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# Overseas Contingency Operations Contracts After Iraq: Enabling Financial Management Research and Transparency Through Contract Labeling[1]

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## Abstract

The challenges posed by both manmade and natural crises require flexible and rapid responses from policy-makers. However, the inherent uncertainty of these situations makes them vulnerable to waste, fraud, and abuse. Consequently, contracts awarded during crises would often be deemed unsuitable during ordinary times. The occupations of Iraq and Afghanistan, the American Recovery and Reinvestment Act's (Recovery Act) efforts after the most recent financial crisis, and the government's responses to natural disasters since this century began have all involved high-profile incidents of crisis contracting. Governmental efforts to improve transparency and oversight regarding these contract awards have been admirable, but they are limited in their ability to maintain and proliferate lessons learned. This project addresses that problem by creating a crisis-funded contract dataset to test best practices across different domains and enhance data transparency for future practitioners and researchers.

## Introduction

Contracting during a crisis is replete with challenges. Delays mean urgent needs go unmet, so speed and flexibility are essential. Additionally, uncertainty is commonplace, whether the crisis is prompted by natural disasters, military conflicts, or economic disturbances. Such crises are vulnerable to the infamous trifecta of waste, fraud, and abuse. Even setting those extremes aside, many justifiable crisis contracts cannot or should not be sustained in ordinary times.

This century has already seen a range of high-profile crisis contracting, including for military overseas contingencies, disaster response, and economic stimulus. These cases have served as learning experiences for the agencies involved in awarding crisis contracts,

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and for the federal government generally. Important work has been done to provide oversight and transparency by the Government Accountability and Transparency Board, the Commission on Wartime Contracting, inspectors general (IGs), and others. However, when policy-maker attention moves on to a new set of crises and the final reports are filed, lessons identified in one domain might not be recognized in another. Moreover, as attention fades away, the increasing difficulty of determining whether recommendations were followed and whether they succeeded in mitigating preexisting risks produces a real threat of backsliding into approaches associated with prior problems.

### *Scope*

This project considers crisis-funded contracting for Department of Defense (DoD) contingencies. It also reviews studies of civilian efforts, such as the Recovery Act and disaster response efforts, because concerns about crisis contracting apply across domains. For the military, the focus is on Overseas Contingency Operations (OCO) funded contracting that occurred after the initial withdrawal from Iraq, a period of reduced scrutiny relative to the pre-withdrawal years that nonetheless benefited from efforts by the DoD to improve data transparency. The three categories of crisis contracting studied in this paper are

- Contingency operations, with a focus on OCO-funded contracting that occurred after the initial withdrawal from Iraq. This situation is also comparatively understudied—in no small part because of the opaqueness and ambiguity surrounding the OCO budget.
- Contracts paid for by the Recovery Act, which started in 2009 and continues thereafter, though the bulk of the spending takes place in the first two years. This data had been collected through recovery.gov, which is no longer operational, and is also reported through the FPDS website (General Services Administration [GSA], 2019).
- Contracts supporting natural disaster responses that are captured by the National Interest Action Code in the period between 2005 and 2016. The first disaster coded in this dataset is Hurricane Katrina. Note that grants make up the bulk of many disaster responses, but this paper is exclusively focused on contracts.

### *Plan of the Paper*

Because earlier iterations of this work have been presented at a past Naval Postgraduate School (NPS) conference, this paper focuses on new results and summarizes material that has already been presented. The Background and Literature Review briefly overviews past research on crisis contracting as well as the regulatory environment for these contracts. The Hypotheses section lays out three possibilities on which contracting approaches aggravate or mitigate the risks inherent in crisis contracting. The hypotheses focus on three areas where the literature review indicates that crisis contracting diverges from conventional contracting: noncompetitive awards, undefinitized contract actions, and reach-back contracts. The Data and Methods section discusses the challenges and contradictions in the labeling of crisis contracts that make identifying OCO-funded contracts particularly difficult. It also introduces the logistical regression model employed by the paper.

After describing the creation of the datasets and model, the paper then proceeds to the Results section, which describes trends in crisis-contracting in the datasets and the results of the model. The Discussion and Conclusion section analyzes these results and evaluates whether they support or refute the paper's hypotheses before drawing out larger implications.

## Background and Literature Review

### *Contingency Contracting*

Contingency contracting has been defined as "direct contracting support to tactical and operational forces engaged in the full spectrum of armed conflict and Military Operations Other Than War, both domestic and overseas. It includes Major Regional Conflicts, Lesser Regional Conflicts, Military Operations Other Than War, and Domestic Disaster/Emergency Relief." In addition, this paper includes humanitarian and peacekeeping operations in this category.

### *Regulatory Environment*

The Competition in Contracting Act of 1984 (CICA) mandates that federal procurements involve full and open competition, but also stipulates exemptions that allow contracting officers to engage in noncompetitive procurement during "urgent and compelling" situations. Additionally, these contingency contracts enjoy exemptions that allow them to start faster. For example, if a losing vendor protests the outcome of a competition, a contingency contract does not have to wait until the protest is resolved to start. In addition, contingency contracts are more able to employ undefinitized contract awards, which allow starting work before all the details of payment are in place.

Despite the range of regulatory exemptions, aspects of crisis contracting face heightened scrutiny. The crisis contract durations are often quite limited to minimize the amount of time the government is committed to expedited deals. Whether such restrictions should be further institutionalized is currently in dispute. Proposed reforms have sought to limit contingency contracts by default, but opponents contend that shorter contingency contracts are not necessarily better.

### *Negative Outcomes of Crisis Contracting*

The urgency that inevitably surrounds crisis contracting provides opportunities for waste, fraud, and abuse because contracting officers are unable to obtain information parity with vendors before funds are dispersed. After Hurricane Katrina, hotels contracted to house the affected sent invoices to relevant contracting officers before the latter could confirm the contract terms. Information asymmetry regarding contractor performance can then extend over the life of these contracts. Moreover, crisis funding for natural disasters can lead to increased levels of incomplete documentation, a lack of contract closeouts, and higher level reviews that do not happen or are insufficiently documented. Insufficient documentation leaves the process vulnerable to fraud throughout.

### *Aggravating or Mitigating Factors*

Noncompetitive Awards—The ability to bypass competition when awarding contracts due to urgency is an important aspect of contingency contracting because competition can lead to delays. For contingency contracting, delays can undermine mission efficiency, regarding both meeting the urgent needs of disaster-affected populations and the effectiveness of responders. Noncompetitive contracts that use the urgency exception are limited to only one year to reduce the risk of overspending, but the relative cost and benefits of shorter contracts are disputed. In addition to the risk of higher prices and lower quality products or services, noncompetitive contracts are also at greater risk of misconduct when compared to ones awarded through the standard procurement process.

Undefinitized Contract Actions—Undefinitized contract actions (UCAs) allow production to start without defining all of the terms of the contract. These contracts can be advantageous because they allow for the immediate production and allocation of critically needed goods or services. Unfortunately, UCAs increase the risk of overpaying for goods

and services, and of making the contracting officer beholden to the vendor. In disaster relief contracting, they carry an even higher risk of cost overruns than when UCAs are used in ordinary times. Entering into a UCA through a noncompetitive award exacerbates these challenges.

Reach-Back Contracting—Reach-back contracting allows contracting officers in the field to "reach-back" to domestic contracting officers for support in contingency operations. It shifts the workload back to domestic contracting offices, which can result in fewer deployed contracting officers. With reduced deployments, the risks and costs associated with transportation and hazardous duty pay also decline. By utilizing reach-back methods, contracting officers can improve their strategic buying and develop greater expertise within their source selection. Furthermore, reach-back contracting facilitates continuity to workflow management and increased standardization for contingency contract reporting.

## Research Question and Hypotheses

This paper is motivated by the high-risk nature of crisis-funded contracting. The research question focuses on U.S. federal contracting because of the range of U.S. crisis-funded activities and the wealth of available data.

> How do crisis-funded contracting approaches employed by the U.S. federal government correlate with performance indicators?

The largest number of U.S. federal crisis-funded transactions relate specifically to Overseas Contracting Operation, but disaster-related and Recovery act acquisition are also included because the risks of urgent acquisition are not limited to the military context. Dealing with recovery from ecological or economic challenges also has the advantage of being more relevant to the private sector as well as state and local governments.

To answer this question, the study team had to create a crisis-funded contract dataset consisting of transactions that have been labeled as supporting OCO, the Recovery Act, or disaster recovery. This dataset was then supplemented by identifying unlabeled OCO activity after the U.S. withdrawal from Iraq based on budgetary data, regulatory restrictions, and similarity to labeled OCO transactions. To achieve both steps, the study team employed a decision. This paper focused the identification work on OCO contracting after the Iraq war for three reasons. First, the wartime period has already been subject to greater scrutiny, including the Commission on Wartime Contracting. Second, the study team identified a significant gap between OCO budgets and the level of labeled contingency contracting activity, suggesting that there was much work to be done. Third, starting in 2012, contract-level budget account labeling was reliably available in FPDS, which facilitates the labeling process. The study team has not attempted to identify unlabeled Recovery Act or disaster contracting. In the former case, the extensive reporting requirements embedded in the effort have already done that work. The study team has less confidence in the completeness of disaster recovery reporting, but undertaking a second systematic identification process was beyond the scope of this paper.

The identification of the crisis-funded dataset makes possible a descriptive analysis of what is being contracted for and how. The paper pays special attention to the differences between defense and civilian contracting as well as contracts that are performed domestically or overseas. OCO contracts are oriented towards the DoD and international performance, but not all international DoD contracts are OCO spending; for example, many contracts relating to U.S. military bases abroad do not provide direct support to ongoing contingency operations.

The descriptive analysis is focused on three categories of contract characteristics associated with aggravated or mitigated risk: competition, UCAs, and reach-back contracting. The aggravating and mitigating characteristics were derived from the literature review. Having identified these categories, the study team then posited hypotheses on the relationship between crisis contracting and contract performance. The two contract performance outcomes examined by this paper are derived from FPDS: contract ceiling breaches and terminations.

The first hypothesis reflects the literature on the risks of crisis-funded contracting and examines them collectively:

> $H_1$: Crisis-funded contracts are more likely to experience poor performance.

The next hypothesis has two parts, both focused on competition. The literature suggests that competition reduces the risk of poor performance, while contracts that are not competed should have their scope limited and should be subject to additional scrutiny. Contracts avoiding competition through use of urgency waivers are singled out in the literature as an aggravated instance of this risk. The H2A and H2B seek to evaluate, respectively, whether competition mitigates and urgency exceptions aggravate the risk of crisis-funded contracts.

> $H_{2A}$: Increasing (decreasing) competition makes poor contract performance less (more) likely for crisis-funded contracts.
>
> $H_{2B}$: The use of urgency exception to competition requirements makes poor crisis-funded contract performance more likely.

Similar to urgency waivers, UCAs embody the pressed for time nature of crisis-funded contracting. UCAs can allow contracting officers to act first and work out the details later, which greatly accelerates the contracting process but leaves uncertainty to be resolved during implementation. UCAs are thought to be high risk even for conventional contracts, and this hypothesis tests whether that risk compounds for crisis-funded contracts.

> $H_3$: The use of UCAs makes poor crisis-funded contract performance more likely.

Finally, crisis-funding contracting can involve a trade-off between employing contracting offices that are closest to the action versus those closer to the action. Reach-back contracting in the strictest sense refers to the practice in the Iraq war of using the home base of deployed units to manage some contracts, but this study seeks to test a more general version of that idea.

> $H_4$: The use of domestically focused contracting offices makes poor crisis-funded contract performance less likely.

## Data and Methods

### *Data Sources and Structure*

#### *Data Sources*

The principal sources for this paper are FPDS and the DoD budget documents published on the comptroller's website. FPDS includes transaction level detail on U.S federal government contracts or task orders with a value of at least $3,500. Prominent exceptions to FPDS reporting requirements include classified contracts, the U.S. Postal Service, and the Defense Commissary Agency. The study team has created its own copy of

FPDS to facilitate analysis, including the creation of derived variables included in this report and the collation of variables at the contract and task order level.

The second primary source is the annual budget documents made available by the DoD comptroller. The study team aggregated the treasury funding accounts across each of the files to determine what percent of each account in each year was enacted with base budget funding versus OCO funding. Starting in Fiscal Year (FY) 2012, these classifications were also reliably available for FPDS contracts. Combining these two sources does not directly reveal whether a contract or task order is funded by OCO money, but it does at least give insight into the larger funding accounts.

### *Data Structure*

Each contract in FPDS has a unique procurement identifier, and each task order has a unique procurement identifier and a parent contract identifier. This collation allows for the creation of the performance variables used in this study, as the study team is interested in the entire history of contracts and task orders that experience challenges, not just the transaction in question. For brevity, in the remainder of the report, contracts and task orders are referred to simply as contracts.

This paper identifies crisis-funded transactions first as this is a more granular dataset, and sometimes a contract may serve both crisis and conventional purposes. After identifying the crisis transactions, the paper examines them in the first half of the Results section. The second half of the Results section narrows the focus to only those contracts with a majority of their obligations going to crisis-funded transactions. This choice reflects that contracts may have both conventional and crisis-oriented elements and the research question's orientation towards the latter.

### *Identifying Crisis Contracts*

This study involves multiple data sets: contingency contracts, disaster relief, and the Recovery Act. For the latter two, CSIS relies on identification work already done by the government. This manual classification of contingency contracts is a response to gaps in the underlying data. The potential magnitude of this gap is well over $100 billion, as may be seen by comparing the magnitude of reporting in FPDS and reporting from other sources. From FY2001–2011, transactions directly labeled as contingency contracts accounted for less than $30 billion in obligations. For that same period, the Commission on Wartime Contracting estimated that the spending on contracts and grants executed in Iraq and Afghanistan in support of operations in those countries exceeded $206 billion (Thibault & Shays, 2011, p. 2).[2]

The study team presented a contingency dataset, based on a point scale, at the 2017 Acquisition Research Symposium in Monterey, CA. Based on conversations after the presentation, the study team came to believe that the dataset may have overestimated the extent of the drop-off in contingency contracting in 2015 and 2016.[3] To increase the transparency and robustness of the contingency classification, the study team consulted with other experts and chose to adopt a decision tree methodology, which allows for the

[2] This estimate was made before FY2011 was completed.

[3] This feedback included the information that internal DoD reporting does label OCO funding streams on a transactional level. The study team was unsuccessful in obtaining that information.

display of underlying data at each step of the process. Rather than giving pieces of information different weights, the first five steps proceed in order, one criteria at a time. Contradictions are resolved in favor of the first criteria, and each subsequent step only assigns unlabeled transactions. Already labeled transactions are not reclassified.

The report still used a scoring system within the decision tree. This paper also updates the ways in which these scores are used, applying the measures directly rather than grouping them into bands to translate them into points (for example, 4 points for a transaction taking place in Iraq, 0 points for one domestically).

### *Measures of Dependent and Independent Variables*

#### *Output and Study Variables*

The study employs two different output variables, both derived from FPDS and listed in Table 1. These variables were first employed, and are described in greater length, in prior work of the study team focusing on fixed-price contracts (Sanders et al., 2015). Terminations is measured using a binary variable that has a value of 1 for any contracts that have experienced a partial or complete termination, 0 otherwise. FPDS does not differentiate between complete and partial terminations, so this can include both a canceled program and a contract that was completed after being initially protested and reassigned. 0.81% of contracts have experienced at least one partial or complete termination, and those records account for about 4.32% of obligations in the dataset. Ceiling Breaches is likewise measured as a binary variable with a value of 1 for any contracts that have experienced a ceiling breach, 0 otherwise. While only 1.19% of contracts have experienced a ceiling breach, the total obligations of those entries account for about 19.5% of obligations in the dataset. In addition, a slim fraction of terminations overlap with ceiling breaches, despite both accounting for a similar percentage of contracts and task orders.

## Table 1. Output and Study Variables

| Name | Type | Description |
|---|---|---|
| ***Output Variables*** | | |
| b_Term | Binary | Whether the contract experienced a partial or complete termination |
| b_CBre | Binary | Whether the contract has experienced a change order that increased its cost ceiling |
| ***Study Variables*** | | |
| CompOff | Categorical | How the variable was competed. Competition with 2-4 offers is the omitted baseline. |
| *NoCompUrg* | *Binary* | *Whether the contract was not competed due to an urgency waiver.* |
| *NoCompOther* | *Binary* | *Whether the contract was not competed for another reason.* |
| *CompOff1* | *Binary* | *Whether contract was competed and received 1 offers.* |
| *CompOff5plus* | *Binary* | *Whether contract was competed and received 5 or more offers.* |
| b_UCA | Binary | Whether contracts begin as a UCA, including letter contracts. |
| C_OffCri | Numerical | The percentage of a contracting offices obligations going to labeled crisis-funds, centered and rescaled. |
| OffPlace | Categorical | The place of performance for a contracting offices contracts. Omitted baseline is at less than 1 percent domestic obligations. |
| OffMixed | Binary | Whether at least 1 percent but less than 50 percent of the contracting offices' obligations are performed abroad. |
| OffIntl | Binary | Whether at least 50 percent of the contracting offices' obligations are performed abroad. |
| Crisis | Categorical | Whether the contract's obligations crisis-funded. For federal contracts, the omitted baseline in non-crisis funded contracts which have less than 50 percent crisis-funding. |
| OCO | Binary | Whether OCO is the top crisis-funding source, this is the omitted baseline for the crisis sample. |
| Recovery | Binary | Whether the Recovery act is the top-crisis funding source. |
| Disaster | Binary | Whether disaster response is the top crisis-funding source. |

The study variables, also listed in Table 1, cover competition, UCAs, and contracting office place of performance. The measure of competition separates urgency exceptions from other reasons not to compete contracts and divides competed contracts by the number of offers. While Urgency exceptions received significant attention in the literature, they are notably rare, making up only 0.87% of contracts, and the obligation they account for is similarly small at 1.3%. The measure for UCA is a binary variable that tracks whether a contract started as a UCA. Like urgency exceptions, UCAs are rare and account for a tiny proportion (around 0.5%) of contracts and only 2.9% of obligations. As an unfortunate side effect of a changeover in the name of the relevant column, UCA classification is missing for nearly 8% of records and 8.2% of obligations in the dataset. Nonetheless, the importance the literature places on this variable merits inclusion.

Specifically identifying reach-back contracts is analytically challenging. There are thousands of contracting offices, and the descriptors and surrounding data are often arcane. This study uses two different proxies. Frist, the project looked at what percentage of a contracting office's obligations go to officially labeled contingency contracts—a measure also used when producing the OCO contracting score. Second, the study team created a categorical variable used in this study that divides contracting offices into three categories based on the percentage of a contracting office's obligations that go to international contracts: domestic offices with less than 1% of their obligations internationally, mixed offices with at least 1% but less than 50% of their obligations internationally, and international offices with 50% or more internationally. For the purposes of this study, domestic and mixed contracting offices have sufficiently varied portfolios to be a reasonable

proxy for Reach-Back contracting, even if they form a far broader category than the Reach-Back division specifically.

### *Empirical Approach*

This paper explores the dataset using two different empirical approaches. First, the three crisis-funded transactions are graphed along with four comparison groups. The comparison groups consist of other transactions during the 2007 to 2015 period divided by whether they are defense and civilian and whether they took place in the United States or abroad.

The second approach involves creating models that estimate the likelihood of ceiling breaches and termination. Each outcome is modeled using both a sample of one million federal contracts and the complete dataset of contracts that have at least 50% of their obligations classified as crisis-funded according to the decision tree criteria. The use of both a federal and a crisis dataset allows comparison between what is typical for all contracts versus crisis contracts in particular, which is key to evaluating the study's hypotheses. The choice of a logistic model is driven by the binary representation of the study outputs. Given the rarity of these negative outcomes, the study team chose to focus on when they occur and not differences in magnitude. The multilevel approach introduces second and third level variables, shown in Table 5 in Appendix B: Presentation of the Estimating Equation, which approximates that different categories of what is being bought, who is buying it, where it is being performed, and when the contract was signed may each have different innate challenges. The multilevel approach allows for separate intercepts for each value of each of the characteristics listed in Table 5.

## Results

### *Extent and Characteristics of Crisis Contracting*

All three datasets exhibit considerable volatility over time, as shown in Figure 1, though the patterns are different depending on the kind of crisis fund. For OCO, the jump between 2010 and 2011 reflects newly available contract funding data.[4] From 2012 and after, funding accounts are reliably labeled, and spending declines from $40.6 billion and $35.5 billion in 2012 and 2013 to between $14.0 billion and $16.6 billion in the last three years of the sample. While international OCO spending began a steady decline after 2013, domestic OCO spending has been much more volatile, with peaks of $5.0 billion, $8.2 billion, and $4.6 billion in 2011, 2014, and 2016, while staying at or below $3.1 billion for every other year in the sample. That said, it is still notable that there was still a floor of over $10 billion a year in international OCO spending from 2014–2017 in addition to highly variable domestic OCO spending.

[4] See Figure 12 for a demonstration of how the funding account data aids in the identification of OCO accounts.

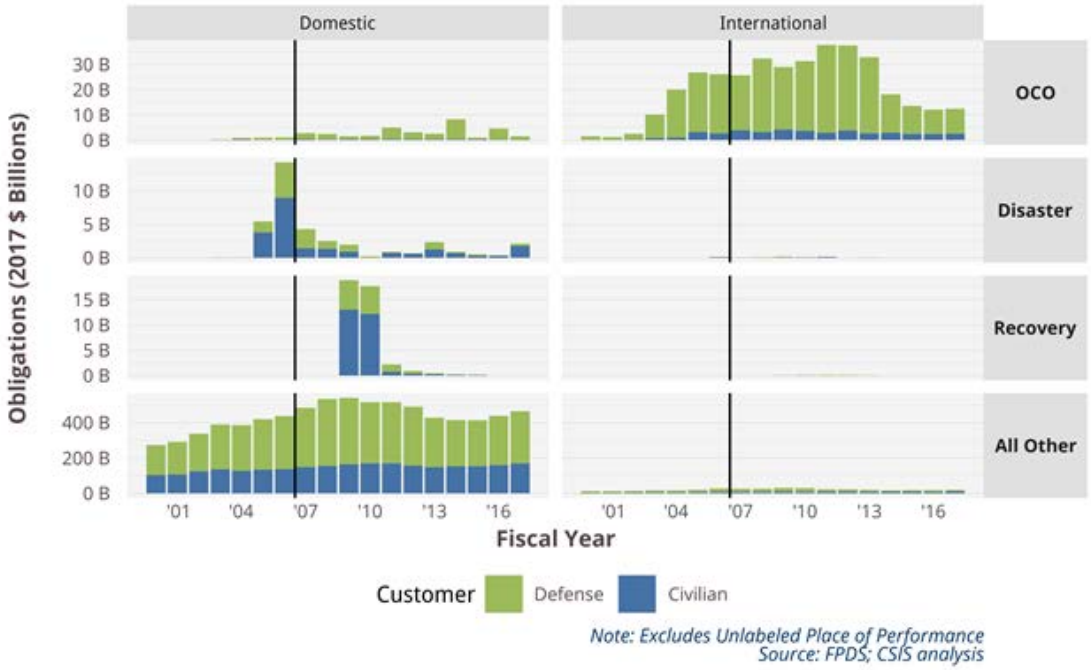


**Figure 1. Contracts Obligations by Crisis-Funding Category**

The Recovery Act was passed on February 17, 2009, and roughly half the obligations, $18.9 billion out of $40.8 billion, under the act were made in the six and a half months remaining in that fiscal year. The variation in disaster spending likely reflects both high profile recovery efforts and variable quality in data labeling. The three largest years for obligations occur in 2005, 2006, and 2007, $5.4 billion, $14.3 billion, and $4.3 billion, respectively, with only 2007 included in the sample.

Hurricane Katrina struck in August 2005, near the end of the fiscal year, and the vast majority of the mid-decade spike in spending relates to recovering from that disaster. The recovery efforts were long lasting, including nearly 79% of obligations in 2007 and over 30% of obligations in 2008, 2009, 2011, and 2016![5] For most of the disaster spending after 2007 in greater detail, and in most cases the obligations are split over multiple years. For example, the second biggest disaster is Hurricane Sandy, with $1.5 billion in obligations in 2013, another nearly $0.7 billion in 2014, and a bit under $0.45 billion in 2015. The majority of the disasters reported, including all with $1 billion or more in obligations, spent less than two-thirds of their obligations in their peak year.[6]

### *Competition*

To examine crisis-funded contracting's employment of competition, UCA, and reach back contracting, the study focuses on the 2007–2017 period and has created four

[5] Hurricane Katrina recovery efforts also had an outsized influence on 2010, which included a net $142 million deobligation of funds.

[6] Hurricane Harvey may prove an exception to this rule, with $932 million in 2017 spending, depending on how much is obligated to recovery efforts in 2018.

comparison groups. These four groups, the right four columns in Figure 2, split the non-crisis contracts by whether they were defense or civilian and whether they were performed internationally or domestically. This comparison is intended to ease like-to-like comparisons, for example, between OCO and other international defense contracts or the Recovery Act and other U.S. civilian contracts.

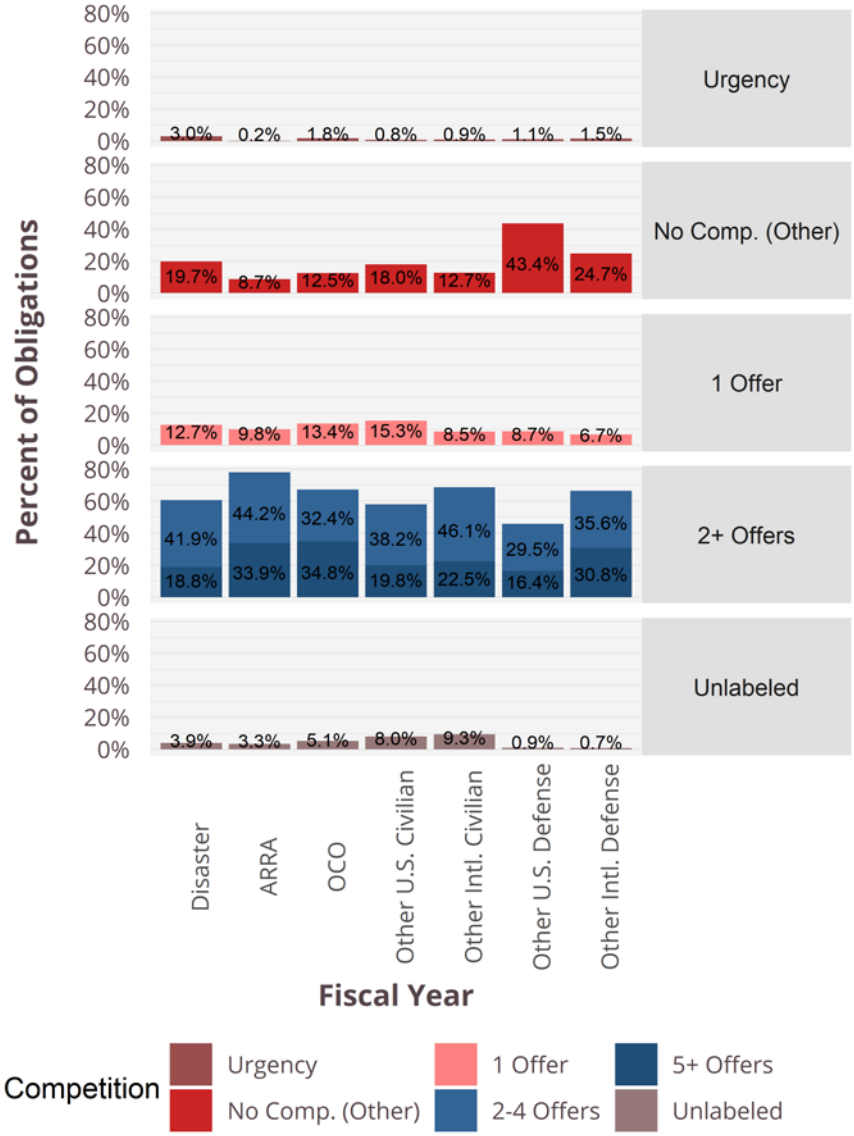


**Figure 2. Competition by Crisis-Funding Category**

As shown in Figure 2, OCO and Recovery Act obligations achieve robust levels of multi-offer competition, 67.2% and 78.1%, respectively. The Recovery Act rate is 20 percentage points in excess of other U.S. civilian contracts at 58.0%. The OCO rate is roughly in line with the 66.3% multi-offer competition rate for other international defense contracting and more than 21 percentage points in excess of the 45.8% other U.S. domestic rate. Disaster contracting has a 60.6% multi-offer competition rate, which is in line with the aforementioned rate for other civilian contracts but below competition rates for civilian and defense international contracting. For competition with 5 or more offers, ARRA, OCO, and

other international defense lead the pack at 33.5, 34.7, and 30.7, respectively, well above the other samples.

Use of Urgency exceptions is rare across the board, but disaster contracting makes the greatest use at 3% of obligation, roughly twice the employment in any other category, with OCO and Other International Defense contracting trailing in their usage at 1.8 and 1.5% of obligations, respectively.

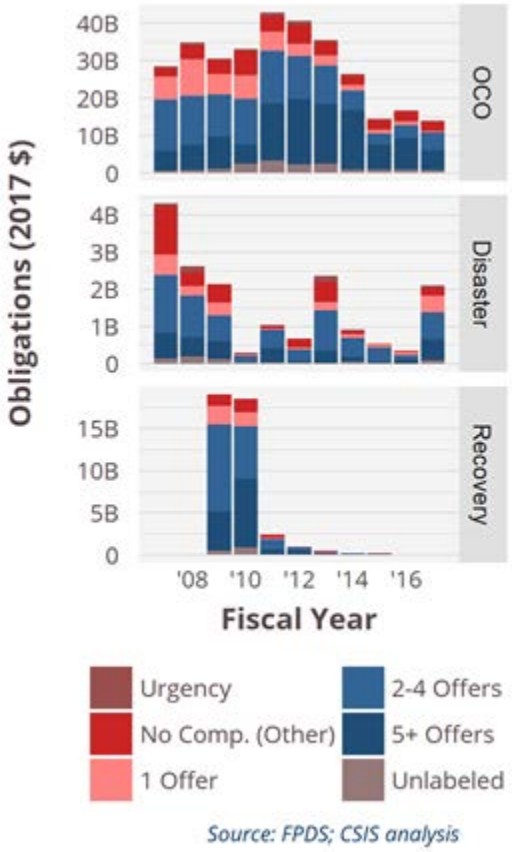


**Figure 3. Contracts Obligations by Crisis-Funding Category**

As shown in Figure 3, the trends over time for competition in crisis-funded contracts do not tell a single clear-cut story. The change in OCO from 2010 was driven by an enhanced ability to label crisis contracts beyond Afghanistan and Iraq rather than a change in competition policy. The $10 billion increase in competition with five or more offers from 2010 to 2011 is striking and sustained through 2014, but a change in composition does not imply a strong change in policy. Another trend during that period does reflect trends in the DoD as a whole, namely a precipitous decline in competition that receives only a single offer (McCormick et al., 2017). In 2011, contracts competed and receiving only one offer received $5.0 billion in OCO obligations, but from 2015 to 2017, they received less than $1 billion each year. This trend does not extend to disaster contracting, where single offer competition bottomed out in percentage and absolute terms in 2011 at only 3% of obligations versus over 20% of obligations in both 2016 and 2017. Likewise, OCO and Disaster contracts have different trends in the use of the Urgency exception. Except for a low year in 2010 (at 0.7%), obligations to OCO contracts employing the urgency exception have a share of 1.25 to

2.5%. For disaster contracts, the usage rate is far more variable, with net obligations not exceeding $0 in four years but accounting for over one in 20 disaster obligation dollars in another four years. Those peaks were 2008, 2010, 2013, and 2014 (6.1, 10.9, 6.5, and 5.2%, respectively), with 2017 coming in close to the average in Figure 2 with 3.1% of disaster obligations employing the urgency exception.

***Undefinitized Contract Actions***

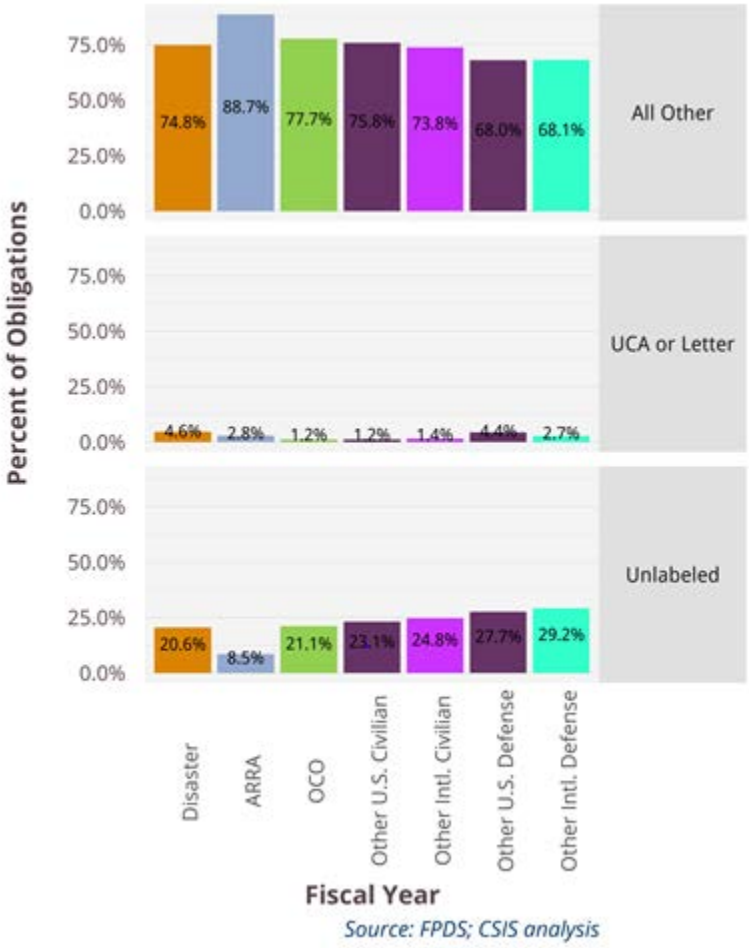


**Figure 4. Frequency of Undefinitized Contract Action**

UCA contracts were used in disaster recovery and under the Recovery Act at rates of 4.6 and 2.8%, respectively, notably higher than for U.S. civilian contracting. As shown in Figure 4, the obligation rate for disaster recovery is even higher than it is for domestic defense spending, where they are sometimes used for high value Major Defense Acquisition Projects. OCO contracts diverge in the other direction, with UCAs only accounting for 1.2% of obligations, less than half of the rate for international defense contracts and even a smidge lower than international civilian ones.

The high rate of unlabeled obligations can be traced to missing data from the USAspending.gov system, which stemmed from the study team discovering an unsuccessfully managed change in the name of the relevant field in the later years of the study period. The proportion of unlabeled contracts is smallest for the Recovery Act, whose spending largely preceded the data glitch. As an unfortunate side effect of the problem, it is

difficult to judge what, if any, trends are present in the rate of UCA usage for crisis contracts over time.[7]

### *Reach-Back Contracting*

The study team lacked reliable location information for many of the contract obligations in the dataset, and so classified contracting offices based on the proportion of their obligations performed domestically versus internationally. The three categories are shown Figure 5, dividing contracting offices between those with a 99% share or greater performed domestically, mixed offices with between 1% and 50% performed internationally, and internationally oriented offices with more than 50% of their obligations performed abroad. That middle category, depicted in light green, is the study's operationalization of reach-back offices, ones which do at least half of their work domestically but also have provided significant overseas support.

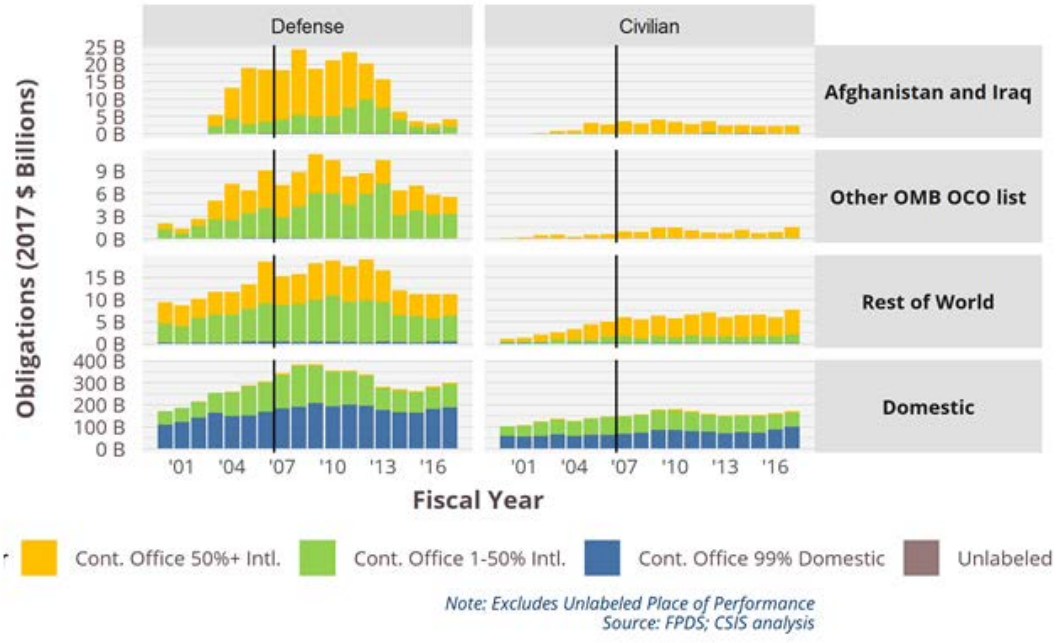


**Figure 5. Contracting Offices' Focus over Time for Selected Countries**

The divisions by contracting office are clear-cut. Internationally oriented offices do little taking place domestically and vice versa. The data show that civilian contracting performed abroad relies more on internationally focused contracting offices than mixed ones. This is especially true in countries associated with OCO-funding: mixed offices only account for a small fraction of obligations in Afghanistan and Iraq (97.1%) and for other

[7] At the time of the completion of this report, the study team is in the process of integrating USAspending.gov data, which was updated during 2018, with historical data. The new data handles funding accounts in ways that are intended to improve fidelity but require additional steps to integrate, which is a challenge for the methodology used in this report. In a positive change, the updated dataset has resolved the UCA labeling issue, and pending successful integration of the new data, the study team will offer an updated version of the dataset but does not intend to rerun the models.

countries on the OCO list (95.8%). By comparison, Defense reach-back contracting's low point is 13.9% of obligations in 2005 and has remained above 40% of obligations from 2012 onwards. For other countries on the OCO list, the obligation share of mixed contracting office usage is even higher, only dipping below 40% in 2004 and 2007 at 33.6% and 39.0%, respectively.

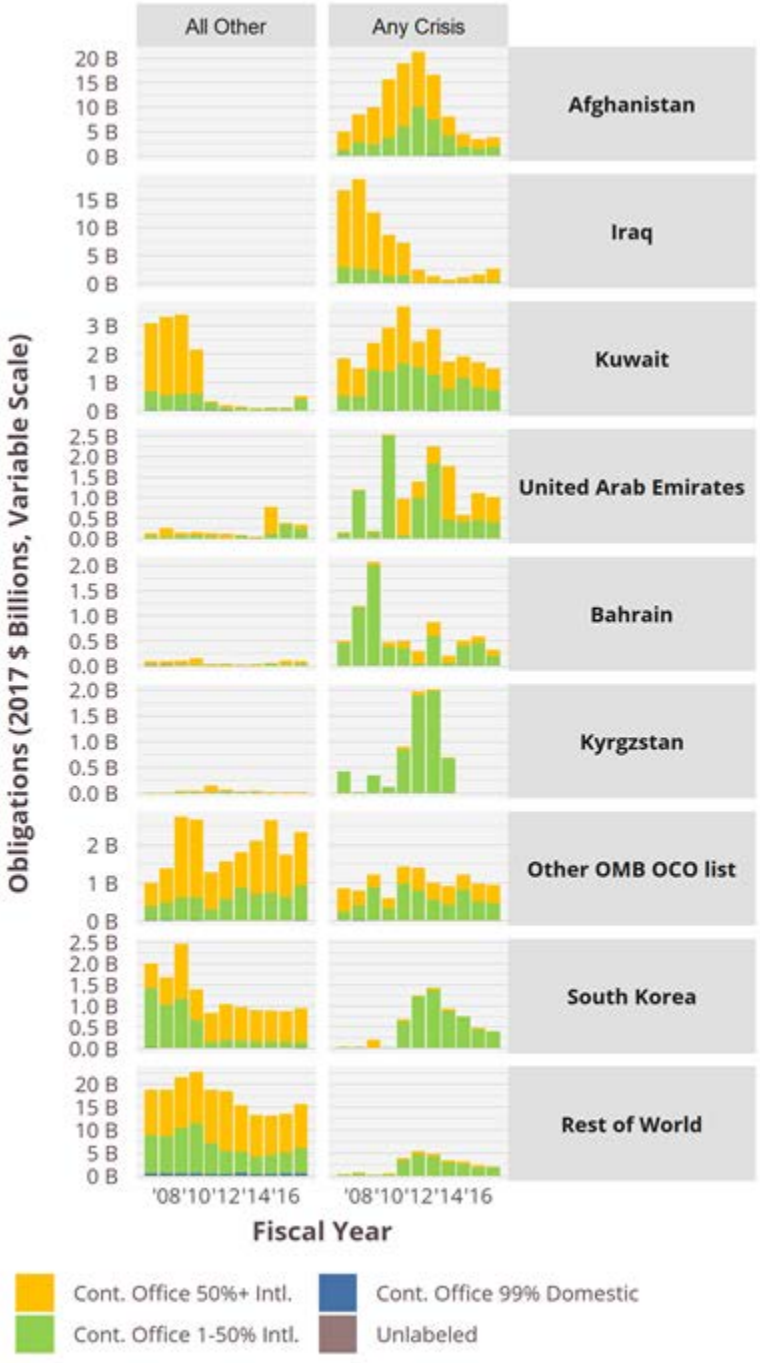


**Figure 6. Obligations by Place of Performance**

The breakdown by country shown in Figure 6 provides additional granularity. Mixed international and domestic offices are an imprecise proxy for reach-back contracting, as shown by the significant mixed office spending in Kuwait before the 2007 debut of the reach-back office. Likewise, the 2009 $1.0 billion jump in mixed contracting office obligations in Kuwait was followed by a larger decrease in Iraq the next year. Nonetheless, comparing Iraq and Afghanistan does show a genuine shift towards mixed offices. Iraq's use of those offices peaked at $4.0 billion in 2004, while Afghanistan surpassed that value from 2011 to 2013 with a peak at $9.9 billion in mixed office obligations in 2012.

Finally, the 2011 jump in mixed office crisis spending in South Korea and the rest of the world can likely be attributed to the improved labeling available do the addition of funding account data.

### *Contract Performance Model*

To analyze performance, the study team switches from the transactions and obligations to using contracts as the unit of analysis. The full estimation results depicted in Table 7 (found in Appendix C: Logit Model Results) are based on whether each contract experienced a ceiling breach or termination. This measure is made across two different samples, first a federal-wide sample that includes 1 million contracts chosen at random from throughout the federal government during the study period. Second, the model is run over a crisis-only sample made up of the population of identified crisis contracts during the study period. The relative scarcity means that this sample is smaller and consists of only 347,000 contracts. The results for both models are presented in odds ratio format, a way of transforming logistic model results that better translates them into outcomes.

An odds ratio of 1.00 means that the variable in question does not have a measurable effect on the likelihood of ceiling breaches or terminations. An odds ratio of greater than one indicates an increased likelihood, with a ratio of 2.0 meaning twice as likely. For example, if an odds ratio was above 1, then the odds would be multiplied by the odds ratio if the binary or categorical variable was true relative to the baseline (e.g., ceiling breaches would be 1.73 times as likely in the Federal model version of Table 2 if a UCA was present versus the baseline of not UCA). If the ratio was below 1.00, then the variable was associated with reduced likelihood relative to the baseline (e.g., ceiling breaches would only be 0.94 times as likely in the Federal model version of Table 2 if a contract was competed but only received one offer versus the baseline of competition with two to four offers).

## Table 2. Ceiling Breach Odds Ratios

| Model | Variable | Odds Ratio | Lower Bound | Upper Bound |
|---|---|---|---|---|
| Federal | **Baseline=Not Crisis** | | | |
| Federal | Crisis=Recovery Act | 2.18*** | 1.85 | 2.57 |
| Federal | Crisis=Disaster | 1.41* | 1.05 | 1.89 |
| Federal | Crisis=OCO | 1.12 | 0.93 | 1.36 |
| Federal | **Baseline = Comp w/2-4 offers)** | | | |
| Federal | No Comp., Urgency | 1.16 | 0.94 | 1.43 |
| Federal | No Comp., Other | 1.01 | 0.95 | 1.08 |
| Federal | Comp. w/ 1 Offer | 0.94. | 0.87 | 1.01 |
| Federal | Comp. w/ 5+ Offers | 1.12** | 1.04 | 1.21 |
| Federal | UCA | 1.73*** | 1.52 | 1.97 |
| Federal | **Baseline= Cont. Office <1% Intl** | | | |
| Federal | Cont. Office 1-50% Intl | 1.04 | 0.9 | 1.2 |
| Federal | Cont. Office 50%+ Intl. | 1.18 | 0.87 | 1.58 |
| Federal | **Baseline=OCO contracting** | | | |
| Crisis | Crisis=Recovery Act | 1.43*** | 1.25 | 1.64 |
| Crisis | Crisis=Disaster | 1.26** | 1.08 | 1.46 |
| Crisis | **Baseline = Comp w/2-4 offers)** | | | |
| Crisis | No Comp., Urgency | 1.44*** | 1.17 | 1.77 |
| Crisis | No Comp., Other | 0.89* | 0.81 | 0.98 |
| Crisis | Comp. w/ 1 Offer | 0.78*** | 0.7 | 0.87 |
| Crisis | Comp. w/ 5+ Offers | 0.71*** | 0.62 | 0.8 |
| Crisis | UCA | 1.02 | 0.88 | 1.19 |
| Crisis | **Baseline= Cont. Office <1% Intl** | | | |
| Crisis | Cont. Office 1-50% Intl | 1.31 | 0.95 | 1.82 |
| Crisis | Cont. Office 50%+ Intl. | 1.13 | 0.71 | 1.78 |

***p < 0.001, **p < 0.01, *p < 0.05, ˙p < 0.1.
*Source: FPDS; CSIS analysis*

In the federal ceiling breach model, OCO contracts were not associated with a greater risk of terminations, but Recovery Act contracts were estimated to be 2.18 times more likely, and Disaster contracts were estimated to be 1.41 times more likely (significant at the 0.1% and 1% levels, respectively). In the crisis-only model, both were more likely to have a breach relative to OCO contracting, although the magnitude of the difference was smaller. The results for competition in the crisis-only model did show that breaches were 1.44 times more likely for contracts competed with the urgency exception and 0.78 times less likely to experience breaches when competed with five or more offers (significant at the 0.1% level in both cases). For UCA, the trend went the other direction, with no significant results in the crisis funding model, but ceiling breaches being an estimated 1.73 times more likely in the federal model. There were no reach-back contracting results of note.

**Table 3. Terminations Odds Ratios**
(FPDS; CSIS analysis)

| Model | Variable | Odds Ratio | Lower Bound | Upper Bound |
|---|---|---|---|---|
| | **Baseline=Not Crisis** | | | |
| Federal | Crisis=Recovery Act | 0.79 | 0.52 | 1.21 |
| Federal | Crisis=Disaster | 1.46 | 0.88 | 2.44 |
| Federal | Crisis=OCO | 1.08 | 0.84 | 1.39 |
| | **Baseline = Comp w/2-4 offers)** | | | |
| Federal | No Comp., Urgency | 0.79 | 0.6 | 1.04 |
| Federal | No Comp., Other | 0.69*** | 0.64 | 0.74 |
| Federal | Comp. w/ 1 Offer | 0.7*** | 0.65 | 0.76 |
| Federal | Comp. w/ 5+ Offers | 1.28*** | 1.21 | 1.37 |
| Federal | UCA | 2.16*** | 1.81 | 2.58 |
| Federal | Cont. Office Crisis % | 1.06 | 0.99 | 1.12 |
| | **Baseline= Cont. Office <1% Intl** | | | |
| Federal | Cont. Office 1-50% Intl | 1.12 | 0.97 | 1.28 |
| Federal | Cont. Office 50%+ Intl. | 0.6* | 0.4 | 0.9 |
| | **Baseline=OCO contracting** | | | |
| Crisis | Crisis=Recovery Act | 0.92 | 0.73 | 1.16 |
| Crisis | Crisis=Disaster | 0.94 | 0.72 | 1.21 |
| | **Baseline = Comp w/2-4 offers)** | | | |
| Crisis | No Comp., Urgency | 1.19 | 0.89 | 1.59 |
| Crisis | No Comp., Other | 0.57*** | 0.5 | 0.66 |
| Crisis | Comp. w/ 1 Offer | 0.65*** | 0.57 | 0.74 |
| Crisis | Comp. w/ 5+ Offers | 1.05 | 0.95 | 1.15 |
| Crisis | UCA | 1 | 0.66 | 1.51 |
| | **Baseline= Cont. Office <1% Intl** | | | |
| Crisis | Cont. Office Crisis % | 1.07 | 1.01 | 1.13 |
| Crisis | Cont. Office 1-50% Intl | 0.92 | 0.49 | 1.73 |
| Crisis | Cont. Office 50%+ Intl. | 0.61* | 0.35 | 1.05 |

***p < 0.001, **p < 0.01, *p < 0.05, ·p < 0.1.
*Source: FPDS; CSIS analysis*

For terminations, there were no significant correlations between any category of crisis contracting and termination rates. For competition, uncompleted contracts that did not use the urgency exception, contract to expectation, had significantly fewer terminations. That said, contracts competed with five or more offers were more likely to be terminated in overall federal contracts but had no significant relationship with crisis contracts. As with ceiling breaches, UCA terminations were much more likely for the federal model (2.16 times, significant at the 0.1 level), but not more likely for the crisis only model. For reach-back contracts, those using international offices were less likely to be terminated than those using domestic offices, contrary to expectations.

## Discussion and Conclusion

### *What Are the Trends in Crisis-Funded Contracts Since the End of the Iraq War?*

One of the larger drivers of the decline in crisis contracting shown in Figure 1 has been the continued reduction in contract spending, first due to the withdrawal from Iraq and

then, to a lesser degree, reinforced as the footprint of U.S. operations in Afghanistan was reduced. OCO spending has not gone away during this period, and U.S. operations in Iraq have resumed.

The wind-down of the Recovery Act was always planned, but natural disasters have not become less intense in intervening years. The reduction in disaster spending may be attributable to increasing utilization of grants and other mechanisms, or it may be because of a drop-off in diligence in labeling. The biggest unexpected trend is the relative stability of contingency contract funding through civilian agencies. This is predominantly driven by activities in Iraq and Afghanistan, but it is nonetheless remarkable that despite military drawdown, civilian activity has been comparatively stable.

***How Reliable Is the Reporting on Crisis-Funded Contracts?***

Furthermore, fields that track contingency operations, humanitarian operations, and other national interest codes would be of far greater value to researchers, practitioners, and overseers if reliably filled out. Transactions caught by one classification are routinely ignored by others. Moreover, a great deal of the contracting performed in Afghanistan and Iraq caught none of those fields meant to capture contingency contracts. Another value of the dataset made available by this study is that researchers who wish to focus on studying rather than identifying contingency contracts may make unrestricted use of the work of this paper and further the study of these important contracts. By comparison, the Recovery Act data is most straightforward to interpret, and the totals align with inspector general reporting in a way that is not true for contingency contracts.

This research provides additional evidence of the increasing divergence between the spending on OCO budget accounts and related contingency contracts. The withdrawal from Iraq and the drawdown in Afghanistan may be revealing that a growing portion of OCO funding might be base funding in disguise. While the decline in contingency contracting spending does seem to have stabilized above $10 billion annually, this still represents a notable decline. The DoD internally tracks OCO funding of contracts in ways that are not included in the FPDS. More rigorous use of the fields that the study team relies on in the decision tree would be one means to improve transparency and accountability of these funds.

***What Methods Do Contracting Officers Employ for Crisis Funded Contracts?***

As detailed in the results, crisis funded contracts often eschewed UCAs and achieved high levels of competition. This does not mean that there is not room for potential progress, but public servants have already clearly heard about the risks of uncompleted contracts and UCAs documented in the literature and are responding accordingly. Likewise, the comparatively low termination rates among non-competed and UCA contracts suggests that contracting officers are being conservative when employing those tools.

Analysis of competition trends within the contingency datasets, shown in Figure 2, confirms findings from the literature review.

***Is the Importance of Competition Different for Crisis Funded Contracting?***

Much of the literature focused specifically on the urgency exception because it is specific to crisis-funded contracts. In keeping with this, Recovery Act contracts relied on different waivers than conventional contracts and made less use of the “only one source” exception. However, disaster and contingency contracts, when not competing, did not make disproportionate use of less common waivers. Furthermore, both UCA and non-competed contracts proved to have lower termination rates. This suggests that the highest risk contracts may not be those that rely on special statutory exceptions available for crisis

contracting. Risk-based audits should therefore consider a broader range of contract characteristics when selecting which contracts merit a closer look. The datasets generated in this study are available to other researchers and practitioners in part to aid them in further developing such criteria.

This is not to say that there is no room for further reduction of non-competitive awards, including using the no competition wavier, but in both the OCO dataset and the disaster dataset, contracts were most likely to go uncompleted because of the use of the only one source exception. Only for the Recovery Act did a majority of non-competitive awards go to "no competition (other)," although its 5.7% rate is still lower than that of any of the comparison groups.

Contingency, disaster response, and Recovery Act contracts were competed at greater rates than conventional. Of the three datasets, disaster contracting made the greatest use of non-competitive awards and had the highest level of single-offer competition. The hypothesis that non-competed contracts would be at greater risk was not proven by the termination measure, as competed contracts were regularly terminated at higher rates. Also, both the disaster and the contingency datasets did not appear to make disproportionately heavy use of urgency waivers when compared to conventional contracting.

Based on the ceiling breach model, this concern about Urgency exceptions and emphasis on competition does seem to be at least partially justified. Contracts that were sole source with an urgency exception performed worse for crisis contracts than for overall federal contracting. Similarly, crisis contracts that were competed and received five or more offers improved performance for crisis contracts with a contrary relationship present for overall federal contracting. As a caveat, contracts that were sole source with another waiver fared slightly better than those competed with two to four offers for both the federal and crisis model.

### *Are UCA Contracts More Risky for Crisis Funded Contracts?*

Strikingly, the answer appears to be no. UCA contracts were associated with significant risks of ceiling breach and terminations in the federal model.

### *How Does Reach-Back Contracting Correlate with Contract Performance?*

In the aggregate, there do not appear to be stronger results with reach-back contracting in either the termination or ceiling breach models. That said, closer examination of individual country results are possible under the model and may be an illuminated topic for future research.

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## Disclaimer

CSIS does not take specific policy positions; accordingly, all views expressed herein should be understood to be solely those of the author(s). The views expressed in written materials or publications, and/or made by speakers, moderators, and presenters, do not necessarily reflect the official policies of the Naval Postgraduate School, nor does mention of trade names, commercial practices, or organizations imply endorsement by the U.S. Government.

## Appendix A: Other Input Variables

The study also includes other contract characteristics that were not identified in the literature review as being critical to crisis contracting, but that are nonetheless important. They were initially developed by Gregory Sanders and Zachary Huitink (2019) and are described in greater detail there.

**Table 4. Description of Independent Level 1 Contract-Level Variables Included in the Model**

| Name | Type | Description |
|---|---|---|
| cl_Ceil | Continuous | The initial contract cost ceiling, logged and then rescaled |
| cl_Days | Continuous | The initial maximum duration of the contract in days, logged and then rescaled |
| Veh | Categorical | Contract Vehicle. The omitted baseline is definitive awards and purchase orders. |
| *SIDV* | *Binary* | *Is the contract vehicle is a single-award indefinite delivery contract* |
| *MIDV* | *Binary* | *Is the contract vehicle is a multiple-award indefinite delivery contract* |
| *FSS-GWAC* | *Binary* | *Is the contract vehicle is a Federal Supply Schedule or Government-Wide Acquisition Contract* |
| *BPA-BOA* | *Binary* | *Whether the contract vehicle is a Blank Purchase Agreement or Basic Ordering Agreement* |
| PricingFee | Categorical | The means of calculating vendor payments. The omitted baseline is firm fixed price contracts. |
| *Other_FP* | *Binary* | *Fixed-price redetermination, fixed-price award fee, and fixed-price economic price adjustment* |
| *Incentive* | *Binary* | *Including fixed-fee incentive fee, cost plus incentive fee, and cost sharing* |
| *Comb-Other* | *Binary* | *Covers contracts using multiple pricing mechanisms or unusual and unclassified types* |
| *Other_CB* | *Binary* | *All types of cost-based contracts, excluding incentive fee* |
| *TM-LH-FPLOE* | *Binary* | *Time and materials, labor hours, and fixed-price level of effort contracts respectively* |

### *Transformed Variables*

In three cases, the study team transformed variables to ease interpretation. Starting with linear transformations, the percent of contracting office obligations formally labeled as going to crisis-funding, c_OffCri, is rescaled by subtracting its mean and then dividing by twice its standard deviation. This rescaling is done to ease comparison between it and the

binary variables included in this study. Table 5 shows the pre-transformation mean, two standard deviations below, and two standard deviations above, corresponding to c_OffCri values of 0, -1, and 1 respectively.

**Table 5. Statistical Summary for Transformed Variables**

**Linear Transformation**

| Variable | Minimum | Maximum | Median | 0 = Mean | 1 unit below | 1 unit above |
|---|---|---|---|---|---|---|
| c_OffCri | 0 | 1 | 0.002 | 0.014 | -0.075* | 0.104 |

**Logarithmic Transformations**

| Variable | Minimum | Maximum | Median | Logarithmic Mean | 1 unit below | 1 unit above |
|---|---|---|---|---|---|---|
| cl_Ceil | 0.01 | 90 trillion | 5,122.4 | 3,942.6 | 15.25 | 1,019,564 |
| cl_Days | 1 | 3,650 | 29.0 | 23.6 | 0.7* | 763.3 |

** The 1 unit below value is below the minimum duration value for this variable.*

Two other variables, initial cost ceiling and duration, are measured in dollars obligated and days, respectively. Duration is capped at 10 years, but no cap is imposed on contract ceiling, which includes an absurdly value listed in Table 5. Both variables are transformed by taking the natural log and then rescaled, again by subtracting their respective mean and dividing by their respective standard deviation. Logarithmic transformation was chosen due to the range between the minimum and maximum values of these variables. Shown in Table 5 are the original values of the logarithmic mean, two standard deviations below, and two standard deviations above, corresponding to OffCri values of 0, -1, and 1 respectively.

## Appendix B: Presentation of the Estimating Equation

### Table 6. Level 2 and Level 3 Variables Included in the Model

| Type | Name | Level | Type | Description | Groups in Federal Sample | Groups in Crisis Dataset |
|---|---|---|---|---|---|---|
| What | Area | 3 | Categorical | Product or Service Area, broad categories of Product or Service Codes. | 17 | 17 |
| | ProdServ | 2 | Categorical | Individual product or Service Code nested underneath Area. | 2,598 | 2,055 |
| Who | Customer | 3 | Categorical | Federal departments with major contracting activities and with remainder grouped as all other | 9 | 9 |
| | Office | 2 | Categorical | Contracting Office Code, nested underneath Customer. | 4,166 | 2,386 |
| Where | Place | 2 | Categorical | Country of Performance. In addition to a separate intercept, each country has a separate slope for OffMixed and OffIntl. | 199 | 186 |
| When | Year | 2 | Numerical | Fiscal Year of Contract Start 2007 to 2015 | 9 | 9 |

To create the model, the study team employed a mix of the modeling technique recommended by Andrew Gelman and Jennifer Hill (2007) and the technique recommended by Nicolas Sommet and Davide Morselli (2017). While the variables chosen for inclusion and the datasets are different, much of the groundwork for this approach was first published in the study team's prior work investigating industrial consolidation (Sanders & Huitink, 2019, pp. 29–31).

For estimating the probability of ceiling breaches for the sample of 1 million federal contracts, the study team used the following model (subscript $i$ refers to the individual contract, while subscript *j* refers to the product or service area, subscript *k* refers to product or service code, subscript *l* refers to contracting customer, subscript *m* refers to contracting office, subscript o refers to country of performance, and subscript *n* refers to calendar year for those equations that include it). The model for crisis-funded contracts differs only in the number of groups, as covered in Table 6 and in the omission of the $\beta_9 OCO_i$ variable. In the crisis-funded version of this equation, there are no non-crisis funded contracts, and therefore OCO contracts become the new baseline.

***Equation 1. Ceiling Breaches***

$$
\begin{aligned}
&Probability\ of\ Ceiling\ Breach\ (y_i = 1\ ) \\
&= Logit^{-1}\Big(\alpha + \alpha_{j[i]}^{Area} + \alpha_{k[i]}^{ProdServ} + \alpha_{l[i]}^{Customer} + \alpha_{m[i[}^{Office} + \alpha_{n[i]}^{Place} \\
&+ \alpha_{o[i]}^{Year} + \beta_1 NoCompUrgency_{\ i} + \beta_2 NoCompOther_i + \beta_3 CompOff1_{\ i} \\
&+ \beta_4 CompOff5plus_i + \beta_5 b\_UCA_i + \beta_6 OffCrisiPct_i + \beta_7 OffMixed_i \\
&+ \beta_8 OffIntl_i + \beta_9 OCO_i + \beta_{10} Recovery_i + \beta_{20} Disaster_i + \beta_{11} cl\_Ceil_i \\
&+ \beta_{12} cl\_Days_i + \beta_{13} SIDV_i + \beta_{14} MIDV_i + \beta_{15} FSS - GWAC_i \\
&+ \beta_{16} BPA - BOA_i \\
&+ \beta_{17} Other\_FP_i + \beta_{18} Incentive_i + \beta_{19} Comb \\
&- Other_i + \beta_{20} Other\_CB_i + \beta_{20} TM - LH - FPLOE_i \\
&+ \beta_{21} NoCompUrgency \cdot b\_cl\_CeilUCA_i + \beta_{22} NoCompOther \cdot b\_cl\_Ceil_i \\
&+ \beta_{23} CompOff1_{\ i} \cdot cl\_Ceil_i + \beta_{24} CompOff5plus_i \cdot cl\_Ceil_i \\
&+ \beta_{21} NoCompUrgency \cdot b\_UCA_i + \beta_{22} NoCompOther \cdot b\_UCA_i \\
&+ \beta_{23} CompOff1_{\ i} \cdot b\_UCA_i + \beta_{24} CompOff5plus_i \cdot b\_UCA_i \\
&+ \epsilon_i\Big), \qquad for\ i = 1\ to\ 1{,}000{,}000 \\
&\alpha_j^{Area} \sim N(\mu_{\alpha,}, \sigma_a^2), \qquad for\ j = 1\ to\ 17 \\
&\alpha_k^{ProdServ} \sim N(\mu_{\alpha,}, \sigma_a^2), \qquad for\ k = 1\ to\ 2{,}598 \\
&\alpha_l^{Customer} \sim N(\mu_{\alpha,}, \sigma_a^2), \qquad for\ l = 1\ to\ 9 \\
&\alpha_m^{Office} \sim N(\mu_{\alpha,}, \sigma_a^2), \qquad for\ m = 1\ to\ 4{,}166 \\
&\alpha_n^{Place} \sim N(\mu_{\alpha,} + \beta_\alpha OffMixed_i + \beta_\alpha OffIntl_i, \sigma_a^2), \qquad for\ n = 1\ to\ 199 \\
&\alpha_o^{Year} \sim N(\mu_{\alpha,}, \sigma_a^2), \qquad for\ o = 1\ to\ 9
\end{aligned}
$$

This paper uses largely the same equation for estimating the probability of terminations for the sample of 1 million federal contracts. Equation 2 does not include the level 2 variable year because it had an inter-class coefficient of zero, which suggests that it has no measurable influence on the outcome. The model also has one addition; the office crisis percentage is only included in the termination model because the measures employed during model building suggested that it added nothing to the ceiling breach model. As with ceiling breaches, the crisis-funded dataset version of this model uses $\beta_9 OCO_i$ as a baseline rather than including it as a variable and has fewer elements in most groups, as covered in Table 6.

***Equation 2. Terminations***

$$
\begin{aligned}
&Probability\ of\ Termination\ (y_i = 1\ ) \\
&= Logit^{-1}\Big(\alpha + \alpha_{j[i]}^{Area} + \alpha_{k[i]}^{ProdServ} + \alpha_{l[i]}^{Customer} + \alpha_{m[i[}^{Office} + \alpha_{n[i]}^{Place} \\
&+ \beta_1 NoCompUrgency_{\ i} + \beta_2 NoCompOther_i + \beta_3 CompOff1_{\ i} \\
&+ \beta_4 CompOff5plus_i + \beta_5 b\_UCA_i + \beta_6 OffCrisisPct_i + \beta_7 OffMixed_i \\
&+ \beta_8 OffIntl_i + \beta_9 OCO_i + \beta_{10} Recovery_i + \beta_{20} Disaster_i + \beta_{11} cl\_Ceil_i \\
&+ \beta_{12} cl\_Days_i + \beta_{13} SIDV_i + \beta_{14} MIDV_i + \beta_{15} FSS - GWAC_i \\
&+ \beta_{16} BPA - BOA_i \\
&+ \beta_{17} Other\_FP_i + \beta_{18} Incentive_i + \beta_{19} Comb \\
&- Other_i + \beta_{20} Other\_CB_i + \beta_{20} TM - LH - FPLOE_i + \epsilon_i\Big), \qquad for\ i \\
&= 1\ to\ 1{,}000{,}000
\end{aligned}
$$

$$\alpha_j^{Area} \sim N(\mu_{\alpha,}, \sigma_a^2), \qquad for\ j = 1\ to\ 17$$

$$\alpha_k^{ProdServ} \sim N(\mu_{\alpha,}, \sigma_a^2), \qquad for\ k = 1\ to\ 2{,}598$$

$$\alpha_l^{Customer} \sim N(\mu_{\alpha,}, \sigma_a^2), \qquad for\ l = 1\ to\ 9$$

$$\alpha_m^{Office} \sim N(\mu_{\alpha,}, \sigma_a^2), \qquad for\ m = 1\ to\ 4{,}166$$

$$\alpha_n^{Place} \sim N(\mu_{\alpha,}, \sigma_a^2), \qquad for\ n = 1\ to\ 199$$

## Appendix C: Logit Model Results

**Table 7. Logit Model Results for Performance Models**

| | Federal-Wide Ceiling Breach | Crisis-Only Ceiling Breach | Federal-Wide Termination | Crisis-Only Termination |
|---|---|---|---|---|
| (Intercept) | **-4.87** (0.28)*** | **-4.77** (0.33)*** | **-5.79** (0.23)*** | **-5.55** (0.20)*** |
| Study Variables | | | | |
| No Comp, Urgency | 0.15 (0.11) | **0.36** (0.11)*** | -0.23 (0.14). | 0.18 (0.15) |
| No Comp, Other | 0.01 (0.03) | **-0.12** (0.05)* | **-0.38** (0.04)*** | **-0.56** (0.07)*** |
| Comp=1 offer | -0.07 (0.04). | **-0.25** (0.05)*** | **-0.35** (0.04)*** | **-0.43** (0.07)*** |
| Comp=5+ offers | **0.12** (0.04)** | **-0.35** (0.06)*** | **0.25** (0.03)*** | 0.05 (0.05) |
| UCA | **0.55** (0.07)*** | 0.02 (0.08) | **0.77** (0.09)*** | -0.00 (0.21) |
| Cont. Office Crisis % | | | 0.05 (0.03). | **0.07** (0.03)* |
| Cont. Office 1-50% Intl. | 0.04 (0.07) | 0.27 (0.17) | 0.11 (0.07) | -0.09 (0.32) |
| Cont. Office 50%+ Intl. | 0.16 (0.15) | 0.12 (0.23) | **-0.51** (0.21)* | -0.49 (0.28). |
| Crisis Category | | | | |
| Crisis=OCO | 0.12 (0.10) | | 0.08 (0.13) | |
| Crisis=Recovery Act | **0.78** (0.08)*** | **0.36** (0.07)*** | -0.23 (0.21) | -0.08 (0.12) |
| Crisis=Disaster Relief | **0.34** (0.15)* | **0.23** (0.08)** | 0.38 (0.26) | -0.07 (0.13) |
| Contract Characteristics | | | | |
| Log(Init. Ceiling) | **1.50** (0.04)*** | **1.40** (0.05)*** | **0.54** (0.04)*** | **0.87** (0.06)*** |
| Log(Init. Days) | **0.41** (0.02)*** | **0.46** (0.03)*** | **0.82** (0.04)*** | **0.80** (0.05)*** |
| Vehicle=S-IDC | **-0.40** (0.03)*** | **-0.42** (0.04)*** | **-0.68** (0.04)*** | **-0.74** (0.07)*** |
| Vehicle=M-IDC | -0.05 (0.03) | **0.20** (0.04)*** | **-0.59** (0.06)*** | **-0.30** (0.08)*** |
| Vehicle=FSS/GWAC | -0.04 (0.03) | **-0.32** (0.07)*** | **-0.20** (0.04)*** | -0.23 (0.12). |
| Vehicle=BPA/BOA | **-0.29** (0.05)*** | -0.11 (0.06). | **-0.61** (0.06)*** | **-0.26** (0.12)* |
| Pricing=Other FP | **-0.38** (0.06)*** | **-0.55** (0.18)** | **-0.44** (0.05)*** | **-1.02** (0.09)*** |
| Pricing=Incentive Fee | **0.95** (0.17)*** | **0.91** (0.30)** | 0.04 (0.29) | 0.36 (0.79) |
| Pricing=Combination or Other | **0.45** (0.09)*** | 0.09 (0.21) | -0.24 (0.17) | -0.06 (0.33) |

**Table 7. Logit Model Results for Performance Models**

| | Federal-Wide Ceiling Breach | Crisis-Only Ceiling Breach | Federal-Wide Termination | Crisis-Only Termination |
|---|---|---|---|---|
| Pricing=Other CB | 0.14 (0.07)$^{\cdot}$ | -0.02 (0.11) | -0.21 (0.13) | **0.45** (0.15)$^{**}$ |
| Pricing=T&M/LH/FP:LoE | **0.24** (0.06)$^{***}$ | -0.19 (0.11)$^{\cdot}$ | **-0.43** (0.12)$^{***}$ | -0.11 (0.16) |
| Interactions | | | | |
| No Comp, Urgency:Log(Init. Ceiling) | -0.12 (0.20) | **-0.41** (0.17)$^{*}$ | | |
| No Comp, Other:Log(Init. Ceiling) | **-0.19** (0.06)$^{***}$ | -0.05 (0.08) | | |
| Comp=1 offer:Log(Init. Ceiling) | -0.12 (0.07)$^{\cdot}$ | -0.01 (0.08) | | |
| Comp=5+ offers:Log(Init. Ceiling) | -0.04 (0.06) | **0.48** (0.08)$^{***}$ | | |
| AIC | 111726.14 | 65160.66 | 87051.85 | 31011.00 |
| BIC | 112163.31 | 65547.97 | 87441.76 | 31355.28 |
| Log Likelihood | -55826.07 | -32544.33 | -43492.92 | -15473.50 |
| Num. obs. | 1000000 | 347563 | 1000000 | 347563 |
| Var: Office:Customer (Intercept) | 1.54 | 1.48 | 1.03 | 2.22 |
| Var: ProdServ: CrisisProductOrServiceArea (Intercept) | 0.22 | 0.36 | 0.18 | 0.35 |
| Var: PlaceCountryISO3 OffPlaceUS99 | 0.12 | 0.15 | 0.46 | 0.66 |
| Var: PlaceCountryISO3 OffPlaceMixed | 0.18 | 0.16 | 0.64 | 0.85 |
| Var: PlaceCountryISO3 OffPlaceIntl | 0.05 | 0.16 | 0.12 | 0.51 |
| Cov: PlaceCountryISO3 OffPlaceUS99 OffPlaceMixed | 0.15 | 0.09 | 0.54 | -0.75 |
| Cov: PlaceCountryISO3 OffPlaceUS99 OffPlaceIntl | 0.08 | -0.07 | 0.08 | -0.04 |
| Cov: PlaceCountryISO3 OffPlaceMixed OffPlaceIntl | 0.10 | 0.07 | 0.09 | 0.00 |
| Var: CrisisProductOrServiceArea (Intercept) | 0.27 | 0.17 | 0.08 | 0.00 |
| Var: StartFY (Intercept) | 0.00 | 0.00 | | |
| Var: Customer (Intercept) | 0.44 | 0.53 | 0.16 0.00 | |

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\cdot}p < 0.1$. Logged inputs are rescaled.

## Appendix D: Model Diagnostics

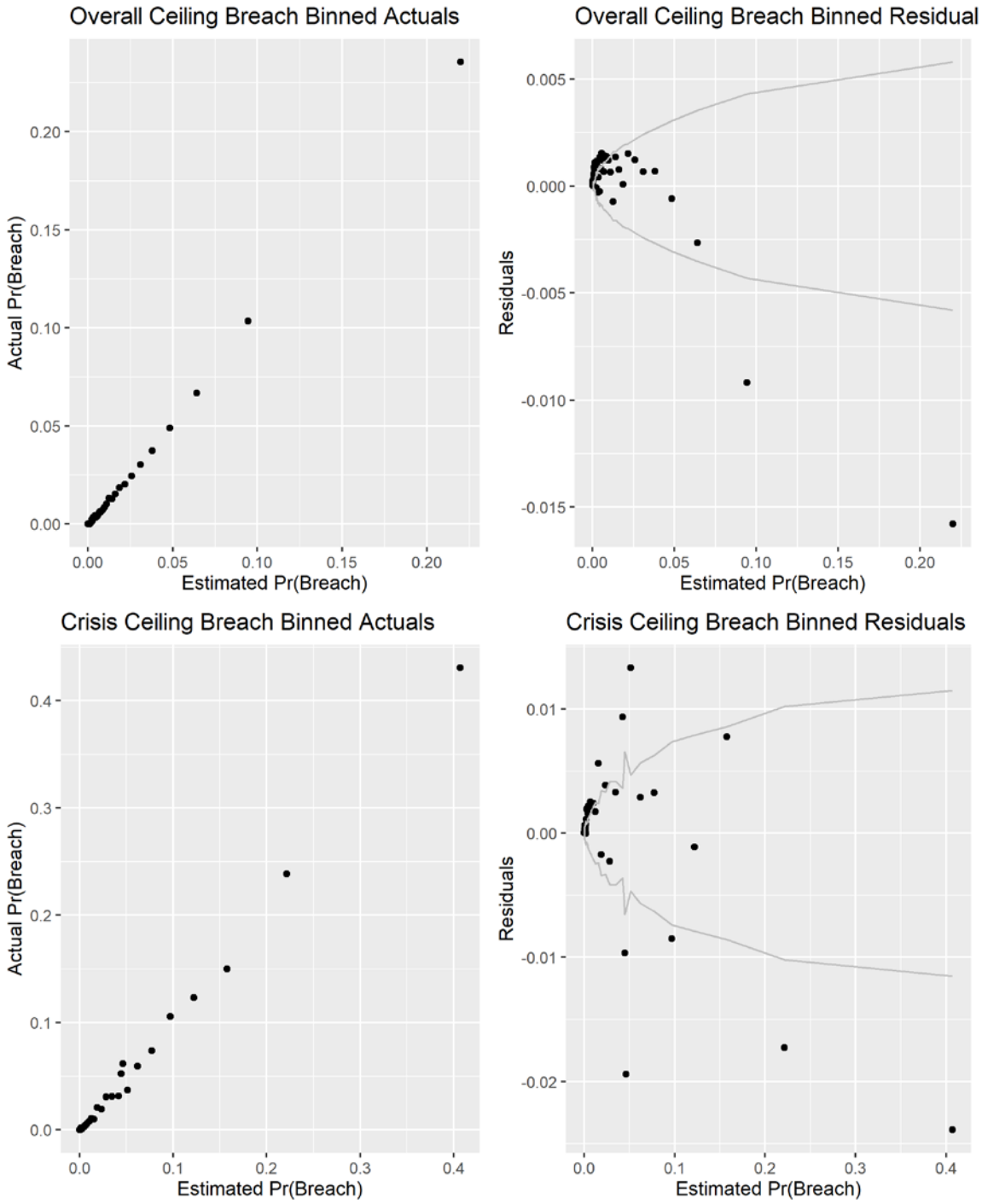


**Figure 7. Fitted and Residual Plots for Ceiling Breaches**

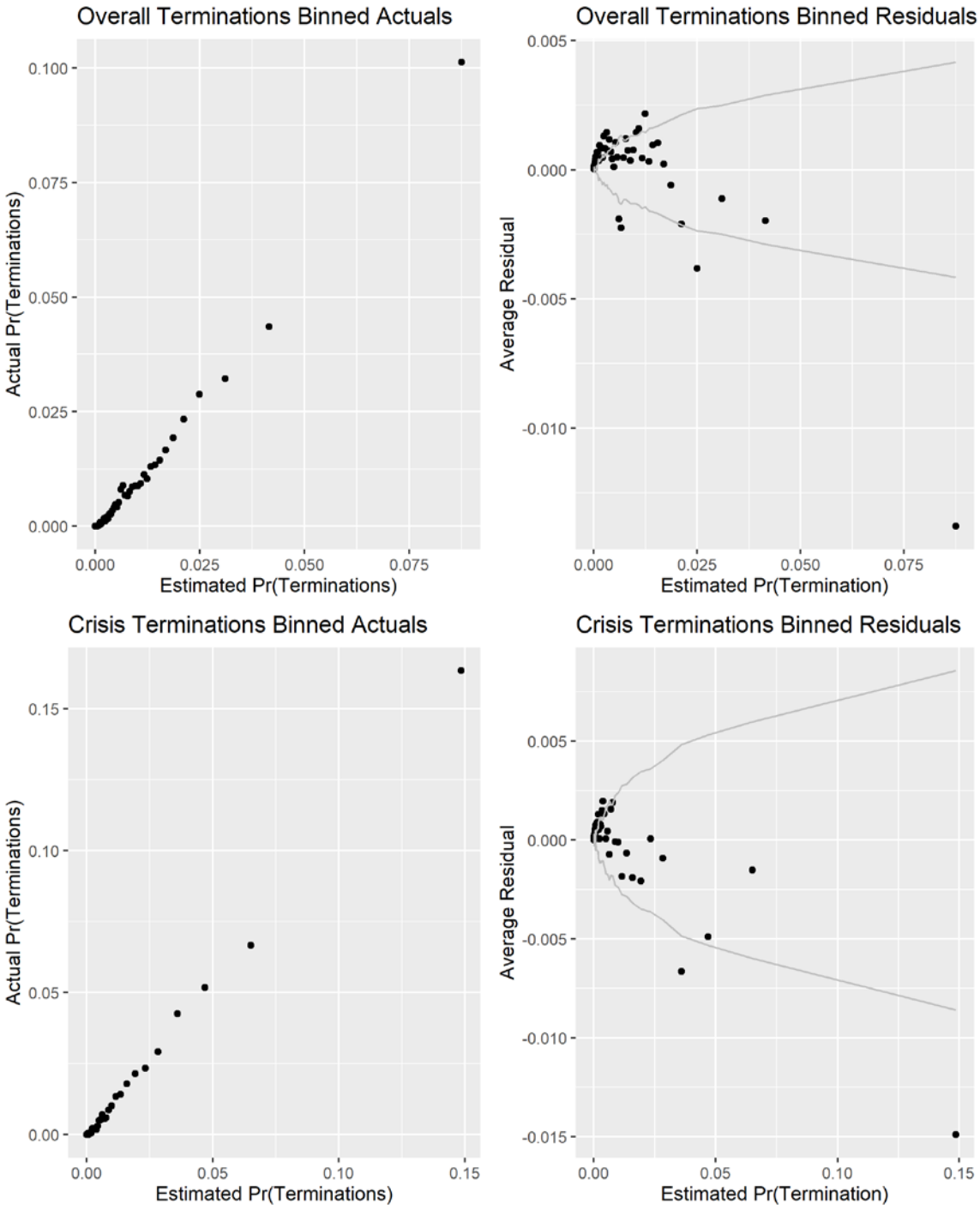


**Figure 8. Fitted and Residual Plots for Terminations**


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