to exert political power to force concessions from the majority party. Generally, these concessions relate to macro issues relating to the size and composition of the overall federal budget, and the trajectory of national debt¹. The legal and administrative ramifications of a continuing resolution, however, create micro-level constraints on operational activities, including multiple additional restrictions on public procurement.

Although continuing resolutions are associated with the control aspect of publicness, they are not a means for congress to intentionally govern procurement activity. The restrictions triggered by a continuing resolution are relatively blunt instruments. For example, a key feature of the spending restrictions in a CR is that the spending level is not explicitly specified, but instead mandated to remain under the rate of spending in the prior year. This rate is frequently established as a percentage of prior year spending that is defined in the CR legislation (GAO, 2006; Young & Gilmore, 2019). Federal agencies are able to request exemptions for specific programs to enable new program creation, but these exceptions are rarely granted by Congress. Young and Gilmore (2019) found that less than 3% of these exception requests, known as “anomalies,” are ultimately granted.

Continuing resolutions also impact federal contracting by putting limits on the duration of service contracts. The federal Antideficiency Act prohibits government employees from entering into contracts or creating other forms of obligations before the funds have been appropriated under the law for that purpose (Candrea 2017; GAO, 2006; 31 U.S.C. 1341 (a)(1)(B)). This means that years with multiple successive continuing resolutions will require a series of separate contracts to maintain continuity of service. Fiscal Year 2011 had seven distinct continuing resolutions with one that lasted only three days. This leads to an increased workload to process multiple contracts for what would have been just a single contract if full budgetary authority had been granted at the beginning of the fiscal year (Bartels, 2018). Creating multiple contracts duplicates effort and increases the administrative burden of the procurement process.

The restrictions triggered by a continuing resolution create environmental conditions that influence procurement activity. Rubin (2007) found that administrators are uncertain about when full budget authority will ultimately be granted and what the final budget amount will be. This uncertainty causes administrators to act more conservatively when executing budget authority. The additional administrative tasks required by continuing resolution status, such as determining whether a given purchase can be linked to the prior year’s budget authority, increase the transaction costs for a given purchase and may induce administrators to postpone procurement actions until full authority is granted (Herrmann, 2017).

This study examines how continuing resolutions impact public procurement by examining outcomes early in the acquisitions life cycle, where purchase requirements are identified and communicated by the end user to the acquisition system. This activity occurs in both governmental and non-governmental systems, but because federal procurement is subject to the rules and environmental factors that are triggered by continuing resolutions, it is public under the control definition of publicness. The first hypothesis proposed in this analysis is that

¹ Of course, these issues are also politicized and opposition may also be based in trying to obstruct and delay the majority party’s agenda.



fewer purchase requests per week when the federal government is in continuing resolution status. Formal restrictions will prohibit purchase requests that cannot be associated with line items that were authorized under the previous year's budget. Additionally, administrative practices, such as agency-level directives to minimize spending, and informal behaviors, including a general reluctance to incur the administrative costs of complying with continuing resolution restrictions, will deter program office officials, on the margin, from initiating new purchase requests. The combination of these formal and informal factors is predicted to reduce the number of procurement actions started during continuing resolutions.

H1: Fewer purchase requests are initiated during continuing resolution status.

The second hypothesis predicts that continuing resolutions will increase the review and approval period prior to new purchase requests being accepted by the acquisitions system. The tasks required to comply with the additional legal and administrative requirements will add to the work required to review and process new purchase requests. Additionally, procurement professionals may reject and require subsequent revisions to purchase requests at a higher rate, or they may perform stricter reviews to ensure that requests comply with regulations. These behaviors are a means of compliance with the formal requirements of continuing resolutions and a risk-reduction strategy for avoiding the consequences of violating regulations. This outcome may be viewed as an example of the "fraud/red tape" dilemma, in which organizations must trade speed and efficiency in public procurement systems to mitigate fraud or other violations of administrative law (McCue et al., 2007). Review officers may act out of an abundance of caution to avoid the legal and professional consequences that result from violating the restrictions imposed by a continuing resolution. These behaviors are predicted to increase the time from the initiation of a purchase request to its ultimate acceptance.

H2: The review and approval period will be extended during continuing resolutions.

The third hypothesis predicts that the dollar amount of purchase requests initiated during continuing resolutions will be lower because of program office requirements to minimize spending. Federal agencies can restrict spending by limiting the allocation of budget execution authority to lower-level offices within their organizations. They are also able to issue directives to minimize expenditures until final budget authorizing legislation is passed. These strategies reflect the top-down nature of cutback budgeting that occurs during periods of fiscal stress (Bozeman & Straussman, 1982).

Additionally, uncertainty regarding the final budget allotment may cause end users to reduce the size of their purchase requests. Goods may be ordered at a lower quantity of units, while service agreements may be pared down to only the most essential functions. This conservatism may help mitigate the risk that when the continuing resolution is replaced with full budget authority, the ultimate spending authorization will be lower than predicted.

H3: The average dollar amount of purchase requests will decrease during continuing resolutions.

The purpose for testing these hypotheses is to better reveal the precise effects that continuing resolutions have on procurement activity. To this point, there has been no quantitative analysis of the magnitude of the distortions that these budgetary events cause. Measuring the responses helps reveal how federal acquisitions systems are impacted by the political influences that are essential to their public character.

Background on United States Marine Corps Purchase Requests

Before discussing the empirical framework used to test the hypotheses, the following section provides some background on public procurement within the Department of Defense, and on the specific system used by the United States Marine Corps that the data used in this



analysis are drawn from. Officials in the Department of Defense have recently renewed their efforts to measure and improve the speed of defense acquisitions (Bertheau, 2018). Part of this improvement effort is to more clearly measure the different milestones in the life of a procurement action. The Federal Acquisition Regulations (FAR) define these milestones as beginning,

at the point when agency needs are established and includes the description of requirements to satisfy agency needs, solicitation and selection of sources, award of contracts, contract financing, contract performance, contract administration, and those technical and management functions directly related to the process of fulfilling agency needs by contract. (FAR, 2020a, 2.101)

The time from identifying agency requirements to the time of awarding a contract for the good or service is defined as the Total Acquisition Lead Time (TALT; Kair, 1996). As depicted in Figure 1, TALT is divided into two components that are separated by the acceptance of the purchase request initiated by the end user that will ultimately use the procured resource. The first portion of the timeline is the preapproval period, defined by Letterle and Kantner (2019) as the Purchase Request Acceptance Lead Time (PRALT). This component of the acquisitions process is not systematically tracked or recorded in procurement management systems. The latter portion of the timeline that follows request acceptance is known as the Procurement Acquisition Lead Time (PALT) and is tracked for most contracting activities. PALT is the primary metric used within the Department of Defense (DoD) to evaluate the effectiveness and efficiency of contracting activities.

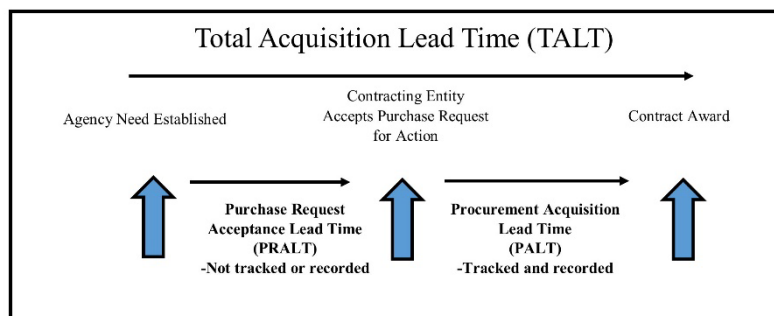


Figure 1. Purchase Request Processing Timeline (Letterle and Kantner, 2019)

The efficiency of the contracting activities that occur in the post-approval PALT phase of the acquisition process is influenced by the quality of the work done in the earlier PRALT phase. While the personnel completing the latter tasks in the PALT stage are procurement professionals, much of the early work during the PRALT phase is conducted by the end users of the procured resources, who may not be trained in acquisitions or contracting regulations. For example, Part 11 of the FAR requires end users to describe the physical characteristics of the requested resources and include them in a Statement of Work (FAR, 2020b, 11.101-11.107). If purchase requests submitted by the end user are not compliant with regulations, they are returned by the contracting professionals. Multiple rounds of revision and resubmission are not uncommon during the PRALT phase.

This lack of training and attention to the preapproval phase of public procurement has been identified in other federal agencies. The Government Accountability Office (GAO) determined that the Federal Emergency Management Agency (FEMA) was lacking in the implementation of controls over the pre-solicitation phase of contracting. Similar to the DoD, FEMA’s acquisition planning process follows a two-part phase divided by the submission of an



acquisition request to the contracting office. Among the GAO's recommendations were to improve the guidance for program office personnel to help implement an acquisition planning schedule (GAO, 2018).

The primary metric of contract performance used by the DoD, PALT, begins with the acceptance of a purchase request by the contracting office. All prior work by the program office during the pre-approval PRALT period, regardless of the time delay and how many revisions to the purchase request are completed, is excluded from the PALT measure. Efforts to improve the efficiency of the PRALT period must overcome the high turnover rates of military personnel within the program offices. Typically, uniformed personnel transfer occupations every two to three years. This leads to a workforce that is relatively unfamiliar with the regulatory framework surrounding defense acquisitions and is subsequently prone to making frequent errors in purchase requests that require multiple rounds of revision.

Data

The data for this analysis are obtained from the United States Marine Corps (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 four 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.

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 negative². After removing other records that had missing or incomplete data, the remaining sample comprises 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.³ 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

² The unit price and total order line amount that make up the total purchase value for individual requests in our 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.

³ Commercial items are covered under Part 12, while negotiated contracts are covered under Part 15 of the FAR (FAR, 2020a).



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) that explored the relationship between bureaucratic competence and procurement outcomes. A total of 28 supply officers and 13 reviewing officials are 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 PRALT. Ideally, PRALT would start earlier than this at the point 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 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. We conducted additional manual inspection of the purchase request descriptive fields to generate an indicator variable (GOOD) that differentiates between goods and services. This indicator is then used to examine whether the responses to continuing resolutions vary for the two types of resources.

Theoretically, goods and services may fare differently under continuing resolutions 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 continuing resolution 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 continuing resolution. The predicted impacts of continuing resolutions on the quantity, size, and length of 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.

Descriptive Analysis

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.

The creation of purchase orders is expected to reflect the seasonal variation in overall defense procurement. Defense spending increases towards the end of the fiscal year as managers follow the “use it or lose it” pressures to obligate funds before their budgetary authority expires (Hurley et al., 2014). These pressures encourage a surge in procurement activity in the final months and weeks of the fiscal year (Liebman & Mahoney, 2017).

Empirical efforts to measure the effect of continuing resolutions must also address the seasonal effects that simultaneously affect procurement activities (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. We control for the average seasonal effect by adding indicators for the quarter of the fiscal year in which each purchase order is initiated. Additionally, we include in the panel data from FY2019, when the defense portion of the federal budget was passed on time and there was no continuing resolution for defense spending. This provides an approximation of a control year that would exhibit the same spending seasonality, but without the added constraints of a CR. Figure 2 depicts the count of purchase orders initiated each month in each of the four years covered in the data. Additionally, this figure includes a dashed vertical line that indicates for FY2016–FY2019 when the full budget authorization bill was enacted for that year. No vertical line for FY2019 is included because its defense budget passed on time. The FY2016 appropriation bill was enacted on December 18, 2015. The FY2017 bill was enacted on May 5, 2017, and the FY2018 bill was enacted on March 23, 2018. For FY2016 and FY2017, federal spending was authorized up to the final enactment date with a series of continuing resolutions. In FY2018, federal spending experienced two relatively short funding gaps in January and February that occurred between the consecutive continuing resolutions. In each year, the count of monthly purchase orders initiated appears to increase once spending authorization transitions from continuing resolutions to current year budget authority.



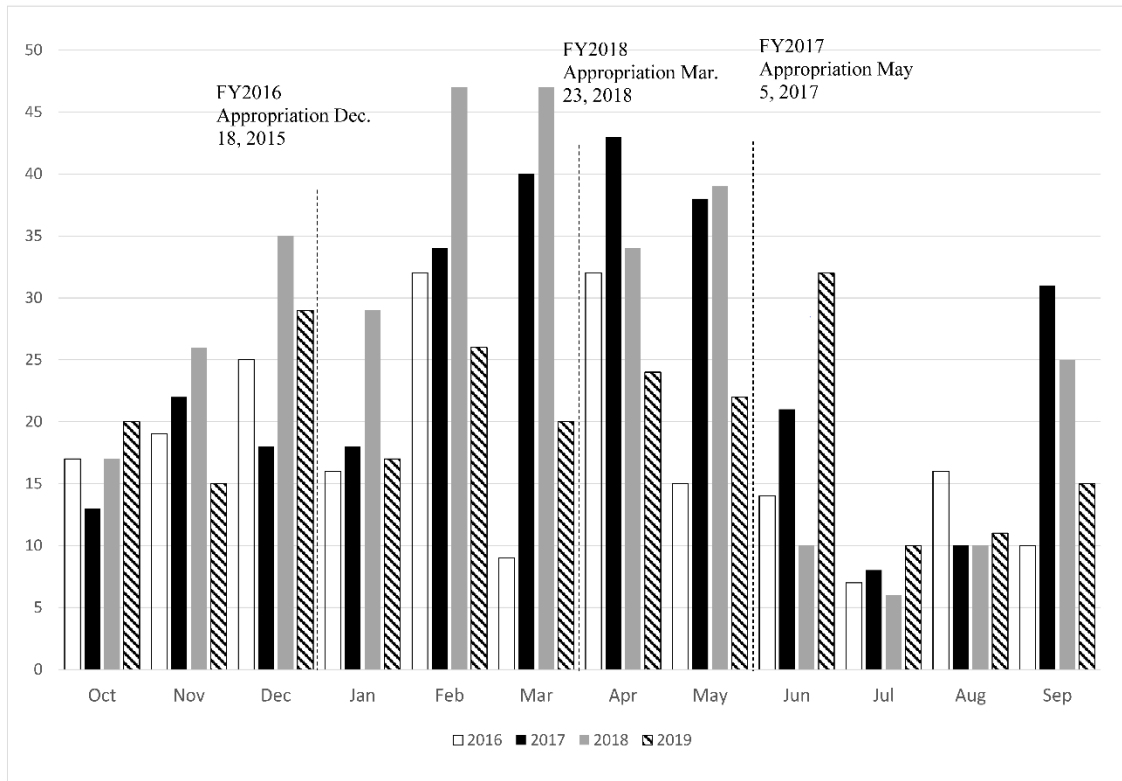


Figure 2. Count of Purchase Orders Created by Month (FY2016–2019)

Results

This section describes the quantitative analysis of three aspects of the USMC purchase orders initiated between FY2016 and FY2019. The three dependent variables examined in this study are 1) the weekly count of purchase orders initiated, 2) PRALT, or the length of time between the initial purchase order creation and its final acceptance, and 3) the total price listed in the purchase order request.

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 four-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 four-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.



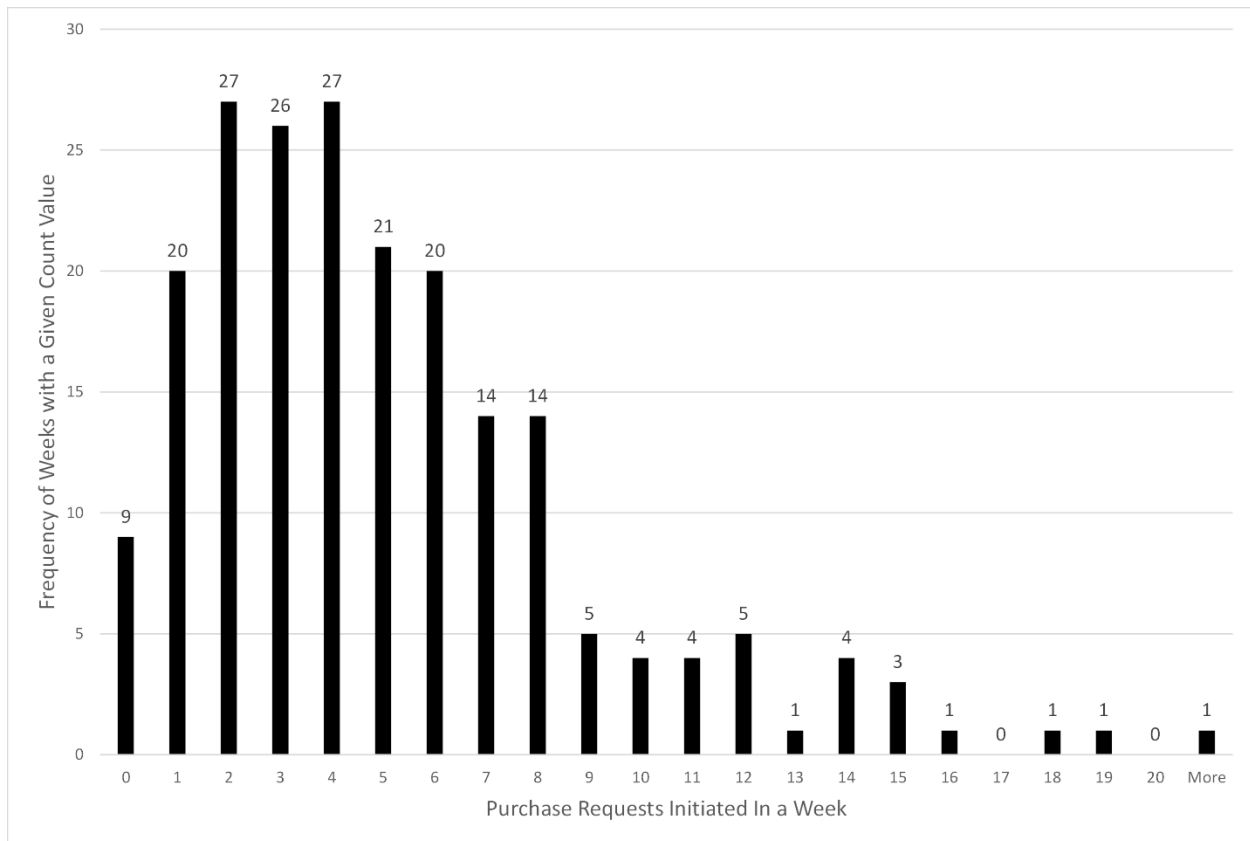


Figure 3. Histogram of the Count of Purchase Requests Initiated By Week (2016–2019)

The primary explanatory variable is an indicator that identifies whether each week occurs within that fiscal year’s continuing resolution 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 dataset and then for the goods and services separately. This approach depicts whether continuing resolutions have a differential effect on the number of purchase orders for goods versus services.

The model is estimated using the linear 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 restrictions⁴, and is more consistent than the Negative Binomial estimator (Wooldridge 2021a, 2021b).

The estimates from both the OLS and Poisson regressions are displayed in Table 1. The estimates from the Poisson regressions have been converted to their Average Partial Effects to enable direct comparison of the marginal effects with the OLS estimates⁵. 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,

⁴ 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.

⁵ The untransformed Poisson estimates are displayed in the Appendix.



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.

It is interesting to note that the seasonal control for the first quarter of the fiscal year is statistically significant in Columns 3, 4, and 6 and marginally significant in Column 1. The combination of statistical significance in both the season controls and the CR indicator helps give assurance that the CR measure is not simply measuring the predicted seasonal pattern of government spending and the pattern of “use it or lose it.” These two factors influence procurement activity in the same downward direction, and appear to be identified separately within this analysis.

PRALT Duration Analysis

The PRALT length model is estimated using Ordinary Least Squares regression. The unit of observation for this model is the individual purchase request, yielding 1074 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 continuing resolution. 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.

Table 3 depicts the results of the PRALT duration analysis. 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 continuing resolutions 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 bottom of the table. The combination is not statistically significant, indicating the effect of the continuing resolution 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 fourth quarter of the year. Those initiated in the third quarter take a little



more than 16 additional days than those initiated in the fourth 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 pre-approval period by approximately eight days. This result is not surprising, but it is interesting to quantify how iterations and adjustments to procurement actions in the pre-approval period lengthen this stage of the process.

Total Purchase Price

The purchase price model uses the same structure as the PRALT duration model. The dependent variable in this model is the real dollar amount per purchase request. Dollar amounts are normalized using the Average Annual CPI index for urban consumers. The key explanatory variable remains the indicator for whether the purchase request was initiated during a week under CR status. The other explanatory variables are also unchanged from the PRALT length model. Analyzing the total price of purchase orders revealed a modest CR effect that is mediated by whether the product is a good or a service. Table 4 depicts the OLS results from four variants of the estimated equation. 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 continuing resolutions. The negative value of the base CR variable only holds for services once the interaction terms are fully taken into account.

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 continuing resolutions remains.

It makes sense that services would experience a differential impact under continuing resolutions. 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 continuing resolutions 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 continuing resolutions. As a robustness test, we reran the analysis in Column 4 of Table 4, 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.

Discussion

The above analysis examined the impact of continuing resolutions on three different aspects 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 continuing resolution 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 framework for understanding the components of publicness (2009). The public value dominating continuing resolution 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 continuing resolutions 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 continuing resolutions 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 continuing resolutions on the release of federal grants to non-profit 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 cause by continuing resolutions is another way to understand its status as a public entity.

Limitations

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 BCA 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 continuing resolution 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 continuing resolutions on federal procurement activity.

Conclusion

Irene Rubin concludes 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” (2007, p. 615). It would be grossly naïve to assume that this study will provide that motivation, but efforts to quantify the administrative burden of continuing resolutions 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 continuing resolutions is felt across society.

There are many anecdotes, news stories, and personal interviews describing the impact of continuing resolutions. This study, to our knowledge, is the first to quantify the impact of these restrictions on agency behavior and the first to explore the interaction between continuing resolutions and public procurement. Further studies that explore the behavioral responses to the uncertainties created by continuing resolutions 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.

Table 1. Summary Statistics of PRALT Length and Total price, Differentiated By Good/Service and Continuing Resolution Status

		Continuing Resolution		Full Budget Authority		Overall
		Service	Good	Service	Good	
Number of Purchase Orders		148	80	530	316	Total 1,074 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)



Table 2. Results of OLS and Poisson Regression Analyses of Continuing Resolution Status on Purchase Requests Initiated Per Week

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*** (0.793)	-1.200** (0.545)	-1.125** (0.449)	-2.238*** (0.781)	-1.237** (0.539)	-0.952** (0.456)
Fiscal Year 2017	2.465*** (0.780)	1.400** (0.569)	1.065** (0.427)	2.447*** (0.776)	1.409** (0.562)	1.024** (0.445)
Fiscal Year 2018	2.620*** (0.766)	1.365** (0.569)	1.255*** (0.431)	2.542*** (0.722)	1.328** (0.538)	1.207*** (0.415)
Fiscal Year 2019	0.066 (0.621)	0.535 (0.471)	-0.469 (0.328)	0.299 (0.530)	0.593 (0.417)	-0.278 (0.276)
FYQ1 (Oct.–Dec.)	-1.577* (0.823)	-0.589 (0.535)	-0.988** (0.478)	-2.143** (0.903)	-0.792 (0.569)	-1.452** (0.574)
FYQ2 (Jan.–Mar.)	-0.311 (0.759)	-0.112 (0.488)	-0.200 (0.471)	-0.172 (0.706)	-0.0625 (0.471)	-0.103 (0.427)
FYQ3 (Apr.–June)	0.390 (0.838)	0.708 (0.620)	-0.317 (0.449)	0.345 (0.667)	0.607 (0.501)	-0.244 (0.353)
Constant	4.943*** (0.622)	2.790*** (0.443)	2.153*** (0.384)			
Observations	208	208	208	208	208	208
R-Squared	0.199	0.118	0.183			
Pseudo 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



Table 3. 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** (10.170)	32.741** (14.389)	5.617 (11.749)	15.416 (15.890)
Purchase Order for Goods (GOOD)	-9.736* (4.964)	-4.508 (5.643)	-9.349* (4.890)	-3.666 (5.462)
Interaction CR*GOOD		-24.831* (14.966)		-27.165* (15.542)
Count of Adjustments Made to the PR	8.390*** (1.136)	8.386*** (1.139)	8.365*** (1.138)	8.366*** (1.142)
Fiscal Year 2017	19.121 (12.411)	20.292 (12.338)	25.497** (12.644)	26.791** (12.586)
Fiscal Year 2018	26.975** (10.826)	27.291** (10.768)	28.350*** (10.654)	28.645*** (10.603)
Fiscal Year 2019	2.367 (9.584)	3.410 (9.539)	-1.530 (9.281)	-0.383 (9.241)
FYQ1 (Oct.–Dec.)			29.823** (12.026)	29.330** (12.109)
FYQ2 (Jan.–Mar.)			30.780*** (7.720)	31.654*** (7.843)
FYQ3 (Apr.–June)			16.113** (7.644)	16.489** (7.616)
Constant	-27.712*** (10.492)	-30.105*** (10.384)	-42.415*** (12.505)	-45.358*** (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 (7.689)		-11.749 (9.360)

Robust standard errors in parentheses

Note: 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



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

Robust standard errors in parentheses

Dollar amounts normalized using Annual Average CPI index for urban consumers.

Note: 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

References

- Bartels, F. (2018). *Continuing resolutions invariably harm national defense*. The Heritage Foundation. <https://www.heritage.org/defense/report/continuing-resolutions-invariably-harm-national-defense>
- Berteau, D. (2018). DoD can reduce time to contract. *The Federal Times*, 30.



- Bozeman, B. (1987). *All organizations are public: Bridging public and private organizational theories*. Jossey-Bass Inc Pub.
- Brien, S. T., Candreva, P. J., Hansen, S. C., & Pizzini, M. 2020. Looking forward to cuts: A simulation decision tool for cutback management. *Public Budgeting & Finance*, 40(1) 3–21.
- Brown, T. L., Potoski, M., & Van Slyke, D. M. (2009). Contracting for complex products. *Journal of Public Administration Research and Theory*, 20(Supplement 1), i41–58.
- Cameron, A. C., & Trivedi, P. K. (2001). Essentials of count data regression. *A Companion to Theoretical Econometrics*.
- Cameron, A. C., & Trivedi, P. K. (2013). *Regression analysis of count data*. Cambridge University Press.
- Decarolis, F., Giuffrida, L. M., Iossa, E., Mollisi, V., & Spagnolo, G. (2018). *Bureaucratic competence and procurement outcomes* [Working Paper]. National Bureau of Economic Research. <http://www.nber.org/papers/w24201>
- FAR. (2020a). <https://www.acquisition.gov/content/part-2-definitions-words-and-terms>.
- FAR. (2020b). 11. <https://www.acquisition.gov/content/part-2-definitions-words-and-terms>.
- Fichtner, J. (2014). Curbing the splurge in year-end federal government spending: Reforming “use it or lose it policies [Mercatus working paper]. <https://ssrn.com/abstract=3191368>
- GAO. (2018). *2017 disaster contracting: Action needed to better ensure more effective use and management of advance contracts*. <https://www.gao.gov/products/GAO-19-93>
- Herrmann, R. M. (2017). The pitfalls of new starts during a continuing resolution. *Army Lawyer*, 2017(8), 5–13.
- Hurley, W. J., Brimberg, J., & Fisher, B. (2014). Use it or lose it: On the incentives to spend annual defence operating budgets. *Defence and Peace Economics*, 25(4), 401–413.
- Joyce, P. G. (2008). Does more (or even better) information lead to better budgeting? A new perspective. *Journal of Policy Analysis and Management*, 27(4), 945–960.
- Kair, L. (1996). *An analysis of total acquisition lead time for small purchase actions in an operational contracting environment*. Air Force Institute of Technology.
- Letterle, K. W., & Kantner, P. A. (2019). *An analysis of contracting activity purchase request acceptance lead time for USMC using unit acquisitions under the simplified acquisitions threshold*. Naval Postgraduate School.
- Liebman, J. B., & Mahoney, N. (2017). Do expiring budgets lead to wasteful year-end spending? Evidence from federal procurement. *American Economic Review*, 107(11), 3510–3549.
- Loader, K. (2013). Is public procurement a successful small business support policy? A review of the evidence. *Environment and Planning C: Government and Policy*, 31(1), 39–55.
- Martin, L. L. (2002). Performance-based contracting for human services: Lessons for public procurement. *Journal of Public Procurement*, 2(1), 55–71.
- McCrudden, C. (2004). Using public procurement to achieve social outcomes. *Natural Resources Forum*, 28(4), 257–267.
- McCue, C. P., Buffington, K. W., & Howell, A. D. (2007). The fraud/red tape dilemma in public procurement. In *Public Procurement: International Cases and Commentary*, Routledge, 247–263.
- McGarry, B. W. (2018). *The defense budget and the budget control act: Frequently asked questions* (44039). Congressional Research Service.
- Moulton, S. (2009). Putting together the publicness puzzle: A framework for realized publicness. *Public Administration Review*, 69.5(2009), 889–900.
- Myers, S. L., & Chan, T. (1996). Who benefits from minority business set-asides? The case of New Jersey. *Journal of Policy Analysis and Management*, 15(2), 202–226.
- Nakabayashi, J. (2013). Small business set-asides in procurement auctions: An empirical analysis. *Journal of Public Economics*, 100, 28–44.



- Palmujoki, A., Parikka-Alhola, K., & Ekroos, A. (2010). Green public procurement: Analysis on the use of environmental criteria in contracts. *Review of European Community & International Environmental Law*, 19(2), 250–262.
- Pandey, S. K. (2010). Cutback management and the paradox of publicness. *Public Administration Review*, 70(4), 564–571.
- Preuss, L. (2011). On the contribution of public procurement to entrepreneurship and small business policy. *Entrepreneurship & Regional Development*, 23(9–10), 787–814.
- Rainey, H. G. (2009). *Understanding and managing public organizations*. John Wiley & Sons.
- Rubin, I. (2007). The great unraveling: Federal budgeting, 1998–2006. *Public Administration Review*, 67(4), 608–617.
- Thai, K. V. (2001). Public procurement re-examined. *Journal of Public Procurement*, 1(1), 9–50.
- Williams, L. M., & Wees, D. P. (2016). *FY2017 defense spending under an interim continuing resolution (CR): In brief*. Congressional Research Service.
- Woolridge, J. [@jmwoolridge]. (2021, April 15). *Confusion about the choice between Bayesian and classical methods* [Tweet]. Twitter.
<https://twitter.com/jmwoolridge/status/138774703966785539>
- Woolridge, J. [@jmwoolridge]. (2021, July 17). *“Efficiency” is another world that we often use too loosely* [Tweet]. Twitter.
<https://twitter.com/jmwoolridge/status/1416420329342345219>

Appendix

Poisson Regression of Purchase Orders Initiated Per Week

Count of Purchase Orders	Poisson Regressions		
	(1) Total Orders	(2) Service Orders	(3) Goods Orders
Indicator of Continuing Resolution	-0.433*** (0.147)	-0.380** (0.161)	-0.500** (0.234)
Fiscal Year 2017	0.485*** (0.143)	0.453*** (0.173)	0.530** (0.216)
Fiscal Year 2018	0.500*** (0.134)	0.432** (0.168)	0.601*** (0.197)
Fiscal Year 2019	0.074 (0.130)	0.216 (0.152)	-0.211 (0.211)
FYQ1 (Oct.–Dec.)	-0.415** (0.174)	-0.243 (0.175)	-0.762** (0.297)
FYQ2 (Jan.–Mar.)	-0.033 (0.137)	-0.019 (0.144)	-0.054 (0.224)
FYQ3 (Apr.–June)	0.067 (0.129)	0.186 (0.152)	-0.128 (0.184)
Constant	1.539*** (0.119)	0.993*** (0.144)	0.674*** (0.191)
Observations	208	208	208
LL	-557.8	-472.7	-385.7
PseudoR2	0.102	0.0580	0.105

Note: Robust standard errors in parentheses

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





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