Accounting Disclosure Requirements in Procurement Contracting

Brad Nathan*

Columbia University

Abstract

This paper studies how requirements for suppliers to privately disclose accounting information affect the bidding and execution of government procurement contracts. Using thresholds related to a federal procurement regulation known as the Truth in Negotiations Act (TINA), which requires suppliers to disclose data supporting their proposed prices unless there is a minimum number of competing bidders, I find that compared to below-threshold contracts, above-threshold contracts experience greater competition, performance (i.e., less frequent re-negotiations and cost overruns), and completeness (i.e., decreased reliance on cost-plus contracts). These findings are consistent with the procurement system paying greater attention to promote competition for above-threshold contracts.

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1 Introduction

This paper studies the effects of accounting disclosure requirements on product markets and bidding outcomes using a quasi-experimental setting related to federal procurement contracting. In 2018 alone, governments around the world spent $13 trillion on procurement (defined as the purchase of goods or services from a supplier by an organization)[1], which was equivalent to 15% of global GDP (OCP [2020], World Bank [2020]). The private sector and non-governmental organizations also engage extensively in the procurement of goods and services. When designing procurement processes, buyers must decide what types of policies they will employ to ensure bid prices are reasonable. One such policy consideration is, should the buyer mandate that suppliers provide accounting information to support their proposed prices? The answer to this question is unclear. Requirements to provide accounting information related to a supplier's pricing can protect the buyer by lessening information asymmetry and agency problems (Jensen and Meckling [1976]). However, such requirements can dissuade potential suppliers from competing due to data gathering and proprietary costs, as well as increase the buyer's information processing costs (Blankespoor, deHaan, and Marinovic [2020]). To alleviate these costs of requiring data, buyers may use alternative methods of ensuring reasonable prices, such as seeking more competing suppliers.

As a first step towards answering this question, I examine the effects of a regulation that requires suppliers to privately disclose accounting information to the federal government. Specifically, I study the effect of the Truth in Negotiations Act (TINA) for federal contracts on competition (i.e., the number of bids), as well as contract performance (i.e., the frequency of renegotiations and budget overruns) and completeness (i.e., thoroughness as measured by the frequency of cost-plus contracts).[2] TINA stipulates comprehensive accounting data disclosure by suppliers to the government when multiple bids are not expected, for

[1] Procurement typically involves a single buyer that bids contracts to either one or multiple suppliers, called contractors. Buyers usually employ agents called procurement officers to manage the procurement process on their behalf, as discussed below.

[2] TINA is now officially called the Truthful Cost or Pricing Data ("TCPD") Act, but it is still colloquially called by its original name.

contracts above a threshold price (the "TINA threshold").[3] TINA's requirements imply that government representatives, called procurement officers (PO's), may use either competition or accounting data to assure reasonable prices.[4] Competition can be valuable because it may lower prices, improve fairness of the procurement system, and lead to better quality goods and services (OECD [2011]). Practitioners widely appear to expect TINA's requirements to reduce competition due to suppliers' costs associated with the data.[5] However, since PO's can avoid requiring the costly data by encouraging additional bidders, these data requirements may increase competition.

TINA represents a form of a buyer procurement policy which is common in both the public and private sectors. Generally, in practice, buyers' procurement organizations require their agents to reduce the buyer's pricing information disadvantage in at least one of three ways: (1) by relying on competition among multiple, independent bidders, (2) by depending on their agents' judgment and analyses of prices, and (3) by requiring private supplier disclosures supporting their proposed prices. These approaches can strengthen the buyer's bargaining power and reassure the buyer that a price is reasonable.[6] Given that buyers' agents may be prone to errors of judgment and moral hazard (in the forms of shirking or colluding with bidders), buyers commonly enact policies that restrict their agents from relying on only their judgment for contracts above a certain price threshold. This leaves agents with just the other two, more objective options of price assurance for higher-dollar

[3] TINA's requirements only apply for contracts for goods or services where a commercial market does not exist. That is, for non-standard goods or services, where any degree of customization or specialization is necessary. Non-commercial goods and services span such categories as electronics, software, construction, helicopters, bunkers, medical supplies, and more.

[4] Contracting Officers are typically the specific procurement officers responsible for managing the writing, solicitation, bidding, and performance of contract awards. To the extent these responsibilities are shared among (or in some instances even allocated) to other procurement employees, such as sourcing specialists, engineers, scientists, lawyers, administrators, contracting assistants, and others, I include these roles in the term "procurement officer".

[5] For example, one popular media outlet and radio station in the Washington D.C. area states, "The time has come for TINA to be modernized because it undermines innovation and competition..." (Federal News Network [2021]).

[6] In the public and private sectors, these supplier disclosures can take a variety of forms, including data related to the supplier's dependability and financial stability, cost estimates coordinated with an independent third party, or detailed cost breakouts. See Section 2.2 for further discussion.

contracts. I provide the first empirical evidence on the impact of such a buyer disclosure policy (as in TINA) on product market outcomes.

A priori, the effect of the TINA supplier data mandate on contract competition is not clear. Data management costs, weakened bargaining power, and exposure risk may ward off some suppliers from competing (Darrough [1993], Berger and Hann [2007], Bens, Berger, and Monahan [2011], Tomy [2019]).[7] TINA requires suppliers provide "cost or pricing data", defined as all factual information that prudent buyers and suppliers would reasonably expect to affect price negotiations significantly. It includes detailed cost line items and supporting facts, such as quotes, drawings, and specifications, which can be costly for suppliers to manage and prepare. Although intended to remain private, there is the risk this information could fall into the hands of competitors through the hiring of government employees by suppliers, bid protests, legal challenges, and Freedom of Information Act requests (Sheffner [2019]). Prior literature finds proprietary costs related to the provision of confidential information lessen companies' (especially innovative firms') willingness to bid on government contracts (He, Li, Li, and Zhang [2021]).

Conversely, the requirements may increase competition by focusing POs' attention towards above-threshold contracts (Warren [2014]), for several reasons. First, given that additional information provision represents a "cost" to suppliers and the government when there is an insufficient number of bids, PO's may try to lower these costs by seeking additional suppliers, relaxing bid specifications, and/or lessening restrictions on which suppliers can bid (Kang and Miller [2017]). Second, data requirements may encourage PO's to not simply choose their favored suppliers, but rather base the decision on their expectations of total government costs. Finally, data requirements may enhance suppliers' perceptions of fairness by signaling impartiality and that procurement is paying closer attention to contract allocations, thereby attracting competitors. To shed light on how TINA's mandatory data

[7] An internet search reveals dozens of law and accounting consultancy firms offering to advise suppliers to reduce their compliance costs with TINA, as well as suppliers expressing their colorful opinions about the requirements.

requirements affect competition, I use a combination of descriptive and quasi-experimental approaches including regression discontinuity design (RDD), using contracts above the TINA data threshold (and subject to its requirements) as the treatment group (i.e., "affected contracts").[8]

My primary findings suggest that PO's actively encourage competition to reduce procurement's costs associated with data requirements. First, PO's are more likely to write solicitations (i.e., requests for bid proposals) where multiple bids can occur, as reflected by both fewer "sole source" contracts (bidding is restricted in the solicitation to a single supplier) and more "open competition" solicitations (all registered suppliers are allowed to bid). I find that the prevalence of sole source contracts decreases by 3.89 percentage points (pp) (or 14.7%) for affected contracts. In addition, realized (i.e., actual) competition increases: the frequency of contracts with multiple bids is 4.39 pp (or 7.5%) greater above the threshold than below the threshold. Overall, regarding the impact of TINA's requirements on competition, these results suggest that the positive effects of procurement paying greater attention to promote competition outweigh the negative effects of added costs to suppliers. This finding is surprising, because the press, government documents, and interviews with federal procurement experts[9] suggest that most practitioners and even the government expect TINA's requirements to primarily dissuade suppliers from competing.

I also study the effect of data requirements on contract performance, in terms of renegotiations (also known as modifications or contract changes) and cost overruns.[10] I examine performance both because it is an important contracting outcome, and because it provides insight into the mechanism underlying my competition results (as explained below). Data requirements could lead to higher performance for affected contracts due to improved monitoring by procurement, both if accounting data is provided or if there is greater procurement

[8] This includes negotiated, non-commercial contracts. See Section 3.2 for details.

[9] Interviews were conducted by the author between 2020-2022.

[10] These measures are regularly used by governments and researchers for assessing the execution performance of contracts. See for instance Mohamed et al. [2011], Duguay et al. [2020], Iimi [2013], and Bajari et al. [2014].

system attention to not require the data. Supplier data requirements may also aid PO's to write more complete contracts that are easier to monitor.[11] However, to the extent that data requirements lead to greater competition, this may lower POs' discretion to choose their favored (likely higher-performing) suppliers and increase pressure on suppliers to make up for lower profits by attempting to renegotiate later. I find affected contracts' performance improves in terms of the number of contract changes and cost overruns. Affected contracts are also more complete, as data requirements cause a significant drop in the frequency of cost-plus contracts. These results are consistent with prior literature, which finds greater procurement attention leads to better performance and more complete contracts (Warren [2014]).

By itself, my finding that data requirements lead to increased competition could be explained by PO's evading the disclosure requirement by opening bidding, but then selecting their favored suppliers regardless. Such an increase in competition should help price assurance, as long as PO's did not (directly or indirectly) signal to their favored suppliers that they will select them regardless, leading them to not feel any competitive pressure (OECD [2011]). Institutional safeguards (e.g., legal risk to PO's, management oversight, bid protests) make such coordination unlikely. Further, if such coordination between PO's and their favored suppliers, rather than procurement system attention, is the primary driver of my competition results, then there should not be any effect of the threshold on performance and completeness for those contracts that did not require the data (since data may improve performance). However, I find the threshold improves performance and completeness even when restricting my analysis to these contracts, suggesting that the results are indeed due to greater procurement attention.

My results differ between contracts for supplies versus those for services and works, commercial versus non-commercial items, and other samples in a manner that is consistent

[11] I use the term "completeness" to mean to what extent the final contract terms depend on certain contingencies, as in prior literature (Christensen, Nikolaev, and Wittenberg-Moerman [2016]; Warren [2014]). In this sense, cost-plus contracts are less complete than fixed-price contracts, because the final price is dependent on the actual costs and the scope is often less fixed.

with accounting data requirements driving my findings. Placebo tests show that only affected contracts respond to the threshold exclusively while it is in effect, and this response changes in concert with the threshold's value as expected. I also find that accounting information and contract competition can act as substitutes for the purposes of reducing the buyer's information disadvantage. Additionally, supplemental analyses confirm an assumption made by my RDD analyses: the extent to which suppliers and/or PO's manipulate contract prices to undercut the threshold is economically insignificant and thus unlikely to drive my results.

This study makes several contributions. First, it contributes to the literature on the use of accounting information in contracts between buyers and suppliers. Watts and Zimmerman [1986] show that financial statement information can be an important input to contract design. Costello [2013] documents the use of financial covenants based on (future) performance in supply contracts to alleviate risk due to asymmetric information. I build on this literature by introducing a novel setting, and documenting that a common type of buyer policy that leverages accounting disclosures and competitive bidding to lessen suppliers' information advantages results in increased contract competition, completeness, and performance.[12] I also provide evidence that buyers use competition and accounting information as substitutes for the purpose of verifying prices.

Second, my study contributes to the literature on government contracting (Williamson [2002], Tadelis [2002], Samuels [2021], Brogaard, Denes, and Duchin [2021]). Related studies examine how competition for federal contracts is affected by public disclosure of procurement data (Duguay, Rauter, and Samuels [2020]) and contract advertising (Carril, Gonzalez-Lira, and Walker [2020]). These papers find greater visibility improves competition and decreases contract prices, but worsens performance likely due to higher oversight by outsiders resulting in diminished PO discretion and greater fixation on bid prices instead of overall project costs (Alesina and Tabellini [2008]). My evidence suggests that private accounting data disclo-

[12] Several studies discuss TINA's data requirements, but few empirically evaluate its effects (see Dahl [1988], Lorell, Graser, and Cook [2005], and Bodenheimer and McLaughlin [2018]). Many studies examine the False Claims Act (FCA) (e.g., Heese and Pérez-Cavazos [2019]), which imposes penalties for making false statements to the government but does not mandate data provision by suppliers.

sure requirements increase both competition and performance, because these requirements focus insiders' (procurement's) attention on assuring reasonable prices, rather than opening competition for competition's sake. My findings are consistent with Warren [2014]'s evidence that greater PO attention increases competitive acquisition procedures and improves performance.[13] Further, my study highlights that both cost or pricing data and TINA's requirements represent important factors for accounting researchers to consider while analyzing federal contracts.[14]

This study is related to the literature on the effects of disclosure on product market competition (e.g., Gal-Or [1986], Darrough [1993], Berger and Hann [2007], Tomy [2019]). Bernard, Burgstahler, and Kaya [2018] uncover that firms go to great lengths to minimize their costs of proprietary disclosure, even managing firm size to stay below mandatory disclosure thresholds. Some suppliers might thus avoid proprietary disclosure requirements. Prior literature also finds that public disclosures can signal investment opportunities and attract competitors (e.g., Bernard [2016], Granja [2018], Breuer [2021]). I document that a mandate for suppliers to *privately* provide accounting information also bolsters product market competition despite the added costs to participants. However, this effect occurs through a different mechanism: focusing buyer attention on affected contracts.

This study also relates to the literature on information processing costs, which typically focuses on investors' processing of financial market information (e.g., Indjejikian [1991], Ball [1992], Healy and Palepu [2001], Blankespoor et al. [2020]). I find that due to the costs to process mandatory accounting disclosures, the government pays greater attention to promote competition to avoid having to require the disclosures in the first place.

The rest of this paper is organized as follows. Section 2 describes the institutional context. Section 3 outlines the conceptual framework and research design. Section 4 presents

[13] My results also complement those of Decarolis et al. [2020], who find greater bureaucratic competence improves performance.

[14] For example, Samuels [2021] considers cost or pricing data when she finds her primary finding, a positive relationship between sales to the government and voluntary disclosure measures, is stronger for suppliers awarded contracts requiring this data.

my results exploring the effects of the data requirements on bidding and execution outcomes. Section 5 contains several robustness checks. The last section concludes. Additional details are discussed in the Appendix and the Online Appendix.

2 Institutional Context

In this section, I discuss procurement contracting as it relates to the public and private sectors in the U.S., and I provide details about TINA.

2.1 Federal Procurement Contracting

In the U.S. in 2019, procurement accounted for one of the largest parts of the federal government's $4.4 trillion budget, at $586 billion (CBO [2020], GAO [2020]). Federal procurement is governed by the U.S. Code, which is a set of legal statutes devised by Congress, along with various regulations. The Federal Acquisition Regulation (FAR) implements the code and contains detailed policies and procedures for federal procurement of goods and services.[15]

The federal government's process for requiring data and awarding of negotiated contracts can be summarized as follows. Negotiated contracts are awarded not solely based on price but also on contract terms and suppliers' capabilities and performance history. These contracts comprise the vast majority of federal procurement contracts and are the only contracts affected by TINA's requirements.[16] The award of a negotiated contract occurs in several steps. First, a solicitation is made, which is typically posted publicly online.[17] The solicitation contains the government's requirements, such as technical specifications, time

[15] The FAR, which contains over 2,000 pages, also prescribes policy goals and guiding principles for the procurement process. The FAR applies to executive agencies (i.e., headed by a Cabinet secretary) and independent agencies. Select legislative agencies (e.g., the Government Accountability Office) also follow the FAR. The full FAR document may be accessed at: `https://www.acquisition.gov/sites/default/files/current/far/pdf/FAR.pdf`.

[16] Based on data from the Federal Procurement Data System - Next Generation (FPDS-NG) database.

[17] See `www.sam.gov` for a list of the U.S. government's active contract solicitations.

frames, and information required with the proposal. Second, the government receives proposals from suppliers describing their technical approach, estimated costs, fee structure, and more. The government may require any type and quantity of data to be submitted with a proposal; however, PO's are directed to request the minimum data necessary to do so, to lessen preparation costs, award times, and government resources expended (FAR 15.402-3). The most comprehensive data is known as "cost or pricing data", which FAR 2.101 defines as "all facts that, as of the date of price agreement... prudent buyers and sellers would reasonably expect to affect price negotiations significantly." This information includes accounting data, vendor quotes, and *any facts* contributing to the supplier's judgment of future costs. Cost or pricing data can be a major advantage to the government during negotiations as it can be used to reliably establish reasonable prices and effectively lower suppliers' profits. Finally, the government selects the winning proposal and, after negotiating direct costs, indirect costs, and fees, the contract is signed (awarded).

As the employees responsible for managing contract contents and the procurement process, PO's play a key role in the competition for and performance of contracts. They are responsible for establishing prices are "fair and reasonable" (discussed below), lowering contract and procurement operating costs, and promoting competition, among other duties (FAR Part 15 and FAR 1.102).[18] The FAR grants PO's substantial leeway in determining pre-award contract characteristics, such as specifications, contract type (e.g. fixed price, cost-plus-fixed-fee), and type of solicitation procedure used (e.g. private negotiations, sealed bids). PO's also determine if only one supplier can reliably meet the specifications and requirements and thus whether a proposal will be solicited *only* from that source (i.e., a "sole source" contract per FAR 6.302-1 and FAR 2.101), or whether additional suppliers should be sought to increase competition. PO's review any supplier data submitted and, after the contract is awarded, monitor contract performance (FAR Part 16). Government

[18] FAR 31.201-3 states that, "a cost is reasonable if, in its nature and amount, it does not exceed that which would be incurred by a prudent person in the conduct of competitive business." A fair price on the other hand is one which is fair to both the buyer and supplier.

managers and auditors oversee PO's, who can face punishment for not ensuring compliance with regulations such as TINA.

Based on FAR 15.402 and discussions with practitioners, I provide a theoretical framework describing how fair and reasonable prices are established in supply contracting in the public and private sectors. I classify the available approaches into three general methods: (1) determining whether adequate competition exists (defined in federal procurement as having two or more independent bidders that submit offers satisfying the government's requirements[19]), (2) relying on PO's own judgment based on their market research and experience, and (3) requiring private supplier disclosures supporting their proposed prices. I discuss supplier disclosures in the public and private sectors, as well as how TINA's requirements affect this framework, in the following subsection.

2.2 Truth in Negotiations Act (TINA)

In 1962, after a series of high-profile incidents of unfair competitive practices and price manipulation arising from collusion between government officials and suppliers, Congress enacted the Truth in Negotiations Act (TINA).[20] Per TINA, suppliers bidding on a negotiated contract *must* disclose cost or pricing data whenever PO's *expect* the contract price to surpass the TINA threshold (currently set at $2,000,000), with some exceptions (discussed below). Further, for contracts with an agreed (i.e., realized) price above the TINA threshold, suppliers must certify that to the best of their knowledge, "the cost or pricing data they provided is accurate, complete, and current." PO's and governmental auditors are responsible for ensuring that suppliers comply with TINA.[21]

Exceptions to TINA's requirements include contracts where prices are more likely

[19] Specifically, FAR 15.403-1(c)(1) states that for "adequate competition", it should be "expected there will be two or more responsible bidders, competing independently, that submit offers which satisfy the government's solicited requirements." See Section A.1.1 of the Online Appendix for details. The DOD in 2019 changed this from the expectation of two or more bidders to there actually being two or more bidders.

[20] U.S.C. 2306a and 41 U.S.C. Chapter 35.

[21] This paper focuses on prime contracts. However, subcontracts and modifications that exceed the threshold are also subject to TINA's requirements.

reasonable, and thus requiring the data would likely unnecessarily drain procurement and supplier resources. These exceptions include contracts where PO's anticipate adequate price competition (i.e., two or more offers), contracts with prices set by law or regulation, and acquisitions classified as "commercial items" for which an established, competitive market already exists.[22] Irrespective of TINA's requirements, the FAR grants PO's the ability to request cost or pricing data (uncertified) when necessary to ensure reasonable prices (see FAR 15.403-3 and Section A.1.1 of the Online Appendix for additional details on certification). Below-threshold contracts may also require certified data with higher-up approval if one of the exceptions is not met (FAR 15.403-4(a)(2)). Figure 1 summarizes application of the TINA threshold.

In essence, TINA stipulates that for contracts above the threshold the government should protect its interest by requiring greater verification that prices are reasonable. For these contracts, procurement should rely less on POs' judgment and more on cost or pricing data and competition (15.403-4). PO's can be subject to agency problems, such as colluding with bidders on contract awards and shirking, as well as errors of judgment, especially as technology and production processes change). These agency problems can reduce competition by negatively impacting suppliers' perceptions of fairness. For higher-dollar contracts, these costs and the costs of a price being unreasonable can substantially increase.[23]

Despite their benefits, TINA's data requirements also pose several costs to suppliers and the government. First, suppliers must gather and prepare the data for submission (see Table 15-2 of FAR 15.408). Certifying cost or pricing data requires the data to be the latest available across the supplier's *entire enterprise*, which can involve time-consuming data collection "sweeps" that add 30 days on average to the award process, according to

[22] A last exception is if a PO applies for an "exceptional case" waiver from TINA's data requirements because sufficient data has been provided recently for a very similar purchase or the supplier refuses to provide the data and necessary supplies or services cannot be obtained by alternative means. These waivers are uncommon (see Table 2).

[23] Several other countries' procurement systems similarly require additional information when information asymmetry is likely to be high. Such requirements can be threshold-based, such as the U.K.'s Single Source Regulations of 2014.

one government estimate (Lorell et al. [2005]). These sweeps can disproportionately affect larger companies with multiple offices, though the costs to implement a specialized system for certification can be costly for smaller companies. Second, cost or pricing data can be highly proprietary, thus deterring companies who would otherwise like to contract with the government (Sheffner [2019]; He et al. [2021]). Third, pecuniary and reputational penalties for providing "defective" (i.e., incomplete, inaccurate, and outdated) cost or pricing data can be high and are feared by suppliers.[24] Investigations can also be costly. Government claims against suppliers can lower their supplier ratings in the Contractor Performance Assessment Reporting System and diminish future prospects of contracting with the government (Heese and Pérez-Cavazos [2019]). Finally, the government must verify the additional information, such as by conducting forward-priced proposal estimate audits, which adds time to the award process.

Between October 1st, 2015 and June 30th, 2018, the TINA threshold was set at \$750,000 per the FAR. However, on July 1st, 2018, a several agencies including the Department of Defense (DOD) increased their threshold to \$2,000,000. These "early adopter" agencies updated their threshold before the FAR mandated doing so to reduce suppliers' data management costs and to comply with the 2018 National Defense Authorization Act, which changed the U.S. Code and signaled an eventual FAR update. This threshold increase was the largest (by dollar value) in the history of TINA (see Appendix B for details). Table 1 presents the dollars obligated by the 15 largest federal agencies in fiscal years 2016–2020 until emergency COVID procurement rules were instituted by the White House on March 13th, 2020 (FR Proclamation 9994). The bottom row shows that early adopter contracts comprised the majority of federal contracts, both in number (81.1%) and dollar (84.6%) terms. The analyses in this paper thus focus on early adopter agencies' contracts around the \$750,000

[24] TINA imposes expensive fines for defective data. Per the False Claims Act, it is illegal to make false statements to the government regarding contracting matters above and below the threshold. Defective pricing claims may therefore also result in civil litigation (Bodenheimer and McLaughlin [2018]), penalties (with treble damages), and criminal charges, regardless of whether there was fraudulent intent. See Section A.1.1 in the Online Appendix for details.

and $2,000,000 TINA thresholds (see Section 3.2 for further discussion and a list of these agencies).[25] In Section 3.1, I discuss the conceptual underpinnings of this study and provide details about how the threshold may affect contract bidding and execution.

Corollaries to TINA's data requirements exist in the private sector as well. Private firms follow a similar approach for establishing price reasonableness as public procurement. Firms want to avoid the risks associated with relying entirely on POs' judgment for higher-dollar contracts. Thus, for contracts expected to surpass a certain dollar amount, firms frequently require a minimum number of bidders or costly additional information (e.g., detailed pricing breakouts; supplier finances; the supplier's own vendors; independent, third-party, ground-up estimates). For example, one Fortune 50 company requires non-commercial procurements exceeding $100,000 to either have a minimum of three independent bidders or a ground-up estimate provided by a third party estimator.[26]

3 Research Design

In this section, I develop this study's conceptual underpinnings, describe how my primary samples are constructed, and specify the research design.

3.1 Conceptual Underpinnings

This section outlines my hypotheses of the effects of TINA's data requirements on contract outcomes, including whether cost or pricing data is required, competition, completeness, and performance.

[25] Hereafter, I always refer to early adopters' contracts unless explicitly noted otherwise. My primary findings (see Section 4) are unchanged by including "late adopter" agencies' contracts. Note that the threshold change for late adopters occurred on August 8th, 2020 (FR 85128) but was confounded by the emergency COVID rules. Given that late adopters' threshold change applied retroactively to July 1st, 2018, it is not clear how this should affect late adopters' bidding outcomes prior to 2020.

[26] Per the author's interview with a procurement employee of the company who wishes to remain anonymous.

3.1.1 Cost or Pricing Data Hypotheses

Above-threshold contracts typically require cost or pricing data to be submitted with bids unless an exception is met (see Figure 1). Although one might expect this requirement to lead to cost or pricing data being required more often, PO's could circumvent the requirement by simply ignoring TINA's data requirements or promoting sufficient competition to trigger an exception so frequently that the requirements have an insignificant effect on the data. Moreover, the threshold could reduce the frequency of data being required, if suppliers often withdraw altogether from bidding. However, I predict that TINA's data requirements will produce a net increase in the rate at which cost or pricing data is submitted (i.e., that H1 will hold):

H1: TINA's requirements are likely to increase the rate of cost or pricing data submission.[27]

3.1.2 Competition Hypotheses

The net effect of TINA's data requirements on contract competition is not obvious, as competition is subject to two countervailing effects, which I call the *supplier effect* and the *procurement system effect*. The *supplier effect* has a negative impact on competition due to costly disclosures forcing suppliers to manage more detailed accounting data, assume greater liability in cases of data issues, face weakened bargaining power, and incur proprietary costs (Darrough [1993], Tomy [2019]). Information leaks, bid protests, legal challenges, and FOIA requests increase the risk that competitors might learn about suppliers' proprietary information (Sheffner [2019]). Information asymmetry may bolster supplier innovation and suppliers' desire to foster a relationship with the government (He et al. [2021], Breuer, Leuz, and Vanhaverbeke [2019]). Data disclosure requirements may thus dissuade firms who would

[27] Note that this hypothesis relates to whether either certified or uncertified cost or pricing data are required with bids. The FPDS does not indicate whether data are certified, so I do not analyze the effects of the threshold on certification.

otherwise like to compete. In fact, reducing suppliers' data management costs was the stated reason behind the 2018 National Defense Authorization Act relaxing TINA's requirements for lower-priced contracts.

In contrast, the *procurement system effect* has a positive impact on competition in several ways, each involving greater procurement attention paid to affected contracts. First, as stipulated in the FAR, PO's should avoid requesting cost or pricing data unless necessary to establish the proposed price is reasonable (FAR 15.402(a)(3)), and they should promote competition (FAR Part 2). For contracts expected to surpass the threshold, the primary way for PO's to bypass the data requirements is via encouraging competition, such as by avoiding sole source contracts, proactively seeking bidders, allowing more "open competition", or loosening specifications.[28] Encouraging competition has its own costs: it requires attention, increases the risk of bid disputes and legal costs to settle, and requires PO's to verify offered prices are realistic. However, promoting competition is often still less costly than requiring cost or pricing data, which entails processing costs, potentially higher contract prices, and project delays as submission of certified cost or pricing data can add weeks or even months to award times.

Second, PO's may promote competition to avoid audit involvement. Audit organizations, such as the DOD's Defense Contracting Audit Authority (DCAA) often have special requirements for TINA-covered contracts that require additional documentation from PO's. Similarly, incurred-cost audits, which are common for cost-plus contracts, require extra effort from PO's when suppliers submit cost or pricing data. To avoid audit involvement, PO's may prefer to promote competition.

Third, data requirements may hinder PO's from awarding contracts to a favored supplier due to familiarity or higher expected performance rather than to competitors who are

[28] PO's could conceivably decide to be more "optimistic" in their expectations of adequate competition to take advantage of TINA's exception, which should have an insignificant effect on competition or even a negative effect as PO's could substitute competitive solicitations for less competitive ones. The extent to which this occurs is likely limited given PO's are monitored by management.

qualified and cheaper overall but likely to deliver lower quality (though acceptable) output.[29] Developing relationships with trusted suppliers can be beneficial, and PO's may wish to avoid the attention and monitoring that lower quality or newer suppliers often need. However, forcing suppliers to be transparent about their costs can make it tougher for PO's to convince their management that selecting their preferred suppliers is in the government's (and not just the PO's and favored supplier's) best interest or, in the case of a sole source contract, that only a single supplier is capable of providing the good or service. Requirements to disclose cost data thus may lead PO's to put effort towards relaxing contract specifications and opening the competition to alternative suppliers.

Last, improving suppliers' perceptions of fairness may increase competition. Greater disclosure requirements for favored suppliers who historically may not have faced much scrutiny could signal increased impartiality in the procurement system. As trust in the procurement process increases, more bidders may compete. Overall, data requirements could improve competition by focusing the procurement system's attention on affected contracts.

These channels by which supplier data policies can affect contract competition are summarized below. I predict H2b will hold (that is, the *procurement system effect* will dominate):

H2a: TINA's data requirements are likely to *decrease* competition if the *supplier effect* dominates the *procurement system effect*.

H2b: TINA's data requirements are likely to *increase* competition if the *procurement system effect* dominates the *supplier effect*.

3.1.3 Performance Hypotheses

I identify two opposing channels by which supplier data requirements can impact contract performance in terms of renegotiations and cost overruns. The first is the *data/attention*

[29] Cost data can also reduce various forms of collusion between PO's and suppliers such as accepting bribes and providing favored suppliers with useful information that is not shared with other suppliers.

effect. Supplier data requirements may cause the procurement system to improve monitoring of above-threshold contracts due to additional data and/or greater attention to avoid the data, resulting in improved contract performance, such as reduced renegotiations and cost overruns (Warren [2014], Decarolis et al. [2020]). To the extent TINA increases competition, this may also press suppliers to improve their quality. In addition, PO's often shift risk to bidders via cost-plus contracts but may do so less frequently if data requirements reduce information asymmetry due to supplier data and/or improved competition. If data requirements aid PO's in writing more complete contracts, then contracts may also become easier to monitor. If the *data/attention effect* dominates, I would expect data requirements to *improve* performance.

The second effect on performance is the *undercut/discretion effect*. Higher competition has been found to lead to two related consequences: reduced PO discretion and more price undercutting – both of which can result in poorer performance. Undercutting, or "buying in", is a strategy by which suppliers lower their prices to undercut competitors but then attempt to compensate for diminished profits by generating additional revenue via negotiating changes to the contract later (Decarolis [2014]).[30] If suppliers face heightened competition due to data requirements, they may become likelier to use this strategy. Also, if PO's have less discretion to choose preferred (higher quality) suppliers due to more open competition procedures, then lower-quality bidders may lead to poorer performance. To the extent data requirements heighten competition, the number of contract modifications and cost overruns may increase (Alesina and Tabellini [2008]). Thus, if the *undercut/discretion effect* dominates, data requirements should have a *negative* effect on performance.

The channels by which supplier data policies can affect performance are summarized below.[31] I predict H3a will hold (i.e., the *data/attention effect* will dominate):

[30] Suppliers also may lower the quality of their goods or services, but the government has specifications and quality assurance methods that limit this tactic, and data are unavailable to study this phenomenon.

[31] As long as the *data/attention effect* plays a role, regardless of whether it or the *undercut/discretion effect* dominates, I would expect a negative effect on cost-plus contracts, because the *undercut/discretion effect* should not affect completeness.

H3a: TINA's data requirements are likely to *improve* performance if the *data/attention effect* dominates the *undercut/discretion effect*.

H3b: TINA's data requirements are likely to *decrease* performance if the *undercut/discretion effect* dominates the *data/attention effect*.

Figure 2 summarizes these and the rest of the hypotheses in this section.

3.2 Sample Construction

In this study, I focus on the TINA thresholds of $750,000 and $2,000,000 (see Section 2.2). The $750,000 threshold for all federal agencies (that follow the FAR), in effect from October 1st, 2015 to June 30th, 2018, increased to $2,000,000 on July 1st, 2018 for early adopter agencies. These agencies are: the DOD, Department of Agriculture, Agency for International Development, Department of the Treasury, NASA, Department of Energy, and Department of Veteran Affairs.[32] Such a large shift in the threshold is rare (see Appendix B). The reason for this sizable increase was to save taxpayers money by lowering suppliers' data management costs in the region where TINA's requirements are relaxed.

The $750,000 and $2,000,000 TINA thresholds are particularly ripe for study because they are relatively far apart, allowing me to perform placebo and other robustness checks for stronger inference.[33] Importantly, these two thresholds were effective during periods for which the Federal Procurement Data System (FPDS) - Next Generation populates the data used in this study. The FPDS tracks federal contracts from the time of award. Moreover, both thresholds are effective during time periods relatively free from contemporaneous confounding events, such as major U.S. conflicts or economic recessions.[34]

[32] I classify early adopters as agencies for which regulatory documentation confirms the threshold changed before the FAR update in 2020 (see Appendix B). The Department of Veteran Affairs' threshold change went into effect on August 6th, 2018, but applied retroactively to contracts signed after June 30th, 2018.

[33] To run these tests, it is necessary that the TINA thresholds studied are chronologically adjacent and far enough away from other threshold values.

[34] Another reason for studying the $750,000 and $2,000,000 thresholds is they were the first TINA thresholds to move at the same time and to the same value as the Cost Accounting Standards threshold, allowing me to study the effects of both together. See Appendix B for details.

I focus on prime contracts signed by early adopters.[35] Sealed bid and commercial solicitations are exempt from TINA's data requirements.[36] Therefore, I restrict my analyses to contracts that are the least likely to be exempt: negotiated, non-commercial contracts.[37] Small Business Innovation Research Program contracts are also excluded due to a lack of price competition (see Appendix A.1.2 for details). The "Full Baseline" sample includes all agency contracts that meet the above criteria with prices between $250,000 and $3,000,000 during periods when *either* the $750,000 or $2,000,000 threshold was in effect.[38] I exclude contracts below $250,000, because several early adopters used a simplified acquisition threshold of $250,000 during the study period.[39] My Full Baseline sample is primarily used for descriptive exercises.

Next, I create two threshold-specific Baseline samples for use in my primary analyses (specified in Section 3.3). I do this in two steps. First, I split the Full Baseline sample into two periods corresponding with the effective periods for each threshold. Specifically, the "$750,000 Threshold" sample contains contracts signed between October 1st, 2015 and June 30th, 2018. The "$2,000,000 Threshold" period starts August 6th, 2018, the date the VA's deviation from FAR was signed, and ends on March 13th, 2020, the day the White House instituted emergency COVID procurement rules.[40] Second, for each sample, I apply a bandwidth centered around the effective threshold (see Section 3.3.

These price ranges are likely to be material to even the largest of private companies.

[35] I exclude contracts signed by the U.S. Defense Logistics Agency (a bureau of the DOD) due to several peculiarities (see Section A.1.2 in the Online Appendix). However, retaining these contracts in my samples does not change my primary results.

[36] Negotiated contracts are also known as "other than sealed bid" contracts (FAR 15.000). Cost or pricing data would not be as useful for sealed bid contracts, as they are awarded solely based on price.

[37] I do not exclude indefinite delivery vehicles (IDVs) because both the master contracts and orders on these contracts are subject to TINA's data requirements.

[38] The TINA threshold applies using a prime contract's base price plus the value of any unexercised options included in the contract at initial award.

[39] Contracts below the simplified acquisition threshold are subject to different rules regarding procurement's discretion for supplier selection and PO's are restricted from requiring certified cost or pricing data for these contracts (FAR 15.403-4(a)(2)). The DOD, for example, set its simplified acquisition threshold to $250,000, effective April 13th, 2018 (see DARS Class Deviation 2018-O0013).

[40] Contracts signed between July 1st, 2018, and August 6th, 2018, are dropped to lessen the impact of any lag in implementation of the new threshold or spillover effects on Department of Veteran Affairs contracts. My primary findings are not sensitive to this design choice.

However, the federal government negotiates some contracts that cost tens of billions of dollars. Thus, one might argue that contracts in the Baseline samples may be inconsequential to the government. Figure A.1 addresses this concern: panels (a) through (c) show that the density of federal contracts decreases exponentially with price across a variety of price ranges, and panel (d) shows that the threshold-specific Baseline samples used for my analyses contain about 80% of *all* contracts above the two TINA thresholds while each was in effect, and that meet the sample filters described above. See Section A.1.3 of the Online Appendix for further discussion of the price distribution. In sum, the price ranges examined in this study should be highly pertinent.

3.3 Regression Discontinuity Design Specification

To study the effects of TINA's data requirements on contract characteristics, I implement an RDD around each threshold while it is in effect. Formally, for *each* TINA threshold P_c (i.e., \$750,000 and \$2,000,000), I use the corresponding threshold-specific sample (i.e., contracts where $P_i \in [\mathrm{P}_c - h,\ P_c + h]$ and which were signed when the threshold was effective; see Section 3.2) to estimate the following model:

$$Y_i = \alpha_0 + \alpha_1 Distance_i + \alpha_2 Treat_{TINAi} + \alpha_3 Treat_{TINAi} * Distance_i + \delta_i + \eta_i + \chi_i + \epsilon_i, \quad (1)$$

where $Treat_{TINAi}$ is a dummy for contracts priced above the corresponding TINA threshold, leaving contracts below that threshold as control contracts. The coefficient of interest, α_2, captures the discontinuity in the outcome variable (see below) at the threshold. $Distance = P_i^* = P_i - P_c$ is the distance (in dollars) between the price of contract i and the corresponding threshold.[41] All regressions contain a vector of control variables (δ_i), which includes the original duration of the contract prior to any modifications and a set of dummies indicating whether the contract has been set aside for disadvantaged firms such

[41] *Distance* is divided by 1,000 for exposition of estimated coefficients.

as small businesses or women or minority-owned firms.[42] η_i and χ_i represent the two-digit product-service code (PSC) and year-quarter fixed effects, respectively. The coefficient α_2 is the RDD estimator and identifies the treatment effect of supplier data requirements. For the RDD around the \$750,000 threshold, bandwidth h is selected to be \$500,000, and for the RDD around the \$2,000,000 threshold, bandwidth h is selected to be \$1,000,000. Contracting offices differ in the mix of contracts they originate and the audit offices assigned to them (audit offices vary in the types of contracts they prefer to audit). Therefore, I cluster standard errors at the agency-contracting office level.[43]

The vector of contract outcomes I study, Y, contains variables related to cost or pricing data, competition, contract completeness, and contract performance. *CP Data* is a dummy that equals 100 if cost or pricing data is required with the bid, and zero otherwise. The competition variables are *Sole Source* and *Multiple Offers*.[44] *Sole Source* is an indicator set to 100 if the contract is awarded as part of a sole source solicitation (i.e., all but one bidder is excluded), and zero otherwise. Given TINA's competition exception is based on whether the contract is expected to receive multiple bids, I also examine *Multiple Offers*, an indicator that equals 100 if the contract receives multiple bids, and zero otherwise.[45] Importantly, *Sole Source* and *Multiple Offers* are not the converse of each other. A contract can have a solicitation where many bidders are *allowed* to bid but only a single bid is received (in which case *Multiple Offers* = 0 and *Sole Source* = 0).

Also included in Y are contract performance and completeness variables. *Log(Number of Modifications)* contains the natural logarithm of the number of modifications (i.e., contract changes). Following Decarolis et al. [2020], I exclude modifications that are unlikely to have

[42] These quotas are set by the Small Business Administration. Each agency head sets its own targets by set-aside type, and these targets are not influenced by PO's. Anecdotally, a contract is often simply declared a set aside if no other type of supplier bids. The primary results of my study hold if I remove set-aside controls from my analyses.

[43] For example, the Defense Contracting Audit Authority offices vary in the minimum cost-plus contract price they will audit and are more likely to audit higher-value contracts than lower-value ones.

[44] Note that data on whether the PO expected adequate competition prior to bidding is not available.

[45] Table A.4 in the Online Appendix shows that the general results of the paper hold when using *Log of the Number of Offers* and *Open Competition* as alternative, less direct competition measures.

performance implications (e.g., contractor address changes).[46] I also exclude changes that are explicit at the initial contract signing (i.e., exercise of options). *Cost Overrun* is a dummy that equals 100 if the contract has a modification that results in a price increase, and zero otherwise.[47] All variables are detailed in Appendix A.

Columns (1), (2) and (3) of Table 2 contain the means of the primary variables for contracts in the three Baseline samples used in this study: Full Baseline, $750,000 Baseline, and $2,000,000 Baseline. In the Full Baseline sample, approximately 18.5% of contracts require cost or pricing data, with an additional 1.0% having the data requirement formally waived. Approximately 77.8% of contracts are fixed-price, 18.5% are cost-plus, and the rest are time and material contracts.[48] The average contract in this sample receives 6.9 bids. Sole source contracts constitute 28.2% of contracts. 57.1% of contracts receive multiple bids, leaving 42.9% with one or zero offers. Contracts in the sample received 1.5 modifications on average. The (unconditional) likelihood of a contract having a cost overrun associated with a modification was 17.8%. Contracts written by three DOD bureaus (Army, Air Force, or Navy), by far the largest federal bureaus by procurement volume, comprise 78.5% of the sample. Per Table A.1 in the Online Appendix, contracts that receive one or zero offers require cost or pricing data at a rate of 24.4% (16.7%) in the $750,000 ($2,000,000) Baseline sample. Meanwhile, contracts receiving multiple offers require cost or pricing data at just under half the rate: 10.3% (7.3%) for the $750,000 ($2,000,000) Threshold Baseline sample. This finding is consistent with PO's requiring cost or pricing data when competition is expected to be insufficient to determine price reasonableness.

An identification assumption behind my research design is that there is not significant

[46] Specifically, according to the FPDS data dictionary, I exclude all amendments classified as "Additional Work (new agreement, FAR part 6 applies)", "Novation Agreement", "Vendor DUNS or name change - Non-Novation" and "Vendor Address Change".

[47] TINA's requirements also apply to modifications above the threshold. Thus, I base both performance variables only on modifications that occur during the threshold period in which the prime contract is signed, so these variables are not affected by the 2018 threshold change. I rely on year-quarter fixed effects to control for any discrepancies in performance of contracts signed earlier versus later in each period.

[48] In the Full Baseline sample, cost-plus contracts require cost or pricing data about twice as often as fixed-price contracts do: 32.7% versus 15.2% respectively. It is coincidental that the share of contracts requiring cost or pricing data is nearly the exact same as the share of cost-plus contracts in this particular sample.

manipulation of contract prices to circumvent the threshold. Two factors should limit the extent to which suppliers reduce their bid prices below the threshold (i.e., "bunch"). First, TINA requires data based on the prices PO's expect prior to bidding. Second, data required from suppliers is posted in the solicitation prior to bidding and thus is largely independent of bid prices. However, suppliers may still bunch to avoid certification of data they provide or to influence POs' expectations of prices for similar future contracts. Further, PO's may also split contracts (i.e., create multiple lower-value contracts rather than a single higher-value contract) to avoid the data requirements, although splitting to undercut the threshold is explicitly prohibited (FAR 13.003(c)(2)(ii)). In the Online Appendix, Section A.3 shows that any bunching below the threshold is economically insignificant and Section A.4's results indicate the rate of splitting to undercut the threshold is likewise low.

4 Results

In this section, I present my primary results analyzing the effects of TINA's supplier data requirements on cost or pricing data (i.e., comprehensive accounting data) submission, contract competition, completeness, and performance.

4.1 Cost or Pricing Data Results

In this section, I assess the effects of TINA's supplier data requirements on how often cost or pricing data are required. My empirical approach includes graphical and RDD analyses around the TINA threshold while in effect.

Figure 3 visualizes the effect of these data requirements on whether cost or pricing data were required in each threshold period for different samples, described below. Note that when the threshold increased for early adopters in 2018, contracts in the Full Baseline sample between \$750,000 and \$2,000,000 were no longer subject to the data mandate. The y-axis is *CP Data*, the share of contracts requiring cost or pricing data. The x-axis is the contract price.

Panel (a) contains the Full Baseline sample, and shows that very few contracts below the $750,000 cutoff require cost or pricing data in either period. This makes sense, because it is costly to gather and process this additional information, so PO's tend to only request it when required to do so. As the $750,000 cutoff is crossed from the left, a sharp increase occurs in the fraction of contracts providing the data in the $750,000 threshold period as represented by the unshaded circles (in blue), and that fraction remains higher for all prices above $750,000. During the period after the threshold increases to $2,000,000 (corresponding with the shaded circles in red), the discontinuity shifts to the right, from $750,000 to $2,000,000, indicating that TINA's requirements significantly impact how often cost or pricing data are required for bids. These discontinuities do not occur at each threshold value when the threshold is not in effect. These findings are even more pronounced in panel (b), which restricts the sample to definitive and purchase order contracts (which are subject to less competition historically and thus less likely to be exempt from TINA's data requirements). As a placebo test, panel (c) shows that commercial contracts, which are exempt from TINA's data requirements, do not exhibit a discontinuity in the rate of data being required across either threshold while in effect.[49]

Table 3 presents results from the RDD (see equation 1) exploring how the data requirements affect the data being required around each threshold while it is in effect. Column (1) uses the $750,000 Threshold Baseline sample, and column (2) uses the $2,000,000 Threshold Baseline sample. The dependent variable is whether cost or pricing data is required. The coefficient of interest is α_2 (on $Treat_{TINA}$), which captures the effect of the requirements on how often the data are required. Columns (1) and (2) demonstrate that the requirements statistically and economically significantly increase the frequency with which cost or pricing data are required by 2.81 pp (17.2%) and 3.85 pp (21.9%) for contracts above the $750,000 and $2,000,000 thresholds, respectively, compared to below-threshold contracts (though α_2 is

[49] See Section 5.2 for discussions on definitive, purchase order contracts, and commercial contracts and Table 2 for summary statistics for these samples.

significant only at the 10% level around the $750,000 threshold).[50] These results complement the visual evidence in Figure 3, panels (a) and (b), and provide support for H1.

4.2 Competition Results

The results from the competition RDD tests are presented in Table 4. Examining *Sole Source*, columns (1) and (3) show negative and statistically significant coefficients on $Treat_{TINA}$ in each time period, indicating that sole source contracts experience a negative discontinuity at the TINA thresholds. Specifically, the prevalence of sole source contracts decreases by 14.7% (=3.893/26.51) and 13.0% (=3.927/30.20) for affected contracts above the $750,000 and $2,000,000 thresholds, respectively, compared to those below these thresholds. Columns (2) and (4) show that contracts above both thresholds are also significantly more likely to receive multiple offers. The frequency of contracts with multiple bids is greater by 7.5% (=4.388/58.46) and 11.4% (=6.306/55.50) above the $750,000 and $2,000,000 thresholds, respectively, than below them. These results are evidence that TINA's requirements increase competition. Figures A.3 and A.4 in the Online Appendix contain RDD plots that mirror the findings from this table.

These results suggest that the *procurement system effect* dominates the *supplier effect*. This is a surprising finding, given that it differs from experts' expectations regarding TINA. However, it makes sense: PO's promote competition in order to reduce data provision and processing costs and/or a procurement system perceived as fairer increases competition. This positive effect outweighs any negative effects on competition due to suppliers' data management costs and proprietary concerns as described in Section 3.1.2. However, based on these results it is unclear whether PO's promote an actual improvement in competition, or whether they promote competition "on paper" by soliciting more bids, but then signaling (directly or indirectly) to their favored supplier they will choose them regardless. Though

[50] Note that the coefficients on *Distance* and/or $Treat_{TINA} * Distance$ in the tables in this section are statistically (and in many cases economically) significant in most regressions, which suggests that including these linear trend terms in the specification is warranted.

institutional factors make this unlikely, in the following section, I explore this question further by examining how the threshold affects contract performance and completeness. Additionally, if PO's can reduce the need for cost or pricing data by promoting competition, a primary mechanism underlying the *procurement system effect*, then a substitution effect should occur between multiple bids and how frequently such data are required. In Section 5.3, I show suggestive evidence of such a substitution effect.

4.3 Performance and Completeness Results

In this section, I test whether the *data/attention effect* or the *undercut/discretion effect* dominate (as described in Section 3.1.3) at each value of the TINA threshold. Table 5 presents the results. This table features the coefficient α_2 on $Treat_{TINA}$ from equation 1 with performance and completeness variables as outcomes, using two types of samples. First, the top row contains the focal results: the threshold-specific Baseline samples. Examining the \$750,000 threshold, the coefficient on $Treat_{TINA}$ in column (1) indicates a modest improvement in the rate of re-negotiations of 2.9% for affected contracts. In addition, the significant, negative coefficient on $Treat_{TINA}$ in column (2) indicates that affected contracts are 13.0% (=1.868/14.42) less likely to experience a cost overrun. Column (3) shows a small decrease in completeness for affected contracts, as the use of cost-plus contracts declines slightly, but this effect is statistically insignificant.

Next, examining the \$2,000,000 threshold, columns (5) and (6) show the thresholds' effects on contract performance are statistically insignificant. As shown in column (6), the cost-plus type becomes 11.3% (=2.612/23.19) less common among affected contracts (significant at the 10% level), suggesting that data requirements may help PO's to write more complete contracts as the government's information environment improves. Figures A.5 and A.6 in the Online Appendix provide the corresponding RDD plots, which align with these results.

Taken together, this evidence suggests that the *data/attention effect* dominates the

undercut/discretion effect, monitoring and the subsequent performance of contracts improves due to the data requirements. This effect appears to occur at least partly due to PO's originating more complete contracts due to the data requirements. Figure 2 summarizes the observed effects on cost or pricing data, competition, and performance from this study.[51]

An alternative explanation for my competition findings in Section 4.2 is that PO's intentionally promote competition to avoid requiring additional data but then signal to their favored suppliers (directly or indirectly) that they will choose them regardless.[52] Although such collusion to avoid the data requirements is unlikely due to institutional factors (e.g., illegality, monitoring by management, bid protests), it could could negate any benefits from increased bidding (e.g., reduced prices) and harm competitors and the government by wasting resources. Of course, one cannot observe the counterfactuals of the number of bidders and who the winners would have been if the data requirements were not in effect, and studying the effect of increased bidding on equilibrium prices presents its own estimation challenges. However, such collusion implies PO's simply select the same suppliers that they would have if the data requirements were not in effect and do not require any additional data, which should not have an effect on contract performance or completeness.

To investigate this alternative hypothesis, I test whether my performance and completeness results hold for contracts that do not require cost or pricing data. This hypothesis predicts insignificant results, while the *data/attention effect* predicts my results should still hold, due to PO attention. As shown in the second row of Table 5, my previous results are unchanged.[53] These findings suggest PO's improving competition "on paper" is not the main driver of my competition results, and that PO attention indeed plays a role in my results.[54]

[51] In untabulated analyses, I plot the coefficients and confidence intervals for each outcome in this section using bandwidths from \$100,000 to \$500,000 for the \$750,000 Threshold sample and \$200,000 to \$1,000,000 for the \$2,000,000 Threshold sample. These plots show that my conclusions are generally supported using these alternative bandwidths.

[52] Competition should be beneficial for assuring reasonable prices even if the favored supplier is still chosen, provided the bidders believed the acquisition was truly competitive.

[53] My main performance results also hold when I restrict the threshold samples to contracts requiring cost or pricing data, as expected, which suggests cost or pricing data also improves monitoring (untabulated).

[54] My competition results hold only for contracts that do not require cost or pricing data, which is consistent with this interpretation.

5 Robustness Checks

In this section, I present the results of robustness checks of my main findings from Section 4. Then, I explore whether these results differ across various samples in ways that are consistent with TINA's requirements driving my findings. Finally, I show my main results hold using a difference-in-discontinuities design, exploiting the 2018 TINA threshold change as a natural experiment.

5.1 Placebo Tests

To further validate my findings in Section 4, I conduct placebo RDD tests. For these tests, I examine the effect of the \$750,000 and \$2,000,000 cutoffs on each outcome variable from Section 4, while each threshold is *not* in effect. These tests use samples obtained by applying the same filters as the threshold-specific Baseline samples but using an alternative time period for each threshold.[55] In contrast to the RDD results from the time periods during which the thresholds were in effect (see Tables 3 through 5), in these alternative time periods I expect the coefficient α_2 on $Treat_{TINA}$, which now captures the effect of the placebo thresholds on contract outcomes, should by and large be insignificant. These placebo test results are presented in Tables A.8 through A.10 in the Online Appendix. Importantly, all estimated coefficients on $Treat_{TINA}$ for the Baseline samples (in the first row of each table) are statistically and economically insignificant as expected (the remaining rows in these tables are related to heterogeneity test results, discussed in Section 5.2). These findings constitute additional evidence that my primary results are driven by the supplier data requirements.

[55] Specifically, for the first placebo test I use contracts around \$750,000 (i.e., from \$250,000 to \$1,250,000), but in the \$2,000,000 threshold period. For the second, I use contracts around \$2,000,000 (i.e., from \$1,000,000 to \$3,000,000) in the \$750,000 threshold period.

5.2 Heterogeneity Tests

To further explore whether my results in Section 4 are driven by TINA's data requirements, I devise a set of heterogeneity tests that analyze how the effects of the data threshold vary across different samples of contracts that are likely to experience stronger or weaker effects due to TINA's requirements (see Section A.2.1 of the Online Appendix for details and the full results).

First, I compare the effects of TINA's requirements on indefinite delivery vehicles (IDVs) and non-IDVs (i.e., definitive and purchase order contracts). IDVs entail more frequent competition than non-IDVs (because they tend to involve less sole source contracts and more bids, per Table A.3 in the Online Appendix). Thus, IDVs should be more frequently exempt from the data requirements. Consistent with this prediction, I find that non-IDVs exhibit statistically stronger effects from the threshold than IDVs in terms of data required and performance.

Second, I compare the effects of the threshold on contracts for supplies (i.e., goods), which are often standardized, against services and works contracts, which tend to have ex-post cost uncertainty, multidimensional quality heterogeneity and limited contractibility (Tadelis [2002]). Contracts for supplies also face less competition (see Table A.3 in the Online Appendix). Thus, I predict it is easier for suppliers to provide cost or pricing data and for PO's to promote competition for supplies than for services and works contracts. Also, services contracts are less straight-forward to monitor than contracts for supplies, as evidenced by more modifications for services. Thus, I expect service contracts' performance to benefit more from additional monitoring due to data requirements. I find evidence in favor of each of these predictions.

Third, contracts expected to receive multiple offers are exempt from the data requirements; thus, I predict that contracts of product service codes that historically tend not to receive multiple offers will exhibit a significantly stronger effect on competition due to the threshold, compared to product service codes whose contracts tend to have multiple bids. My

findings confirm this prediction. Importantly, placebo tests using each subsample described above show that only contracts subject to the TINA threshold (while in effect) exhibit a response at the threshold value.

I also analyze the effects of the threshold on commercial contracts (which are excepted from TINA's requirements) versus commercial contracts. As anticipated, I find only non-commercial contracts exhibit a discontinuity at the thresholds solely while they are in effect.[56] Together, the results of these heterogeneity tests suggest that my primary results in Section 4 are indeed driven by TINA's data requirements.

5.3 Substitution Between Cost or Pricing Data and Competition

The FAR outlines three ways for price reasonableness to be established below the TINA threshold: expecting multiple (independent) bids, PO judgement, and provision of additional data. A substitution effect (i.e., a negative relationship) might thus occur between the frequency of requiring cost or pricing data and that of contracts with multiple bids. Furthermore, above the threshold, these options decrease to two: expecting multiple bidders or additional data submission. Therefore, any substitution effect between multiple bids and comprehensive data submission should be stronger above the threshold.[57] To test these substitution predictions, I modify equation 1 from Section 3.3 to include an indicator variable for multiple bids and its interactions with $Treat_{TINA}$ and $Distance$ (see Section A.2.2 of the Online Appendix for details on the implementation and results).

My results suggest that below the threshold there is a substitution effect: below-threshold contracts with multiple offers have a 52.3% (=11.746/22.19) lower likelihood of the data being required than below-threshold contracts without multiple offers (the base group).

[56] As an additional robustness check I find my primary results hold when restricting the Baseline samples to contracts signed by the three largest DOD bureaus: the Army, Air Force, and Navy. Also, research and development contracts can be subject to different procedures in the FAR. In untabulated results, I find my main findings hold when excluding these contracts.

[57] A possible counterpoint is that the FAR permits PO's to request cost or pricing data (uncertified), regardless of whether multiple bids are received, if it is necessary to establish a price is reasonable (as mentioned in Section 2.2), per FAR 15.403-3(a)(1)(ii). Therefore, this substitution effect may not be detectable below or even above the threshold.

I also find the TINA threshold enhances the substitution effect. In fact, the results suggest that my previous finding that the TINA threshold increases the rate cost or pricing data is required (see Section 4.1) is concentrated among contracts without multiple offers for both the $750,000 and $2,000,000 thresholds. Together, these results suggest that competition and accounting information can act as substitutes for the purposes of reducing information asymmetry for supply contracts. They also provide verification that PO's can avoid requiring cost or pricing data by promoting competition.

These results suggest that cost or pricing data being required and contract competition, as well as other contract outcomes, are likely simultaneously determined. However, it becomes prohibitively difficult to obtain multiple exogenous instruments to jointly estimate all contractual terms. Thus, I estimate the cost or pricing data, competition, completeness, and performance regressions from Section 4 as a system of equations using a seemingly unrelated regression model, allowing the error terms to be correlated in all regressions. My primary findings are robust to this estimation (untabulated).

5.4 Difference-in-Discontinuities Design

In this section, I discuss results of a difference-in-discontinuities design ("Diff-in-Disc") as an additional robustness check of my main findings from Section 4. Section A.2.3 of the Online Appendix contains the specification and details about the results. This design exploits the change in the TINA threshold from $750,000 to $2,000,000 in 2018 as an additional source of exogenous variation to analyze the impact of data requirements on contract outcomes. A difference-in-discontinuities design has an important advantage over an RDD: if a persistent confounding factor similarly affects the variable of interest around the threshold both before and after a policy change, then under certain assumptions (see Grembi et al. [2016]), that effect can be "differenced out" across the two periods.[58] The results of these tests echo those of my RDD analyses in Section 4, as anticipated.

[58] However, this design is more susceptible to confounding policies introduced over time that have differential effects on above and below-threshold contracts. See Section A.2.3 of the Online Appendix for details.

6 Conclusion

This paper examines the effect on supply contracting outcomes of a buyer policy that mandates suppliers privately provide accounting information. Specifically, it analyzes the effect of such a policy on contract competition (i.e., the number of bids), completeness (i.e., frequency of cost-plus and fixed-price contracts), and performance (i.e., the prevalence of re-negotiations and cost overruns) by exploiting quasi-experimental variation introduced by a regulation requiring federal suppliers of contracts above a certain value submit detailed accounting data, called cost or pricing data, to the government.

My primary findings are three-fold. First, as evidenced by graphical and RDD analyses, the TINA threshold substantially increases the rate at which cost or pricing data is required. This rate decreases when the government expects multiple bids, indicating a substitution effect between accounting information and competition, an effect that is enhanced by the TINA threshold. Second, the data requirements result in overall *greater* competition, which is surprising to practitioners, who tend to predict that data management and proprietary costs will dissuade competition. My findings suggest this higher competition results from the procurement system attempting to reduce costly information requirements by promoting competition and/or the system attracting additional suppliers because it is perceived as fairer. Both of these outcomes can be achieved when PO's pay more attention to affected contracts. Third, I find improved contract performance and completeness for affected contracts, likely due to closer monitoring.

In 2018, the government increased the TINA threshold to lower suppliers' data management costs, thereby saving taxpayers money. Information on the intended effects of TINA's requirements on competition is not available, but if this policy only lowers supplier costs, then relaxing the requirements should encourage competition. It is possible, however, that this change had unintended consequences: relaxing TINA's requirements for lower-priced contracts means PO's are less incentivized to seek an exemption in the form of adequate competition for contracts in this price range. Saving PO resources on lower-dollar

contracts could allow PO's to focus on higher-dollar contracts above the new threshold. In this way, increasing the TINA threshold may help align the government's limited resources with its higher priority needs, thereby increasing the government's utility.

I find that TINA's requirements improve contract competition, completeness, and performance. However, this paper does not attempt to evaluate the net effect of the 2018 TINA threshold change on the government's overall objective function, mainly because information on actual accounting data management costs saved by suppliers due to the relaxation of TINA's requirements is not readily available to researchers. I also do not analyze how TINA's requirements affect bid prices. Further, it is difficult to assign a dollar value to the benefits of fairer bidding or lower corruption resulting from data requirements. Finally, supplier data requirements likely decrease the government's ability to award contracts swiftly, which would be especially costly for urgent projects. However, data on award phase length and the costs of delaying project awards are not publicly available and thus not examined in this study.[59]

To the best of my knowledge, this is the first study to link mandatory accounting disclosure requirements with explicit contracting outcomes. This study conducts a novel exploration of the effects of TINA's data requirements on the bidding and execution of supply contracts. Further research will be needed to determine whether the findings extend to private sector procurement, which also faces an information asymmetry problem and additional costly data provision requirements but has different laws, enforcement, funding sources, and approval processes.

[59] Theory suggests that the effects of information disclosure on product market competition depend on the information content of the disclosure (e.g., price versus demand-related) and the nature of the competition (Gal-Or [1986], Darrough [1993], Arya, Mittendorf, and Yoon [2019], Bagnoli and Watts [2015]). A limitation of this study and the wider product markets literature is that theory implies that results are not easily generalizable.

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Appendix A Variable Definitions

Table A.1: Variable Definitions

Variable	Definition
CP Data	Equals 100 if cost or pricing data was required to be submitted with proposals, and 0 otherwise.
Cost or Pricing Data Waived	Equals 100 if the contract had an exceptional case waiver from the requirement to submit cost or pricing data, and 0 otherwise.
Cost-Plus	Equals 100 if the contract was of cost-plus type, and 0 otherwise.
Fixed-Price	Equals 100 if the contract was of fixed-price type, and 0 otherwise.
Sole Source	Equals 100 if the contract was only solicited to a single source, and 0 otherwise.
Multiple Offers	Equals 100 if the contract received more than one bid, and 0 otherwise.
Multiple Bids	Defined similarly as Multiple Offers, but equals 1 if the contract received more than one bid, and 0 otherwise.
Open Competition	Equals 100 if the solicitation allowed full and open competition (with or without set asides), and 0 otherwise.
Log(Number of Offers)	The natural logarithm of one plus the number of bids.
Log(Number of Modifications)	The natural logarithm of one plus the number of modifications (see Section 3.3 for details).
Cost Overrun	Equals 100 if the contract had a net increase in cost due to modifications over the threshold period in which the contract was signed, and 0 otherwise.
$\text{Treat}_{\text{TINA}}$	Equals 1 if the realized price of the contract was strictly above the corresponding TINA threshold, and 0 otherwise.
Treat_{R}	Equals 1 if the realized price of the contract is greater or equal to \$750,000 and less than \$2,000,000, and 0 otherwise.
Distance	The difference between the realized price of the contract and the corresponding TINA threshold.
Initial Duration	The original estimated length of the contract (in days) at the time of signing.
Definitive and Purchase Orders	Equals 1 if a contract is a definitive or purchase order contract (i.e., FPDS award type code equals "B" or "D", respectively), and 0 otherwise.
Indefinite Delivery Vehicle	Equals 1 if a contract is a indefinite delivery vehicle (i.e., any sample contract that is not a definitive or purchase order contract), and 0 otherwise.
Supplies	Equals 1 for contracts for supplies (i.e., FPDS product service code begins a digit 0 through 9), and 0 otherwise.
Services and Works	Equals 1 for contracts for services and works (i.e., FPDS product service code begins with a letter other than "A"), and 0 otherwise.
Research	Equals 1 for research contracts (i.e., FPDS product service code begins with "A"), and 0 otherwise.
Army, Air Force, and Navy	Equals 1 for contracts signed by the Army, Air Force, or Navy, and 0 otherwise.

Notes: Definitions of the variables used in this study.

Appendix B Historical TINA Thresholds

Table B.1: Changes to the Truth in Negotiations Act (TINA) Threshold Over Time

Threshold Value	Year	Federal Agencies Affected	Inflation Adjustment?	Regulatory Act
$100,000	1962	DOD, Coast Guard, NASA	No	Public Law 87-653
$500,000	1990	DOD, Coast Guard, NASA	No	Public Law 101-510
$500,000	1994	All remaining	No	FASA
$550,000	2000	All	Yes	65 FR 60553
$650,000	2006	All	Yes	71 FR 57363
$700,000	2010	All	Yes	75 FR 53129
$750,000	2015	All	Yes	80 FR 38293
$2,000,000	2018	Early Adopters	No	Class deviations
$2,000,000	2020	All remaining	No	85 FR 40071

Notes: The historical values of the Truth in Negotiations Act (TINA) threshold since its inception in 1962. Each threshold applied to all agencies that followed the Federal Acquisition Regulation (FAR) unless otherwise indicated.

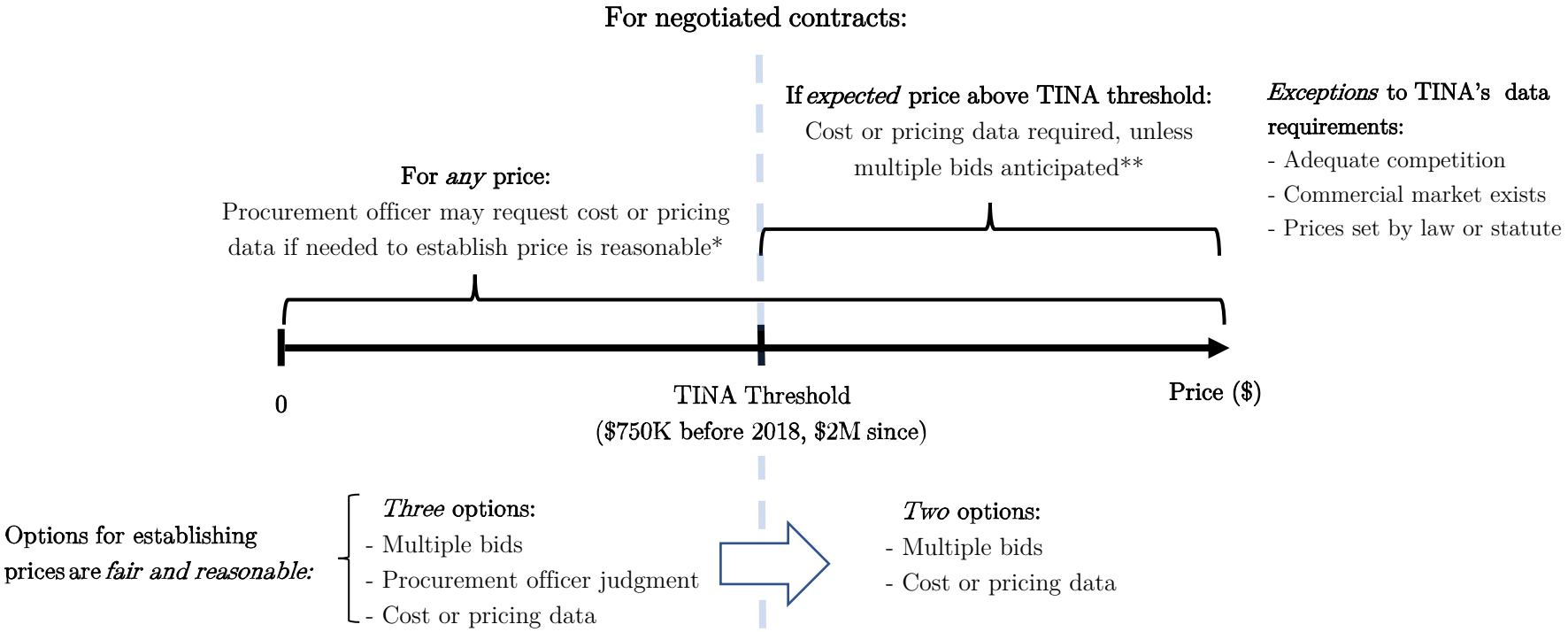
In this section, I discuss changes to the TINA threshold since its inception in 1962. Threshold updates occur via Congressional and regulatory actions, most of which are relatively small, periodic inflation adjustments.

TINA was passed in 1962 with an initial value of $100,000. The first update to the threshold in 1990 was relatively large to account for the effects of inflation over the prior decades. From 2000 to 2015, all changes to the TINA threshold were smaller inflation adjustments, which have been mandatory every five years for all statutory thresholds since October 1st, 1995 and occur in multiples of $50,000 (10 U.S.C. 2306a(a)(7) and 41 U.S.C. 254b(a)(7)). Since the $750,000 threshold was introduced in 2015, the FAR has tied compliance with the Cost Accounting Standards (CAS) to the TINA threshold, rather than a different value as was typical beforehand (see Appendix A.1.1 for details about the CAS threshold).

On December 12th, 2017, Congress passed the National Defense Authorization Act of Fiscal Year 2018, which contained the largest change to the TINA threshold in its history, from $750,000 to $2,000,000. Due to bureaucratic delays, the FAR was not updated to

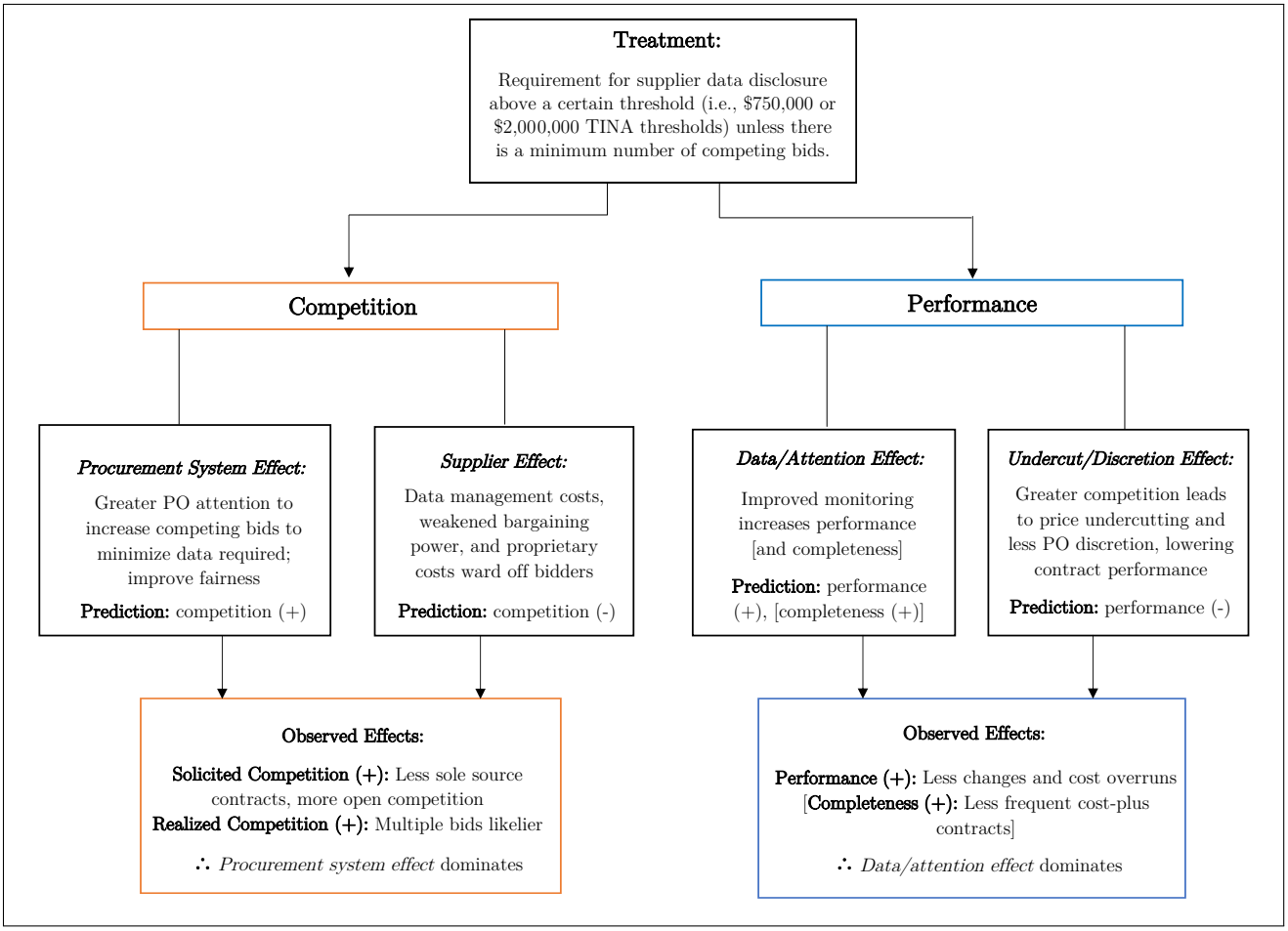
reflect this change until 2020, however. See Section 3.2) for discussion on the threshold change from $750,000 to $2,000,000, which agencies passed class deviations from FAR to adopt the threshold earlier than the FAR was updated to reflect this change (i.e., early adopter agencies), and the effective date for each agency.

Figure 1: TINA Threshold Application



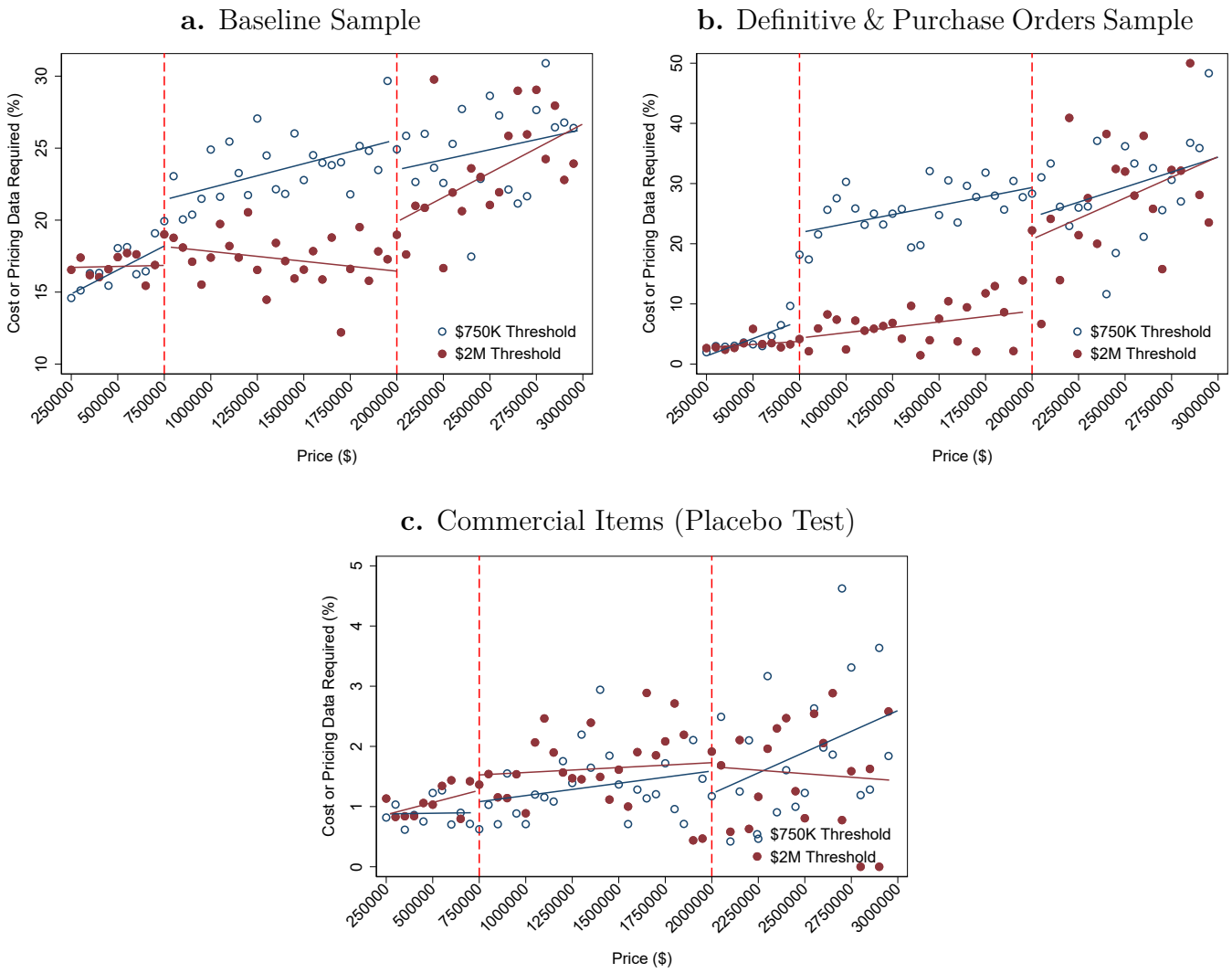
Notes: This figure depicts the application of the TINA threshold. For contracts at any price, procurement officers may request any data necessary to determine a price is reasonable. For contracts with prices expected to exceed the TINA threshold, cost or pricing data (i.e., comprehensive accounting data) is required unless an exception applies. An exception to TINA's data requirements is made for contracts where multiple, independent bidders are expected, a commercial market exists, or prices are set by law or regulation. The TINA threshold changed from $750,000 to $2,000,000 for contracts awarded by early adopter agencies after June 30th, 2018. See Section 2.2 and Section A.1.1 of the Online Appendix for more on the TINA threshold. For a list of early adopter agencies and the dates they adopted the new threshold, see Section 3.2. See Section 2.1 for a discussion of how procurement officers can establish prices are fair and reasonable. * For contracts below the TINA threshold but above the simplified acquisition threshold (SAT), procurement officers may request certified data with higher-up approval, unless one of TINA's exceptions is met. ** If a contract's realized (i.e, actual) price is above the TINA threshold, certification of the cost or pricing data submitted is also required.

Figure 2: Predicted and Observed Effects of Supplier Data Requirements on Contract Competition and Performance



Notes: This figure illustrates the predicted and observed effects of buyer requirements for suppliers to provide additional information when insufficient information is available to determine price reasonableness, on contract competition and performance. See Section 3.1 for more on these predicted effects and Section 4 for details about the results. See Appendix A for definitions of the variables listed under observed effects.

Figure 3: Cost or Pricing Data Required Versus Price, Binned Scatter-Plots



Notes: Binned scatter-plots with $50,000 price bins. Panel (a) contains the Full Baseline sample, which is restricted to negotiated, non-commercial, prime contracts awarded by early adopters and valued between $250,000 and $3,000,000. Panel (b) further restricts the sample in panel (a) to definitive and purchase order contracts. Panel (c) is similar to the sample in panel (a), except it includes *only* contracts for commercial items (rather than excluding them), as a placebo test. The y-axis is the variable *CP Data*, which equals 100 when cost or pricing data (i.e., comprehensive accounting data) is required to be submitted with the contract proposal and zero otherwise. Each dot represents the mean of the y-variable across all contracts in the price bin for the time period shown. Unshaded circles (in blue) correspond to contracts signed during the period when the $750,000 TINA threshold was effective. Shaded circles (in red) correspond to contracts signed in the period when the $2,000,000 TINA threshold was effective. Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.2 for a list of early adopter agencies and when each threshold applied for each agency.

Table 1: Dollars Obligated to and Number of Contracts Signed by Federal Agencies: Negotiated, Non-Commercial, Prime Contracts Valued Over $250,000

			Fiscal Year						
Rank	Agency	Early Adopter?	2016	2017	2018	2019	2020 (Until COVID)	Total	% of All Agencies
1	Department of Defense (DOD)	Yes	65.9	71.7	81.6	94.0	29.8	343.1	78.6%
			(36,978)	(36,082)	(35,067)	(40,174)	(11,598)	(159,899)	(74.2%)
2	Department of Health and Human Services (HHS)	No	3.9	3.7	3.1	4.7	1.1	16.5	3.8%
			(2,147)	(1,919)	(1,750)	(2,010)	(322)	(8,148)	(3.8%)
3	Department of Veterans Affairs (VA)	Yes	2.7	4.2	2.5	2.2	0.4	12.1	2.8%
			(1,623)	(1,297)	(1,274)	(1,462)	(285)	(5,941)	(2.8%)
4	Department of Homeland Security (DHS)	No	2.9	2.6	2.9	2.6	0.5	11.5	2.6%
			(1,279)	(1,237)	(1,321)	(1,099)	(284)	(5,220)	(2.4%)
5	Department of State (DOS)	No	1.9	3.4	2.4	1.8	0.1	9.6	2.2%
			(888)	(939)	(937)	(924)	(173)	(3,861)	(1.8%)
6	General Services Administration (GSA)	No	1.9	2.6	1.7	2.0	0.6	8.8	2.0%
			(1,321)	(1,325)	(1,147)	(1,272)	(388)	(5,453)	(2.5%)
7	Department of Justice (DOJ)	No	1.4	1.4	0.9	1.4	0.5	5.6	1.3%
			(970)	(894)	(820)	(835)	(379)	(3,898)	(1.8%)
8	Department of the Treasury (TREAS)	Yes	1.8	1.4	0.6	0.8	0.4	4.9	1.1%
			(558)	(520)	(305)	(391)	(119)	(1,893)	(0.9%)
9	Department of Transportation (DOT)	No	1.0	1.0	1.1	1.1	0.4	4.6	1.1%
			(1,449)	(1,352)	(1,544)	(1,389)	(424)	(6,158)	(2.9%)
10	Department of the Interior (DOI)	No	0.8	0.8	0.8	0.8	0.1	3.3	0.8%
			(805)	(688)	(727)	(770)	(128)	(3,118)	(1.4%)
11	Agency for International Development (USAID)	Yes	1.0	0.7	0.6	0.8	0.2	3.3	0.8%
			(405)	(376)	(274)	(336)	(138)	(1,529)	(0.7%)
12	National Aeronautics and Space Administration (NASA)	Yes	0.6	0.5	0.5	0.8	0.1	2.6	0.6%
			(460)	(395)	(449)	(528)	(151)	(1,983)	(0.9%)
13	Department of Agriculture (USDA)	Yes	0.6	1.0	0.4	0.5	0.1	2.5	0.6%
			(646)	(810)	(544)	(647)	(56)	(2,703)	(1.3%)
14	Department of Commerce (DOC)	No	0.5	0.4	0.4	0.5	0.1	2.0	0.5%
			(381)	(300)	(304)	(307)	(72)	(1,364)	(0.6%)
15	Department of Housing and Urban Development (HUD)	No	0.5	0.6	0.4	0.3	0.1	1.8	0.4%
			(93)	(69)	(66)	(81)	(38)	(347)	(0.2%)
							All Early Adopter Agencies Total:	369.1 (174,624)	84.6% (81.1%)

Notes: Dollars (in billions) obligated to negotiated, non-commercial, prime contracts valued over $250,000, with counts of these contracts signed in parentheses, by fiscal year. The last two columns present totals and shares of all such federal contracts across the time period examined. This table ranks the top 15 federal agencies by total dollars obligated to such contracts (valued above $250,000 each). The sample follows the Full Baseline sample's time period, spanning between October 1st, 2015 (i.e., the beginning of fiscal year 2016) and March 13th, 2020 (i.e., the date the COVID emergency procurement orders were issued), as described in Section 3.2. The last column contains the percentage that the dollars obligated to (contract counts of) a given agency comprise of all federal agencies' dollars obligated (contract counts) for such contracts. In the bottom right corner, totals and shares of contracts are presented for *all* early adopter agencies (including those not listed in this table). Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.2 for the full list of early adopter agencies.

Table 2: Descriptive Statistics of the Baseline Samples

	Baseline		
	(1)	(2)	(3)
	Full	$750,000 Threshold	$2,000,000 Threshold
Cost or Pricing Data Required (%)	18.529	17.689	19.291
	(0.130)	(0.186)	(0.385)
Cost or Pricing Data Waived (%)	0.939	0.936	0.715
	(0.032)	(0.047)	(0.082)
Cost-Plus Contract (%)	18.514	16.962	24.828
	(0.130)	(0.183)	(0.422)
Fixed Price Contract (%)	77.715	79.492	72.293
	(0.140)	(0.197)	(0.437)
Number of Offers Received	6.907	6.461	9.004
	(0.171)	(0.185)	(0.804)
Sole Source (%)	28.269	26.740	30.080
	(0.151)	(0.216)	(0.448)
Multiple Offers (%)	57.188	58.461	56.044
	(0.190)	(0.254)	(0.639)
Open Competition (%)	38.981	41.914	37.124
	(0.164)	(0.241)	(0.472)
Number of Modifications	1.530	1.421	1.852
	(0.008)	(0.012)	(0.023)
Modification (%)	60.978	58.557	69.968
	(0.164)	(0.240)	(0.448)
Cost Overrun (%)	17.835	14.969	26.067
	(0.128)	(0.174)	(0.429)
Initial Duration (Days)	362.490	331.518	443.161
	(1.086)	(1.468)	(3.304)
Definitive and Purchase Orders (%)	16.492	15.476	19.758
	(0.124)	(0.176)	(0.389)
Indefinite Delivery Vehicles (IDV's) (%)	83.508	84.524	80.242
	(0.124)	(0.176)	(0.389)
Supplies (%)	16.973	16.567	16.717
	(0.126)	(0.181)	(0.364)
Services (%)	73.672	75.246	69.615
	(0.148)	(0.211)	(0.449)
Research (%)	9.355	8.187	13.668
	(0.098)	(0.134)	(0.335)
Army, Air Force, and Navy (%)	78.718	77.858	81.433
	(0.137)	(0.203)	(0.380)
Observations	88,967	41,993	10,492

Notes: Standard errors in parentheses. Characteristics of negotiated, non-commercial, prime contracts awarded by early adopter agencies in the sample indicated, with standard errors in parentheses. Column (1) contains characteristics of all these contracts in the Full Baseline sample (which contains contracts priced between $250,000 and $3,000,000) in both the $750,000 and $2,000,000 threshold periods. Column (2) restricts these contracts to those included in the $750,000 Threshold Baseline sample (in the $750,000 threshold period with prices between $250,000 and $1,250,000). Column (3) restricts the sample in Column (1) to contracts in the $2,000,000 Threshold Baseline sample (in the $2,000,000 threshold period with prices between $1,000,000 and $3,000,000). Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.2 for the list of early adopter agencies and when the $750,000 and $2,000,000 TINA thresholds applied for each agency. All variables are defined in Appendix A.

Table 3: Regression Discontinuity Design: Effect of the TINA Threshold on Cost or Pricing Data Being Required

	$750,000 Threshold	$2,000,000 Threshold
	(1)	(2)
	CP Data (%)	CP Data (%)
Treat$_{\text{TINA}}$	2.812*	3.851**
	(1.460)	(1.899)
Distance	0.005**	-0.001
	(0.002)	(0.002)
Treat$_{TINA} * Distance$	-0.002	0.006**
	(0.004)	(0.003)
Controls	Yes	Yes
Product Service Code Fixed Effects	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes
Bandwidth (h, $1,000's)	500	1,000
Mean Outcome (Below Threshold)	16.32	17.55
Std. Dev. Outcome	36.96	38.04
Observations	41,993	10,492

Notes: Standard errors clustered by agency-contracting-office shown in parenthesis. All columns present results from equation 1 in Section 3.3. The coefficient of interest, on $Treat_{TINA}$, represents the discontinuity (i.e., change in level) in the outcome variable at the threshold indicated. *Distance* is the difference (in dollars) between the contract price and the threshold value shown in each column. The regressions in this table include the following controls: *Distance* is the difference (in dollars) between the contract price and the threshold value shown for each column; *Initial Duration* is the expected duration of the contract at signing; a vector of dummies controlling for (1) set asides for small businesses and (2) all other set asides (e.g., women and minority-owned businesses). The dependent variable is defined as follows: *CP Data* equals 100 if cost or pricing data (i.e., comprehensive accounting data) was required to be submitted with the contract proposal and zero otherwise. Contracts are from the threshold-specific Baseline sample indicated (i.e., negotiated, non-commercial, prime contracts awarded by early adopter agencies in the threshold-period and within the bandwidth indicated) in each column. The $750,000 threshold period is between October 1st, 2015 and June 30th, 2018. Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.2 for the list of early adopter agencies and when the $2,000,000 TINA threshold applied for each agency.

Table 4: Regression Discontinuity Design: Effect of the TINA Threshold on Competition

	$750,000 Threshold		$2,000,000 Threshold	
	(1) Sole Source (%)	(2) Multiple Offers (%)	(3) Sole Source (%)	(4) Multiple Offers (%)
Treat$_{\text{TINA}}$	-3.893***	4.388***	-3.927**	6.306**
	(1.092)	(1.136)	(1.992)	(2.625)
Distance	0.006**	-0.007**	0.003*	-0.006**
	(0.003)	(0.003)	(0.002)	(0.003)
Treat$_{TINA} * Distance$	-0.002	0.005	-0.002	-<0.001
	(0.004)	(0.005)	(0.003)	(0.004)
Controls	Yes	Yes	Yes	Yes
Product Service Code Fixed Effects	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes
Bandwidth (h, $1,000's)	500	500	1,000	1,000
Mean Outcome (Below Threshold)	26.51	58.46	30.20	55.50
Std. Dev. Outcome	44.14	49.28	45.92	49.70
Observations	41,993	37,769	10,492	6,024

Notes: Standard errors clustered by agency-contracting-office shown in parenthesis. All columns present results from equation 1 in Section 3.3. The coefficient of interest, on $Treat_{TINA}$, represents the discontinuity (i.e., change in level) in the outcome variable at the threshold indicated. *Distance* is the difference (in dollars) between the contract price and the threshold value shown for each column. The regressions in this table include the following controls: *Distance* is the difference (in dollars) between the contract price and the threshold value shown for each column; *Initial Duration* is the expected duration of the contract at signing; a vector of dummies controlling for (1) set asides for small businesses and (2) all other set asides (e.g., women and minority-owned businesses). The dependent variables are defined as follows: *Sole Source* equals 100 if the contract was awarded as part of a sole source solicitation (i.e., where all but one bidder is excluded), and zero otherwise; *Multiple Offers* equals 100 if the contract received multiple bids and zero otherwise. Contracts are from the threshold-specific Baseline sample indicated (i.e., negotiated, non-commercial, prime contracts awarded by early adopter agencies in the threshold-period and within the bandwidth indicated) in each column. The $750,000 threshold period is between October 1$^{\text{st}}$, 2015 and June 30$^{\text{th}}$, 2018. Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.2 for the list of early adopter agencies and when the $2,000,000 TINA threshold applied for each agency.

Table 5: Regression Discontinuity Design: Effect of the TINA Threshold on Contract Performance and Completeness

	$750,000 Threshold			$2,000,000 Threshold		
	(1) Log(Number of Modifications)	(2) Cost Overrun (%)	(3) Cost-Plus (%)	(4) Log(Number of Modifications)	(5) Cost Overrun (%)	(6) Cost-Plus (%)
Coefficient: α_2 ($on Treat_{TINA}$)						
Sample						
Baseline	-0.029**	-1.868**	-0.957	0.024	2.982	-2.612*
	(0.014)	(0.787)	(0.765)	(0.026)	(1.858)	(1.419)
Cost or Pricing Data Not Required	-0.026*	-2.165**	-0.921	0.023	3.130	-2.987*
	(0.016)	(0.917)	(0.660)	(0.030)	(2.048)	(1.614)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Product Service Code Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Bandwidth (h, 1,000's)	500	500	500	1,000	1,000	1,000
Mean Outcome (Baseline, Below Threshold)	0.74	16.79	22.30	0.87	27.94	28.39
Std. Dev. Outcome (Baseline)	0.69	37.38	41.63	0.68	44.88	45.10
Observations						
Baseline	41,993	41,993	41,993	10,492	10,492	10,492
Cost or Pricing Data Not Required	34,565	34,565	34,565	8,467	8,467	8,467

Notes: Standard errors clustered by agency-contracting-office shown in parenthesis. All columns feature the coefficient α_2 on $Treat_{TINA}$ from equation 1 in from equation 1 in Section 3.3 for two types of samples: (1) the threshold-specific Baseline samples, and (2) the subset of contracts in each Baseline sample that did *not* require cost or pricing data. The coefficient on $Treat_{TINA}$ represents the discontinuity (i.e., change in level) in the outcome variable at the threshold indicated. The regressions in this table include the following controls: *Distance* is the difference (in dollars) between the contract price and the threshold value shown for each column; *Initial Duration* is the expected duration of the contract at signing; a vector of dummies controlling for (1) set asides for small businesses and (2) all other set asides (e.g., women and minority-owned businesses). The dependent variables are defined as follows: *Log(Number of Modifications)* is the natural logarithm of one plus the number of modifications; *Cost Overrun* equals 100 if the contract had a modification that resulted in an increase in the contract price and zero otherwise; *Cost-Plus* equals 100 when the contract is of cost-plus reimbursement type, and zero otherwise. Contracts are from the threshold-specific Baseline sample indicated (i.e., negotiated, non-commercial, prime contracts awarded by early adopter agencies in the threshold-period and within the bandwidth indicated) in each column. The $750,000 threshold period is between October 1st, 2015 and June 30th, 2018. Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.2 for the list of early adopter agencies and when the $2,000,000 TINA threshold applied for each agency.

Online Appendix (For Online Publication Only)

Nathan, "Accounting Disclosure Requirements in Procurement Contracting"

October 1, 2022

A Further Details and Results

A.1 Additional Details About the Institutional Context and Data

In this section, I provide more details about the institutional context and the data used in this study.

A.1.1 Federal Procurement, TINA, and Certified Cost or Pricing Data

In this section, I provide additional details about the federal procurement process and TINA's requirements for cost or pricing data submission. This section discusses when cost or pricing data must be certified or not, additional details about certification of this data, penalties for suppliers found not adhering to TINA's requirements, and the CAS threshold.

When required, suppliers certify data that the cost or pricing data they provide is complete, accurate, and current by filling out a statement called the "Certificate of Current Cost or Pricing Data" (FAR 15.406-2). See Section B of the Online Appendix for an example of this form.

If a contract meets an exception to TINA's requirements, regardless of whether its price is above the TINA threshold, PO's are expressly prohibited from requesting certified cost or pricing data (FAR 15.403-1), though they may always require any non-certified data necessary to establish the price is reasonable. In special cases, for below threshold contracts PO's may require cost or pricing to be certified by the supplier (FAR 15.403-4(a)(2)). Figure A.7 provides a detailed flow chart of when any type of data (including certified or uncertified cost or pricing data) is required, as described in this paper. This figure is discussed briefly in Section A.1.2.

Next, I provide details about one of the exceptions to TINA's cost or pricing data requirements: when there is "adequate competition". FAR 15.403-1(c)(1) states adequate competition is present when the following conditions are met: (1) PO's expect there will be two or more responsible bidders, competing independently, that submit offers which satisfy the government's solicited requirements, (2) PO's can conclude that the supplier believed other capable suppliers exist and did not have any information that they would not submit bids, (3) the award will be based on best value where price is a substantial factor (but not the only factor) in award, and (4) there is not any finding that the price is otherwise unreasonable (i.e. far too low or too high based on other bids or historical prices). The DOD in 2019 changed (1) from the expectation of two or more bidders to there actually being two or more bidders.

As discussed in Section 2.2, there can be stiff penalties for suppliers that provide "defective" (i.e., incomplete, inaccurate, and/or noncurrent) cost or pricing data when certification is required. I provide additional details on these penalties here. TINA allows the awarding agency the administrative remedy of directly reducing the contract price plus interest if it believes (a) the cost or pricing data was defective and (b) the government's reliance on the defective data caused an increase in the price of the contract (FAR 52.215-10 and FAR 15.407-1). TINA prescribes an additional 100% overpayment penalty if the data supplied was *knowingly* defective. Defective pricing claims may also result in False Claims Act (FCA) suits (Bodenheimer and McLaughlin [2018]), which carry their own civil penalties (with treble damages) and/or criminal charges, regardless of whether there was fraudulent intent. Note that FCA claims can occur above and below the TINA threshold. State-level civil and criminal penalties may also apply for defective data cases.

Finally, I provide additional details about the CAS threshold (the contract value above which suppliers must comply with the CAS). Since the $750,000 TINA threshold went into effect in 2015, the FAR has tied the CAS threshold to the TINA threshold value (80 FR 38293), rather than a different value as was typical before. The FAR stipulate that suppliers

bidding on negotiated (i.e., non-sealed bid) contracts in excess of the CAS threshold must comply with the CAS, unless an exception applies (FAR 9903-201). Exceptions to requirements to follow the CAS partially overlap with TINA's exceptions, but differ in several ways. For example, above the CAS threshold cost-plus contracts as well as fixed price contracts where cost or pricing data were received are not exempt from the CAS even if prices may be fair and reasonable. Small businesses (as defined by the Small Business Act[60]) and contracts for commercial items are exempt from following the CAS. Therefore, small businesses do not have to certify as detailed of cost or pricing data as larger companies do.

A.1.2 Data Sources

In this section, I provide additional details about the construction of my samples.

I exclude the Defense Logistics Agency (DLA) due to several contract peculiarities. For example, around 65% of DLA contracts in each $50,000 interval between $750,000 and $1,000,000 are comprised of specific medical supplies with open competition, but at the $750,000 threshold and below the rate suddenly drops and stays to around 40% down to $250,000. Above $1,000,000, the rate of these contracts immediately drops to below 20%. This distribution persists both before and after the $750,000 threshold changed to $2,000,000. Keeping DLA contracts in my analyses does not change any of the main results of this study.

The Small Business Innovation Research Program (SBIRP) was created to spur innovation by allowing R&D contracts to be awarded with vaguely-defined scope. Contracts in this program are regularly awarded at the maximum value available for the program (either $750,000, $1,000,000, or $1,500,000), rather than on the basis of a competitive and (somewhat) accurately estimated price. Due to this, SBIRP contracts are excluded from my samples.

IDV contracts are included in my Baseline samples. IDVs are comprised of indefinite

[60] 15 U.S.C. 632. Section 3 of the Small Business Act defines a small business to be "one which is independently owned and operated and which is not dominant in its field of operation". Size thresholds for classification as a small business are determined by the Small Business Administration and vary by across industries and by year.

delivery/indefinite quantity (IDIQ) contracts or agreements (e.g., Blanket Purchase Agreement) from the FPDS database.

Figure A.7 provides a detailed flow chart of when any type of data, including certified or uncertified cost or pricing data, is required to be submitted with suppliers' bids, as described in this paper. This flow chart shows specifically when a contract is coded coded as requiring cost or pricing data submission (i.e., $CP\ Data = 100$) or not (i.e., $CP\ Data = 0$).[61]

A.1.3 Descriptive Statistics about the Contract Price Distributions

In this section, I build on the discussion in Section 3.2 about the price distribution of negotiated, non-commercial prime contracts awarded by early adopters.

Figure A.1 presents graphical evidence that the Baseline samples (i.e., full Baseline, $750,000 Baseline, and $2,000,000 Baseline) contain contracts in price ranges that are highly relevant both for the study of the TINA threshold and in the federal procurement context more broadly. Figure A.1 uses the same sample filters described in Section 3.2 (except on price). Firstly, panels (a) and (b) show that the density of federal contracts decreases exponentially with price. Contracts are heavily concentrated at lower values, particularly below the SAT, but this exponential decrease in density holds among contracts at higher price ranges (e.g., between $1,000,000 to $20,000,000), as illustrated by panel (b). Panel (c) shows this tendency holds true within the Full Baseline sample as well. Finally, panel (d) shows that the two threshold-specific Baseline samples contain about 80% of *all* contracts signed by early adopters above the $750,000 and $2,000,000 thresholds while they were each in effect (that meet the sample filters described above). In sum, the price ranges examined in this study should be highly pertinent to the federal government.

[61] Note that contracts with exceptional case waivers are coded as $CP\ Data = 100$, since the data was required to be submitted (not pictured in Figure A.7), even though it was ultimately waived.

A.2 Additional Details About the Robustness Checks

In this section, I provide details about several robustness tests described in the body and their results: heterogeneity tests (Section 5.2), substitution tests (Section 5.3), and difference-in-discontinuities tests (Section 5.4).

A.2.1 Details About the Heterogeneity Tests

In this section, I provide details on the heterogeneity test results briefly discussed in Section 5.2 of the body. These tests analyze how the effects of the data threshold found in Section 4 (in the body) vary across different samples of contracts whose characteristics are likely to experience stronger or weaker effects due to TINA's data requirements. This analysis explores heterogeneities across several subsamples of the $750,000 and $2,000,000 Threshold Baseline samples, including: definitive and purchase order contracts versus indefinite delivery vehicles (IDVs), product-service codes (PSC's) with a high concentration of contracts with just a single offer versus PSC's with higher concentrations of contracts with multiple offers, contracts for supplies versus services and works. In addition, I compare results for commercial versus non-commercial contracts, I also study Army, Air Force, and Navy contracts. The first two subsamples I examine are definitive and purchase orders versus indefinite delivery vehicles (IDVs). IDVs are contracts that can typically be used for multiple orders, often on an on-going basis. The government awards a "master" IDV contract, frequently to several suppliers at once, and it makes orders at a later date against those contracts. Often when the government makes orders against master IDV contracts, it allows multiple suppliers to bid, and selects one for the task. Both the master IDV contracts and calls against the master contracts are considered prime contracts and are usually awarded by negotiated procedures, thus they are subject to TINA's data requirements (unless an exception applies). Non-IDV contracts, on the other hand, fall into the categories of definitive contracts (i.e., contracts with definite end dates) and purchase orders (usually contracts for standardized products or services). Since IDVs are more frequently competed than non-IDVs (that is, they tend to

have more bids and less sole source contracts – see Table 2), IDVs should be exempt from the data requirements more often. Therefore, we would expect the requirements to have relatively stronger effects on definitive and purchase order contracts than IDV contracts.

Tables A.5 through A.7 correspond to heterogeneity tests for cost or pricing data, competition, and performance/completeness variables, respectively. Each table shows the coefficient on $Treat_{TINA}$ from estimating equation 1 where the outcome variable is shown at the top of the column, for the subsample represented in each row. The first row of each of these tables shows the Baseline results from Tables 3 through 5 in the body for reference. The second row of Table A.5 shows that for the definitive and purchase orders sample, I find significant and economically strong coefficients on $Treat_{TINA}$ in columns (1) and (2), indicating that non-IDV contracts experience a strong, positive discontinuity in the requirement for cost or pricing data at the TINA threshold. The third row shows these effects are much weaker and statistically insignificant for IDV contracts, with the difference between these two samples' coefficients being highly statistically significant (p-value<0.001 and p-value=0.002 for columns (1) and (2) respectively). The second and third rows of Table A.6 present the competition results for these two samples. The coefficients on $Treat_{TINA}$ in both subsamples are statistically significant around the \$750,000 threshold, while they are only statistically significant around the \$2,000,000 threshold for IDVs. However, I do not detect any statistically significant difference in these samples' $Treat_{TINA}$ coefficients around either threshold (e.g., p-value=0.887 in column(1)). Finally, Table A.7 presents the contract performance and completeness results for each sample. Column (1) of this table shows that definitive and purchase order contracts experience statistically significant (at the 1% level) reductions in the logarithm of the number of modifications, while we do not see a significant effect for IDVs. This difference is statistically significant (p-value=0.005), indicating affected definitive and purchase order contracts experienced a greater improvement in performance than affected IDVs did, as expected. The coefficients on $Treat_{TINA}$ in columns (3) and (6) show that data requirements significantly improve the rate of contract completeness (i.e.,

there are less cost-plus contracts) for the IDV sample, but not the definitive and purchase orders sample. However, these coefficients for the non-IDV sample are not very precisely estimated and the differences between these samples' estimates are statistically insignificant.

Next, I examine how the effects of the data requirements differ between contracts for supplies versus services and works. Compared to the procurement of services and works which tend to involve ex-post cost uncertainty, multidimensional quality heterogeneity and limited contractibility (Tadelis [2002]), goods (supplies) are often more standardized. Contracts for supplies also face less competition than contracts for services and works (see Table A.3 in the Online Appendix). Thus, it is likely easier for suppliers to provide cost or pricing data and for PO's to promote competition for supplies contracts than for services and works. Indeed, the estimates in Table A.5 suggest this is the case. For example, supplies affected by the $750,000 threshold are estimated to experience an increase in the rate cost or pricing data is required of 10.44 pp versus nearly no change around the threshold for services and works, and this difference is economically and statistically significant (p-value=0.023 and 0.014 for columns (1) and (2), respectively). Table A.6 also shows larger effects of data requirements on competition for supplies contracts than for services and works, though these differences are not statistically significant (for multiple offers in column (2) for example, this difference's p-value=0.513). Finally, given that service contracts are less straight-forward to monitor than contracts for supplies (as evidenced by more costly modifications in Table A.3), I expect service contracts' performance stand to benefit more from any additional data and procurement attention brought about by the data requirements. Further, since goods are usually more homogeneous than services, negotiations for contracts for supplies may emphasize price more strongly than other terms (as compared to service contracts). To the extent data requirements increase competition, contracts for supplies likely experience a stronger *undercut/discretion* and poorer performance. Columns (2) and (3) Table A.7 confirm that only services and works contracts experience statistically and economically significant improvements in performance and contract completeness above the $750,000 threshold. However, as shown in columns (4)

through (6), the effects of the $2,000,000 threshold on performance and completeness are insignificant for these subsamples. Overall, supplies contracts appear to experience relatively larger effects on data provision and competition due to TINA's requirements, while contracts for services and works experience improved performance, as anticipated.

The next heterogeneity test exploits TINA's adequate competition exception. For this test, I identify two-digit PSC's where at least 50% of contracts had single offers and multiple offers, respectively, in the two years prior to the date the $750,000 threshold went into effect (i.e., October 1st, 2015). Since contracts that PO's expect to receive multiple offers are exempt from the requirements, I predict that contracts of PSC's that, historically, tended not to have adequate competition will exhibit a significantly stronger discontinuity in competition around the threshold than PSC's that tended to have greater competition. Table A.6 demonstrates that this is indeed the case. All of the coefficients on $Treat_{TINA}$ in the competition regressions are larger for the high-single-offer PSC's sample than the high-multiple-offer PSC's, with all but one of these differences being statistically significant (for example, p-value=0.012 for multiple offers in column (2)). Tables A.5 and A.7 do not show any statistically significant differences in the effects of TINA's requirements on cost or pricing data, performance, or completeness between these two samples. Importantly, placebo tests in Tables A.8 through A.10 show that the effects on the outcome variables found for subsamples discussed thus far generally do not exist around the thresholds while they are not effective.

Last, I examine contracts for commercial items, which were purposely excluded from the Baseline samples. Commercial items are goods and services customarily used for non-government purposes and offered to the government and the general public contemporaneously under similar terms and conditions (e.g., office equipment, IT services, etc.). Such items are subject to the discipline of the marketplace, reducing the need for contracting processes to achieve competitive prices. The FAR includes a set of simplified and streamlined acquisition procedures for commercial items.[62] Most importantly, commercial contracts are

[62] These include use of only fixed price contracts, less rigorous quality assurance procedures, and more (FAR Part 12).

exempt from TINA's requirements to provide certified cost or pricing data (FAR 12.2), as well as following the CAS.

I devise a heterogeneity test based on TINA's commercial items exception to see whether my main findings (see Tables 3 through 5 and the placebo tests in Tables A.8 through A.10) hold for commercial items. I hypothesize that they will not. To answer this question, I use similar filters to those used to construct the threshold-specific Baseline samples (see Section 3), except I drop *non*-commercial contracts instead of commercial contracts. Column (1) of Table A.5 shows that for commercial item contracts, in a regression where the dependent variable is *CP Data*, the coefficient on $Treat_{TINA}$ is statistically insignificant. Further the coefficient in column (1) is estimated to be negative. Together with the graphical evidence in Figure 3 panel (c) in the body, it is quite apparent that the threshold did not affect whether cost or pricing data was required for commercial contracts, as expected. Table A.6 presents the estimates of the effects of TINA's requirements on competition for commercial contracts. The results in column (2) show that the coefficients on $Treat_{TINA}$ for the multiple offers regression around the $750,000 threshold are actually statistically and economically significant and of the same sign as that estimated for the Baseline sample (though somewhat smaller in magnitude). Since we do not expect to see an effect of data requirements on commercial contracts, this warrants further investigation. Table A.9 shows that upon closer inspection, the discontinuity in *Multiple Offers* for commercial items around the $750,000 cutoff actually exists (and has a larger estimated magnitude) when the $750,000 TINA threshold is *not* in effect. The coefficients on $Treat_{TINA}$ for the $2,000,000 commercial contracts sample shown in Table A.6 are insignificant, indicating this phenomenon only occurred around the $750,000 threshold. On the other hand, for the Baseline samples these effects on competition around the $750,000 and $2,000,000 thresholds do *not* remain when the data requirements are not in effect (i.e. in the $2,000,000 and $750,000 threshold periods, respectively), consistent with TINA's data requirements driving these effects. Given that the new $2,000,000 TINA threshold, like many statutory thresholds after becoming effective, may have had a lag in

its implementation, that should only bias us against finding these results. Therefore only non-commercial contracts exhibit a discontinuity at the thresholds solely while they are in effect, as expected.

Additionally, I verify that my results generally hold when restricting the Baseline samples to contracts signed by the three largest DOD bureaus: the Army, the Air Force, and the Navy (Tables A.5 through A.7).

A.2.2 Details About the Substitution Tests

In this section, I discuss the substitution tests from Section 5.3 in the body in detail. Here, I develop predictions and present the results of tests for substitution effects (i.e., a negative relationship) between cost or pricing data being required and whether multiple bids are received, to further validate that my main empirical results are driven by TINA's data requirements.

Section 5.3 in the body discusses two hypotheses related to a substitution effect between multiple bids and cost or pricing data being required: (1) there is a substitution effect between how often cost or pricing data is required and how often contracts have multiple bids below the threshold, and (2) any substitution effect between multiple bids and comprehensive data submission should be stronger above the threshold.[63]

To test these substitution hypotheses, I modify equation 1 from Section 3.3 to include an indicator variable, *Multiple Bids*, and its interactions with $Treat_{TINA}$ and *Distance*.[64] The specification is as follows:

[63] The *procurement system effect*, which predicts PO's promote competition to avoid requiring cost or pricing data (see Section 3.1.2), also suggests such a substitution effect should become stronger above the threshold.

[64] The only difference between *Multiple Bids* and *Multiple Offers* from Section 4 is that *Multiple Bids* equals 1 (rather than 100) if multiple bids were received, and 0 otherwise. This is for easier interpretation of coefficients.

$$
\begin{aligned}
y_i = \beta_0 &+ \beta_1 Distance_i + \beta_2 MultipleBids_i + \beta_3 Treat_{TINAi} \\
&+ \beta_4 Treat_{TINAi} * MultipleBids_i + \beta_5 MultipleBids_i * Distance_i \\
&+ \beta_6 Treat_{TINAi} * Distance_i \\
&+ \beta_7 Treat_{TINAi} * MultipleBids_i * Distance_i + \delta_i + \eta_i + \chi_i + \upsilon_i,
\end{aligned}
\tag{A.1}
$$

The dependent variable, y, is whether cost or pricing data was required.[65] This model contains several coefficients of interest. First, β_2 captures whether below-threshold contracts *with* multiple bids were more (or less) likely to require cost or pricing data than below-threshold contracts *without* multiple bids (the base group). If there is a substitution effect present between cost or pricing data submission and competition below the threshold, we expect β_2 to be negative. β_3 contains the effect of the threshold on the frequency of the data's submission for contracts *without* multiple bids. Finally, β_4 measures the impact of the threshold on any substitution effect between the data and multiple bids being received.

The results of testing the substitution effects between data and multiple bids being received are shown in Table A.11. Columns (1) and (2) estimate equation A.1 using the \$750,000 and \$2,000,000 Threshold Baseline samples, respectively. The estimates of β_3, the coefficient on $Treat_{TINA}$, in the first two columns indicate that above-threshold contracts without multiple bids have an increased likelihood of cost or pricing data being required compared to below-threshold contracts without multiple offers. In column (1), the coefficient on *Multiple Bids* (β_2) implies that contracts below the \$750,000 threshold with multiple offers have a significantly lower likelihood of the data being required. This is evidence in favor my prediction of a substitution effect for below threshold contracts. The estimates of β_4, the coefficient on the interaction term between $Treat_{TINA}$ and *Multiple Bids*, in columns (1) and (2) suggest that this substitution effect is strengthened above the threshold (significant at the 10% level). In fact, the results suggest my prior finding of the positive effect of the TINA threshold on the rate the data is required (from Table 3) is concentrated among contracts

[65] *Multiple Offers* is endogenized in equation 1 and therefore equation A.1 is clearly endogenous, though it is useful for measuring associations.

without multiple offers, given the sum of β_3 and β_4 (for contracts with multiple offers) is nearly zero in both columns. I find that the substitution effect is insignificant for below-threshold contracts in the $2,000,000 Threshold sample, as evidenced by the coefficient on *Multiple Bids* in column (2). This suggests that for contracts in the higher-dollar sample in column (2), PO's tend to want to require cost or pricing data even if they expect multiple bids in order to cover themselves, but TINA's exception to requiring cost or pricing data above the threshold may make it somewhat harder to do so (though non-certified cost or pricing data is not prohibited when multiple bids are expected above the threshold).

As placebo tests, I examine the effect of the $750,000 and $2,000,000 thresholds on contract characteristics when each threshold was *not* in effect. These tests use samples obtained by applying the same filters as the Baseline samples, but using an alternative time period (similar to Section 5.1). Columns (3) and (4) show the results. The sample in Column (3) focuses on the $750,000 threshold and contains contracts between $250,000 and $1,250,000 during the period the $2,000,000 threshold was effective. As expected, I do not find significant effects of the $750,000 threshold while it is not in effect. The sample in Column (4) contains contracts between $1,000,000 and $3,000,000 during the $750,000 threshold period. *All* of the contracts in this sample are subject to the $750,000 threshold while it was in effect. As expected, we see a strong effect for contracts with multiple bids in Column (4), and the placebo threshold (at $2,000,000) does not accentuate this effect. Together, these results are suggestive evidence that competition and accounting information are substitutes for the purposes of reducing information asymmetry in federal supply contracts. They also provide verification that PO's can avoid requiring cost or pricing data by promoting competition.

As mentioned in Section 5.3 in the body, my main results are robust to SUR estimation. In addition, placebo tests using SUR estimation in alternative time periods find that my main results do not hold when the threshold is not in effect, as expected.

A.2.3 Details About the Difference-in-Discontinuities Design

In this section, I provide details on the difference-in-discontinuities test results briefly discussed in Section 5.4 of the body. This test exploits the change in the TINA threshold from \$750,000 to \$2,000,000 for early adopters in 2018 as an additional source of exogenous variation to analyze the impact of TINA's data requirements on contract outcomes. As mentioned in Section 5.4 of the body, a difference-in-discontinuities design has a strength over an RDD that under certain assumptions (see Grembi et al. [2016]) persistent confounding factors can be "differenced out" across the two periods. However, this design is more susceptible confounding policies introduced over time that have differential effects on above and below-threshold contracts.[66]

Formally, for each TINA threshold P_c (i.e., \$750,000 and \$2,000,000), I restrict the sample to contracts where $P_{it} \in [\mathrm{P}_c - h,\ P_c + h]$ and estimate the following difference-in-discontinuities model:

$$\begin{aligned} Y_{it} &= \lambda_0 + \lambda_1 Distance_{it} + Treat_{Ri}(\gamma_0 + \gamma_1 Distance_{it}) \\ &+ Post_t[\alpha_0 + \alpha_1 Distance_{it} + Treat_{Ri}(\beta_0 + \beta_1 Distance_{it})] + \delta_{it} + \eta_{it} + \chi_{it} + \epsilon_{it}, \end{aligned} \tag{A.2}$$

where $Treat_{Ri}$ is a dummy for contracts in the price range where the data requirements were *relaxed* (i.e., between \$750,000 and \$2,000,000).[67] Thus, for the \$750,000 Threshold sample, $Treat_{Ri}$ corresponds to the region *above* the \$750,000 (i.e., old) threshold, while for the \$2,000,000 Threshold sample, $Treat_{Ri}$ corresponds to contracts *below* the \$2,000,000 (i.e., new) threshold. $Post_t$ is an indicator for the post-treatment period (i.e., after the threshold change) and $Distance = P^*_{it} = P_{it} - P_c$ is the normalized contract price. δ represents a similar vector of controls and η and χ similar two-digit product-service code and year-

[66] One such potential confounder in this setting is that the DOD updated its exception to TINA from *anticipated* adequate competition to *realized* adequate competition on July 31st, 2019. Similarly, as part of a wider government push to request and use cost or pricing data in negotiations more frequently beginning in mid-2018, the DOD released a memo on June 7th, 2018 indicating it would more strictly enforce timing requirements for certified cost or pricing data provided by "sweeps" following contract signing (see Section 2 in the body for more on sweeps).

[67] This is not to be confused with the $Treat_{TINA}$ dummy from equation 1, which indicates a contract is *above* the TINA threshold.

quarter fixed effects, respectively, as from equation 1. h is defined for each threshold as in Section 3.3. For this analysis, I balance the time period of contracts included to two years before and after the 2018 TINA threshold became effective. Standard errors are clustered at the agency-contracting office level. The coefficient β_0 is the diff-in-disc estimator and identifies the treatment effect of relaxing supplier data requirements, as the treatment is $R_{it} = Treat_{Ri} \cdot \text{Post}_t$.

Table A.12 presents the diff-in-disc estimates for the effect of relaxing the data requirements on whether cost or pricing data is included. This table shows that the coefficients on $Post * Treat_{TINA}$ in columns (1) and (2) are estimated to be nearly the exact same as the coefficients on $Treat_{TINA}$ as the corresponding columns in Table 3, though they are statistically insignificant.

Table A.13 shows the effects of relaxing data requirements on competition. Columns (1) and (3) indicate that relaxing the requirements led to a statistically significant increase in the frequency of sole source contracts. Further, columns (2) and (4) estimate that relaxing the requirements had a negative effect on whether contracts received multiple offers (though this result is only statistically significant in column (4) around the $2,000,000 threshold). These results are very similar in magnitude to those estimated using an RDD in Table 4, and are further evidence that supplier data requirements promote competition.

Finally, Table A.14 presents the effects of relaxing data requirements on contract performance and completeness. Column (1) shows a statistically and economically significant positive effect on performance from relaxing the data requirements, in that the number of modifications increases by 4.7% (significant at the 5% level). This result is qualitatively similar to that found in the corresponding RDD performance analysis (see Table 5). Finally, this table finds weak evidence that contract completeness also improved when the data requirements were in effect, given relaxing the requirements is estimated to lead to a higher frequency of (more incomplete) cost-plus contracts (though this effect is not statistically significant here).

In all, these results echo those of the primary RDD analyses in this paper by suggesting that supplier data requirements cause greater competition and performance for affected contracts. Additionally, the estimated effects of relaxing TINA's requirements on cost or pricing data submission were quite similar in magnitude as in the main analysis.

A.3 Bunching Below the TINA Threshold: Additional Checks

In this section, I assess whether suppliers strategically sort their offer prices in order to undercut the TINA threshold (i.e., "bunch" below the threshold), which would violate an assumption underlying my RDD analyses: that there is not a significant degree of manipulation of the running variable (Saez [2010]; Carril [2021]). Following Palguta and Pertold [2017], I carry out two different types of bunching tests: (1) graphical analyses and (2) a difference-in-differences estimation of changes in the distribution of contracts below the TINA threshold values due to the 2018 change in the threshold.

A.3.1 Graphical Analyses of Bunching Below the TINA Threshold

In this section, I present graphical analyses of the distribution of contracts with prices in the neighborhood of the TINA thresholds to examine whether there is evidence of bunching (Palguta and Pertold [2017]).

During the time period of my study, suppliers' bidding behavior may potentially be influenced by three requirements posed by exceeding the TINA threshold (as discussed in Section 2 and Section A.1.1 of the Online Appendix). These three requirements include: (1) submission of cost or pricing data, (2) data certification, and (3) following the CAS. Of these, only the certification requirement is based on the realized price of the contract, while submission of cost or pricing data and the applicability of the CAS are based on expected contract price. Further, whenever the price of a negotiated, non-commercial contract is expected to be within the ballpark of the TINA threshold, PO's are supposed to err on the side of caution by requiring cost or pricing data (unless an exception is met, see Section 2).

This data will typically need to be as detailed as certified data, even if ultimately the realized price is below the threshold. Expected prices are determined by PO's *prior* to bid solicitation and thus should be especially difficult for suppliers to game.

Given that TINA's certification requirement is based on realized prices, suppliers may be incentivized to manipulate their bids to undercut the threshold on solicitations that require cost or pricing data, so they do not have to assume the liability of certifying the data is complete, accurate, and the timeliest available. This may occur if the costs to suppliers of providing the certification are greater than the costs to manipulate their bid prices. Suppliers' costs of manipulation include the immediate revenue hit from undercutting the threshold and the risk that such manipulation could attract the government's attention, especially since the PO expected the price to exceed the threshold (which is why the detailed data was required in the first place).[68] To the extent suppliers strategically lower their proposed prices to undercut the threshold, we would expect an increase in the concentration of contracts just below the threshold value when the threshold is in effect compared to when it is not in effect. Likewise, we would expect an accompanying dip in the mass of contracts just above the threshold (while in effect) where the contracts' prices would have otherwise been, compared to when the threshold is not in effect.

Figures A.8 and A.9 present graphical analyses of whether there is significant bunching below the $750,000 and $2,000,000 thresholds while they are in effect. These figures focus on the distributions of contracts in the Full Baseline sample that were signed by early adopters agencies and required cost or pricing data, around the $750K and $2 million thresholds respectively. Panel (a) of each figure shows the distribution of contracts before the 2018 TINA threshold change, panel (b) shows the distribution after the threshold change, and panel (c) shows the percentage point differences in the distribution between the two time periods (i.e., Post - Pre). Figures A.8 and A.9 have price bin widths of $10,000 and $20,000,

[68] In addition to suppliers manipulating contract prices to undercut the threshold, PO's may also *split* contracts to evade TINA's requirements. I analyze this possibility in Section A.4 of the Online Appendix and do not find any evidence of splitting of contracts to avoid the threshold in the price ranges examined in this study ($250,000 to $3,000,000).

respectively, (price bins shown are right-endpoint inclusive). As is common in contracting, suppliers often have a preference for round-number bids which exists even when there is not a policy-based threshold in effect. For instance, we see a relatively large concentration of contracts at $700,000 in Figure A.8.a and at $2,100,000 in Figure A.9.b, as well as at both TINA thresholds even when they are not in effect (Figures A.8.a and A.9.b). For this reason, I focus on the differences in the distribution between the two time periods (i.e., panel (c) of each figure).

Figure A.8.c shows that bunching at and below the cutoff (where TINA's requirements do not apply) is not any larger after the threshold changed to $2,000,000. In the first two bins to the left of this cutoff (which include the cutoff value), there were slight decreases in the frequency of contracts after the threshold no longer applied. However, the graph is quite symmetric around the threshold, as suppliers became no more likely to price contracts just above the threshold after the threshold changed, and in fact experienced decreases in the two bins above the threshold that were roughy equal to the two bins below the threshold. As presented in Figure A.9.c, once the $2,000,000 threshold went into effect, there was a prominent *decrease* in contracts priced at the bin including the new threshold value of $2,000,000, which is the opposite of what we would expect if bunching were widely present. The next few bins below that show some slightly positive changes after the threshold move, but this is not sufficient to offset the decrease in the bin at and just below the $2,000,000 threshold. Further, contracts priced just above the $2,000,000 threshold do not appear to become any less frequent, as we would expect if suppliers significantly manipulated prices to undercut the threshold. This evidence is inconsistent with economically significant bunching.

Recall that TINA only requires that PO's request cost or pricing data when they expect the price to exceed the threshold. Therefore, suppliers' realized bid prices should have no bearing on whether additional data is required, unless suppliers are able to credibly signal to PO's (or PO's can reliably infer) what the bid prices will be prior to bidding actually taking place. As an additional check, in Figures A.10 and A.11, I extend my analysis to all

Full Baseline contracts in the neighborhood of each threshold value, rather than just those contracts requiring cost or pricing data.

Figures A.10 and A.11 show the results for all Full Baseline around the $750,000 and $2,000,000 thresholds, respectively, and have more granular price bin widths ($5,000 and $10,000, respectively), due to the larger number of contracts in their samples. Examining the $750,000 cutoff value, Figure A.10.c shows that bunching at and below the cutoff, where TINA's data requirements do not apply, is clearly not any less prevalent after the threshold changed to $2,000,000. In fact, in the first bin at (and just below) the TINA threshold, there was an *increase* in the frequency of contracts when the threshold no longer applied. Though there is a minor increase in contracts in the few bins just above the cutoff, overall, this evidence is inconsistent with bunching below the $750,000 threshold. Figure A.11.c examines the $2,000,000 cutoff value. Here there is an increase in contracts priced within the bin that includes the new threshold value of $2,000,000. The next couple of bins below that show near-zero changes compared to before the threshold move. Contracts priced just above the $2,000,000 threshold become somewhat less frequent. By itself, this result could be taken to be consistent with suppliers avoiding exceeding the $2,000,000 threshold, albeit only to a very small extent. However, combined with the evidence in the analyses in this section so far, there does not appear to be economically significant bunching below either threshold.

A.3.2 Difference-in-Differences Estimation of Bunching Below the TINA Threshold

In this section, I examine bunching below the TINA threshold using a statistical test from Palguta and Pertold [2017]. This test proceeds as follows. First, I divide the price range of contracts I study into bins. Then, I use the change in the threshold as a shock to the price distribution and examine how many more contracts are included in the bins just below the threshold (i.e., "suspect" bins), which are the bins most likely to be affected by bunching. This analysis assumes that the shape of the density distribution in each threshold-specific

sample after the threshold change would look the same as it did prior to the change.

Specifically, for both the $750,000 and $2,000,000 TINA thresholds, I compare the counts of contracts in the three bins to the left of the threshold after the threshold changed to the counterfactual predicted by excluding those three bins after the threshold change. That is, I regress the number of contracts in bin b and period t on an interaction term between an indicator for contracts located in the excluded region and an indicator for the period after the threshold changed ($Post$). Formally, I estimate the following difference-in-differences model:

$$\ln(Y_{jbt}) = \alpha_b + \alpha_t + \sum_{i=-R}^{0} \gamma_i \cdot I_b \cdot Post_t + \epsilon_i, \tag{A.3}$$

where Y_{jt} is the number of contracts with prices in bin b at time period t, I_b is an indicator for whether bin b lays within the excluded region, and R denotes the width of the excluded region below the threshold measured as the number of excluded bins. Bin and event-year fixed effects are also included. Similarly to Palguta and Pertold [2017], I estimate equation A.3 using Poisson conditional fixed-effects quasi-maximum likelihood (QML), which the authors note have several advantages over OLS.[69] Standard errors are clustered by price bin. For each threshold ($750,000 and $2,000,000), I use three different price bins, expressed as fractions of the threshold value (1.25%, 2.5%, and 5%). If there is any bunching below the TINA threshold, we would expect a decrease in the number of contracts below the $750,000 cutoff once the $750,000 threshold no longer applies, and an increase in the number of contracts below the $2,000,000 threshold after it goes into effect. However, I expect any bunching should be small, given that the requirement for cost or pricing data is based on POs' expectation of price (not actual price), and the data requirement is posted in the solicitation (before bidding occurs).

Table A.15 shows the results. Column (1) estimates that there is a statistically significant excess mass of contracts in the three 1.25%-width (i.e., $9,375) bins right below the $750,000 threshold. In each row, the percentage change in the number of contracts in the

[69] My results are nearly unchanged if I estimate equation A.3 by OLS (using either Y_{jt} or the natural logarithm of Y_{jt} as the dependent variable).

three suspect bins only (*not* the entire sample) can be interpreted as (exp($\hat{\gamma}$) – 1) x 100. Contrary to what would be predicted by bunching, the first bin below the threshold actually has a statistically higher number of contracts than the counterfactual distribution predicts, by 5.7%, as calculated using the γ_1 estimate of 0.055. The next two bins however have statistically significant decreases in the numbers of contracts of contracts by 10.4% and 3.9% respectively. Overall, the number of contracts in the suspect bins was lower than predicted by about 1.5%, i.e., approximately 17 contracts (compared to 1,115 contracts in these three bins during the $750,000 threshold period). This is evidence that there may be some bunching in the range just below the $750,000 threshold. However, this excess mass is a minute number compared to the size of the $750,000 Threshold sample (41,993 observations). Repeating this analysis with wider bins ($18,750 each), column (2) shows the suspect bins have a larger magnitude of excess mass (-2.9%), or 65 contracts lower than predicted. This small number of contracts constitutes only 0.15% of the $750,000 Threshold sample. Examining very large, 5%-width ($37,500) bins, column (3) now estimates a slight positive excess mass, however it is statistically insignificant.[70]

Columns (4) through (6) examine the region below the $2,000,000 Threshold. Using 1.25%-wide ($25,000) bins, column (4) estimates that the three suspect bins below the threshold have a combined quantity of contracts that is 15.9% (or 133 contracts) higher than predicted. Using wider bins of 2.5% ($50,000) and 5% ($100,000) in columns (2) and (3), the excess mass is estimated to be 12.0% and 11.1% (or 172 and 286 contracts), respectively. While these three estimates of the excess mass are larger in magnitude than below the $750,000 threshold, compared to the number of contracts in the $2,000,000 Threshold sample (10,492), this is still a relatively small number of contracts (at 1.3%-2.7% of the sample). Due to the costs involved with bunching, it is unlikely that suppliers manipulated their contracts much further below $1,850,000 (or three 2.5% bins) to undercut the $2,000,000 threshold, so

[70] Out of the subsample of contracts requiring cost or pricing data, untabulated results show that there was an excess mass of approximately 18% (or 42 contracts in total) in the three 1.25%-sized bins below the $750,000 threshold. The rest of the results for this subsample are similar to those presented in this subsection (below both the $750,000 and $2,000,000 thresholds).

172 contracts (or 1.6% of the sample) provides a likely upper bound estimate of bunching.

Despite the requirement for cost or pricing data being in the solicitation, there appears to be a statistically significant, but small and economically insignificant amount of bunching just below the TINA threshold. This may be due to a few reasons. To a limited extent, PO's may communicate with suppliers about their prices before they post solicitations, some suppliers may attempt to avoid TINA's certification requirement, and/or a few suppliers may attempt to influence POs' expectations of future prices based on their (bunched) current prices. To test whether my primary results from Section 4 are driven by this relatively small amount of bunching, I re-run my primary analyses dropping contracts in the range most likely to be directly affected by manipulation: those just below and above the threshold. Specifically, for the \$750,000 (\$2,000,000) threshold, I drop contracts \$30,000 (\$60,000) below and above the threshold. I find that all of my primary results are unaffected by dropping these near-threshold contracts. This constitutes strong evidence that my results are not driven by bunching. In sum, the findings in this appendix suggest that while a minor amount of bunching below the TINA threshold may occur, it is not large enough to affect my main analyses.

A.4 Contract Splitting to Avoid the TINA Threshold: Additional Checks

In this section, I test for whether PO's engage in contract splitting in order to avoid TINA's data requirements, to a significant degree.

If PO's often find certified cost or pricing to be of little value or exceedingly costly, in terms of processing costs, lengthened award times, or the costs to the suppliers to provide the data, then that may incentivize PO's to break contracts above the threshold into smaller contracts to avoid requiring the data. My main analyses in Section 4 use RDD, which assumes that PO's do not manipulate contract prices to circumvent the threshold to a significant extent. To further check this assumption, I test for evidence of contract splitting.

There are several reasons to expect that splitting should not be pervasive. First, splitting of contracts to avoid any requirement is forbidden by the FAR.[71] Second, the author's conversations with practitioners suggest that the prohibition of splitting to undercut the TINA threshold is taken seriously by POs' management and government audit organizations. The objective of the TINA threshold is to prevent PO's from relying on their judgment of the reasonableness of contract prices above a certain value, thus management should prevent PO's from skirting the law apply their own judgment when it is prohibited.

To test for splitting, I examine changes in the broader price distribution of contracts above and below the TINA thresholds, by exploiting the 2018 threshold change in a differences-in-differences specification. If PO's engage in significant splitting to avoid the thresholds, then the broader price ranges *below* each threshold should exhibit significantly greater numbers of contracts when the TINA threshold is in effect, by however many smaller contracts that the original contracts were split into. Conversely, the price ranges *above* the threshold should exhibit a decrease in the number of contracts for each contract split.

My approach uses office-price-bin-period observations, constructed in two steps. First, I divide the Full Baseline sample into two time periods: before and after (i.e., Pre and Post) the threshold change. Finally, they are divided again into distinct price bins and then summed by agency-contracting-office. I estimate regressions using the following difference-in-differences specification by OLS:

$$\ln(Y_{jbt}) = \alpha_j + \alpha_b + \alpha_t + \sum_{k \in K} \delta_K \cdot I\{P_i \in B_k\} \cdot POST_t + \epsilon_i, \tag{A.4}$$

Where Y_{jbt} is the percentage of contracts in the distribution of those written by agency-contracting-office j in period t (Pre or Post) that are for an amount in bin b. Bins are right-inclusive and their ranges are defined below. I include agency-offices with at least 500 contracts in each price range and period t. $Post_t$ equals 1 for after the threshold change,

[71] This prohibition on splitting to avoid requirements applies to any contract priced above the micro-purchase threshold. See FAR 13.003(c)(2)(ii)) and `https://www.dau.edu/aap/Pages/home.aspx#!details|17897`.

and 0 otherwise. $I\{P_i \in B_b\}$ is an indicator that equals 1 for price bin b. K is a partition of the award amount space. Standards errors are clustered by price bin. The coefficients $\delta_k \in [1, K]$ identify the treatment effect of the TINA threshold change on the distribution of agency-offices' contracts.

Figure A.12 shows the estimated δ_K coefficients. This figure breaks the first bin into two: ($0, $150,000] and ($150,000, $250,000]. This is to gain additional visibility into effects on contracts below $250,000, because as mentioned in Section 3 the simplified acquisition threshold changed in the second quarter of 2018 from $150,000 to $250,000 for most early adopter agencies right around the date they adopted the new TINA threshold. Panel (a) contains all contracts in the sample. Contracts for supplies may be simpler to split, since it tends to be easier to adjust quantities for goods. Panels (b) and (c) contain only contracts for supplies and services and works, respectively.

Importantly, I do not detect any significant distributional changes in panel (a), which does not provide any evidence in favor of splitting being pervasive. Panel (b) shows that contracts for supplies, which should be easier to split than those for services, also do not exhibit splitting to circumvent the threshold. In fact, the two bins at and below the $750,000 cutoff are estimated to have large increases in the concentration of contracts after the threshold moved (the lower of these two being significant at the 10% level), which is inconsistent with widespread splitting to undercut the threshold. The bin below the $2,000,000 cutoff exhibits an increase in contract density after the threshold moved, which by itself would be (weak) evidence that splitting may be occurring; however the bin just above this cutoff also shows an increase in concentration.

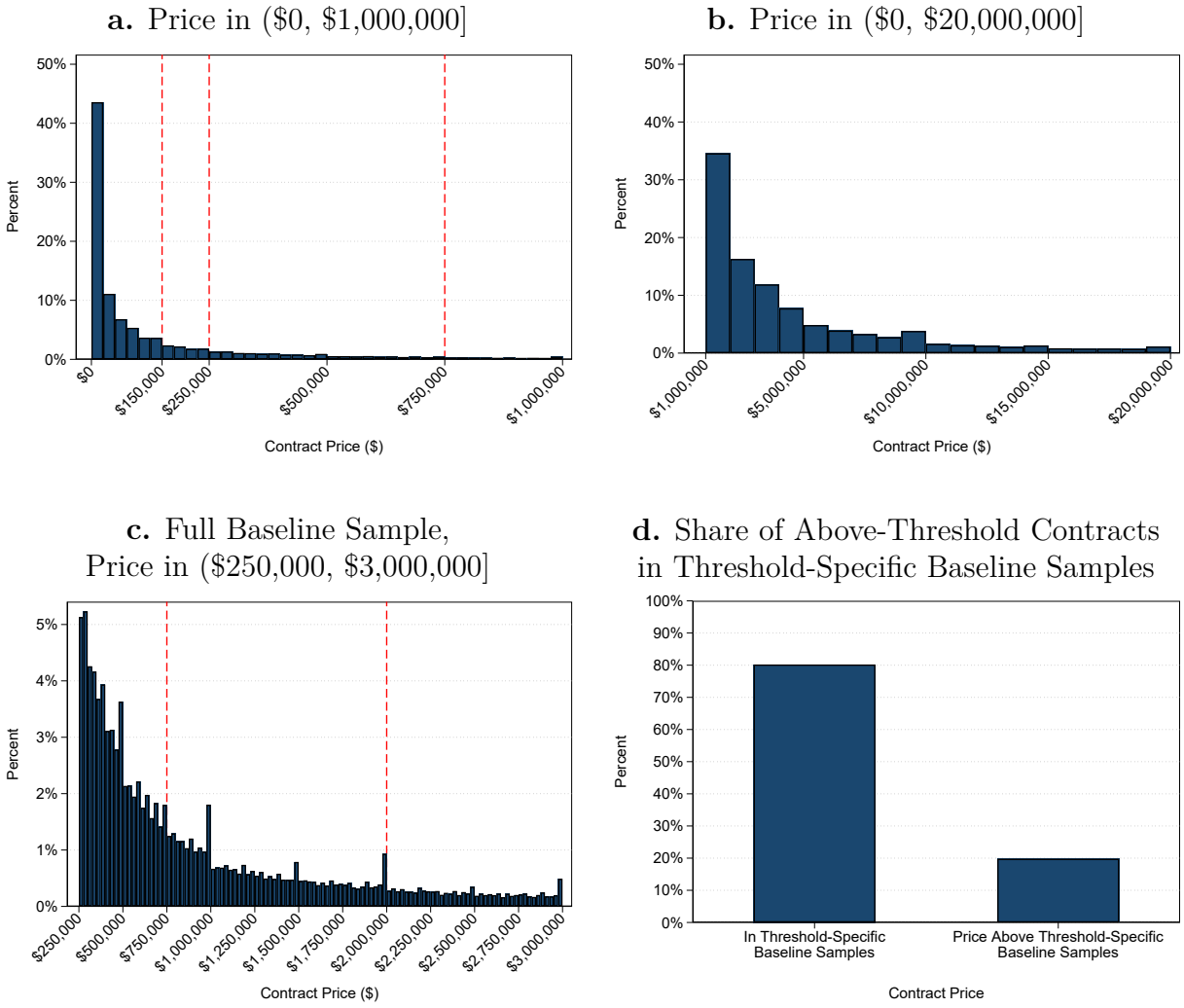
Once the SAT increased, contracts for supplies became significantly more concentrated in the ($150,000, $250,000] bin. This may be because either contracts in this bin were no longer being split to undercut the prior $150,000 SAT or splitting is occurring in higher bins to evade the new $250,000 SAT. To the extent splitting of contracts from bins above $250,000 into either SAT range was occurring, this test does not find any evidence that it is coming

from any single bin more frequently than other bins.

Panel (c) does not find any evidence of splitting of contracts for services, either. In fact, the few statistically significant changes in the distribution occur in the opposite direction from what would be expected if splitting is common. Namely, contracts in the ($1,750,000, $2,000,000] and ($1,250,000, $1,500,000] bins become less common rather than more common as would be predicted by significant splitting. In sum, the evidence in this section does not support there being pervasive splitting to undercut the TINA threshold.

If contracting offices and suppliers coordinate to split large contracts into two or more smaller awards, then my finding of improved competition for above-threshold contracts should driven by office-supplier pairs with multiple transactions within the budget cycle. As a second test for splitting, I restrict my analyses in Section 4 to contracts whose agency-offices only had a single transaction with the contract's supplier during the fiscal year (Carril [2021]). The results (untabulated) show that my previous estimates of the effects of the TINA thresholds on the competition variables are essentially unchanged. If my main results were driven by splitting, I should not find these results when restricting my samples to contracts where splitting is least likely.

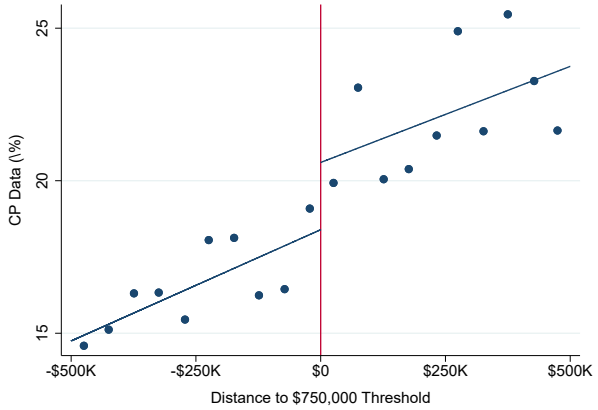
Figure A.1: Price Distributions of Negotiated, Non-Commercial Contracts



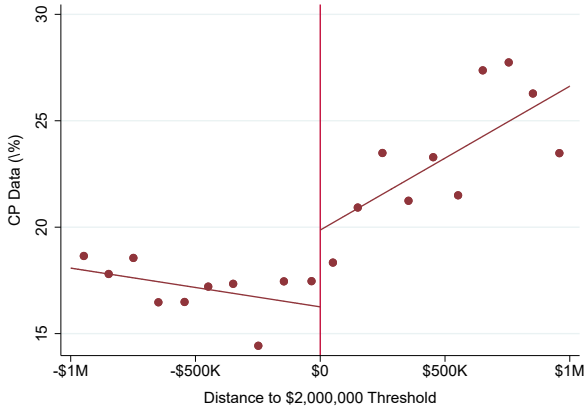
Notes: Price distributions of negotiated, non-commercial, prime contracts awarded by early adopter agencies in the price ranges specified. Panels (a) through (c) show price bins, where the bar height represents the percentage of contracts in each bin out of all such contracts in the price range specified. Panels (a) and (c) use $25,000 price bins, while panel (b) uses $1,000,000 price bins (right-inclusive). Panel (d) shows the share of all TINA-affected contracts, i.e., where $P_i \in$ (TINA threshold, ∞), during the time period of this study that *are included* in either the $750,000 or $2,000,000 Threshold Baseline samples versus the share *not included* in these samples. The sample in each panel follows the Full Baseline sample's time period, spanning between October 1st, 2015 (i.e., the beginning of fiscal year 2016) and March 13th, 2020 (i.e., the date the COVID emergency procurement orders were issued), as described in Section 3.2. Early adopters are defined as agencies that adopted the $2,000,000 TINA threshold in 2018. See Section 3.3 for the list of early adopter agencies and the date range contracts were included for each agency in the Baseline sample in panel (c) (these same dates apply in panels (a), (b), and (d).

Figure A.2: Regression Discontinuity Plots Around the TINA Thresholds: Cost or Pricing Data Required

a. Cost or Pricing Data Required
$750,000 Threshold Period

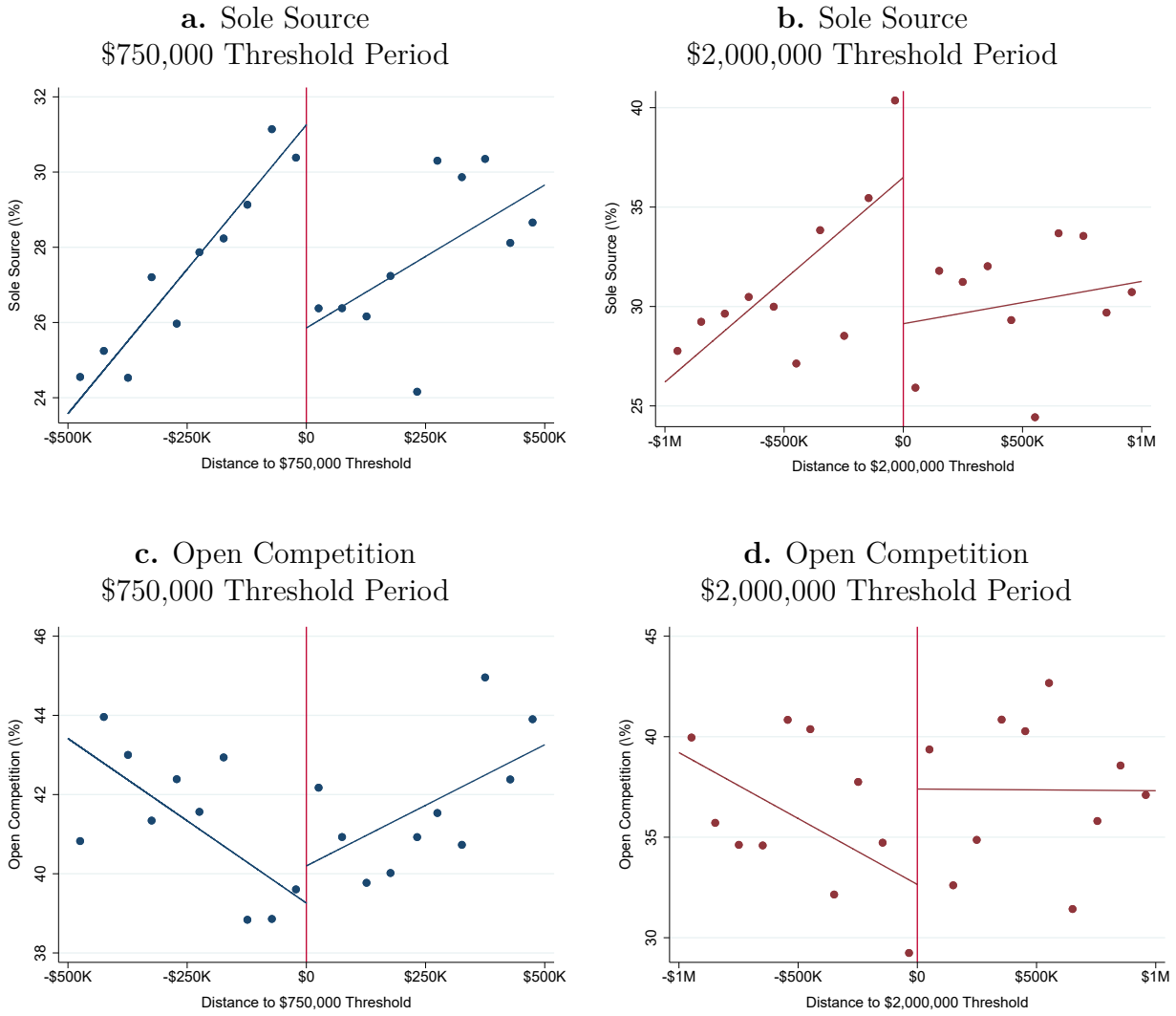


b. Cost or Pricing Data Required
$2,000,000 Threshold Period



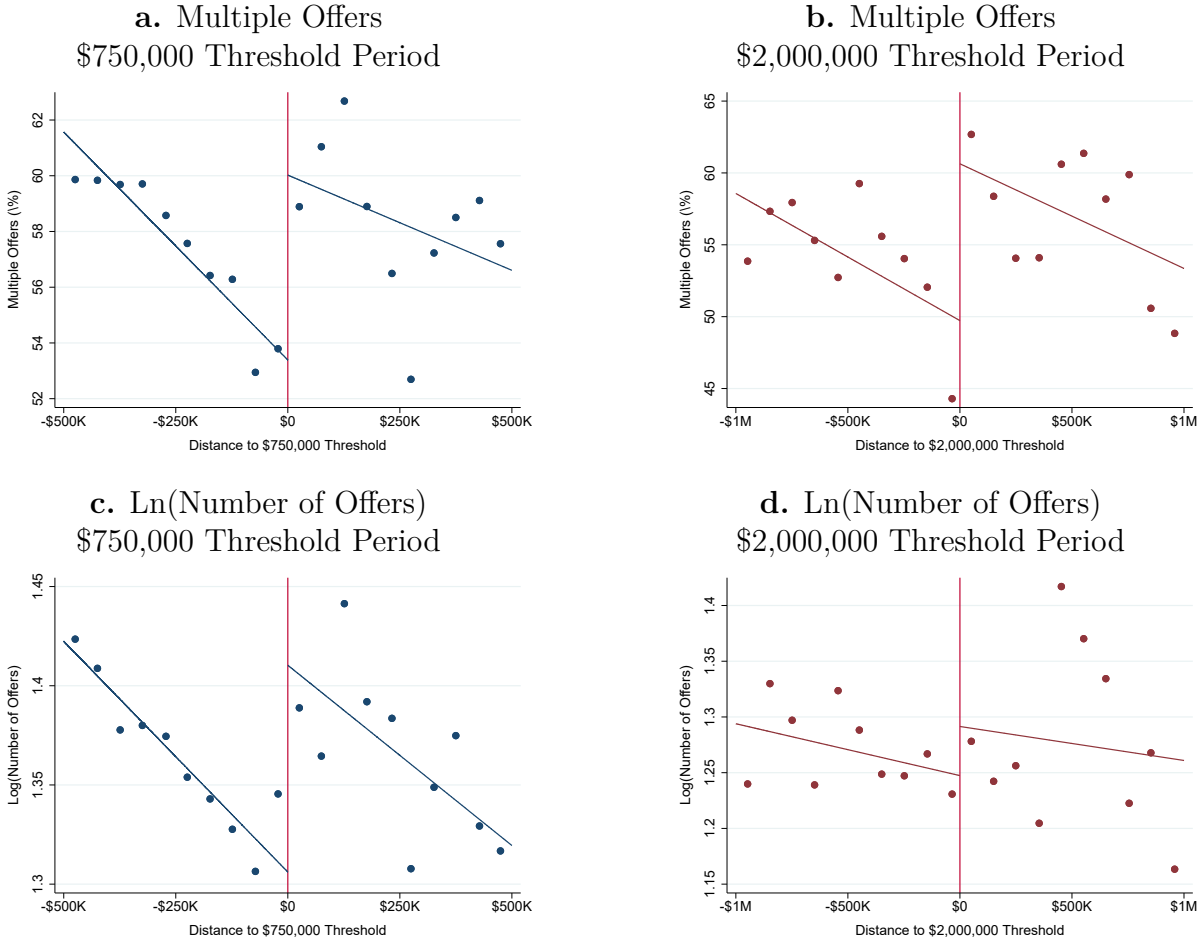
Notes: Binned scatter-plots around the $750,000 and $2,000,000 TINA thresholds while each threshold is in effect, using $50,000 and $100,000 price bins respectively. Each sample is comprised of negotiated, non-commercial, prime contracts awarded by early adopter agencies. *CP Data* equals 100 if cost or pricing data (i.e., comprehensive accounting data) was required to be submitted with the contract proposal and zero otherwise. Each circle represents the mean of the y-variable across all contracts in the price bin and threshold period shown. The x-axis shows the distance (in dollars) from the center of the price bin shown to the TINA threshold indicated. Panel (a) contains contracts signed during the $750,000 threshold period and valued between $250,000 and $750,000, while panel (b) contains contracts signed during the $2,000,000 threshold period and valued between $1,000,000 and $2,000,000. Early adopters are defined as agencies that adopted the $2,000,000 TINA threshold in 2018. See Section 3.3 for the list of early adopter agencies and when the $2,000,000 TINA threshold applied for each agency.

Figure A.3: Regression Discontinuity Plots Around the TINA Thresholds: Solicited Competition



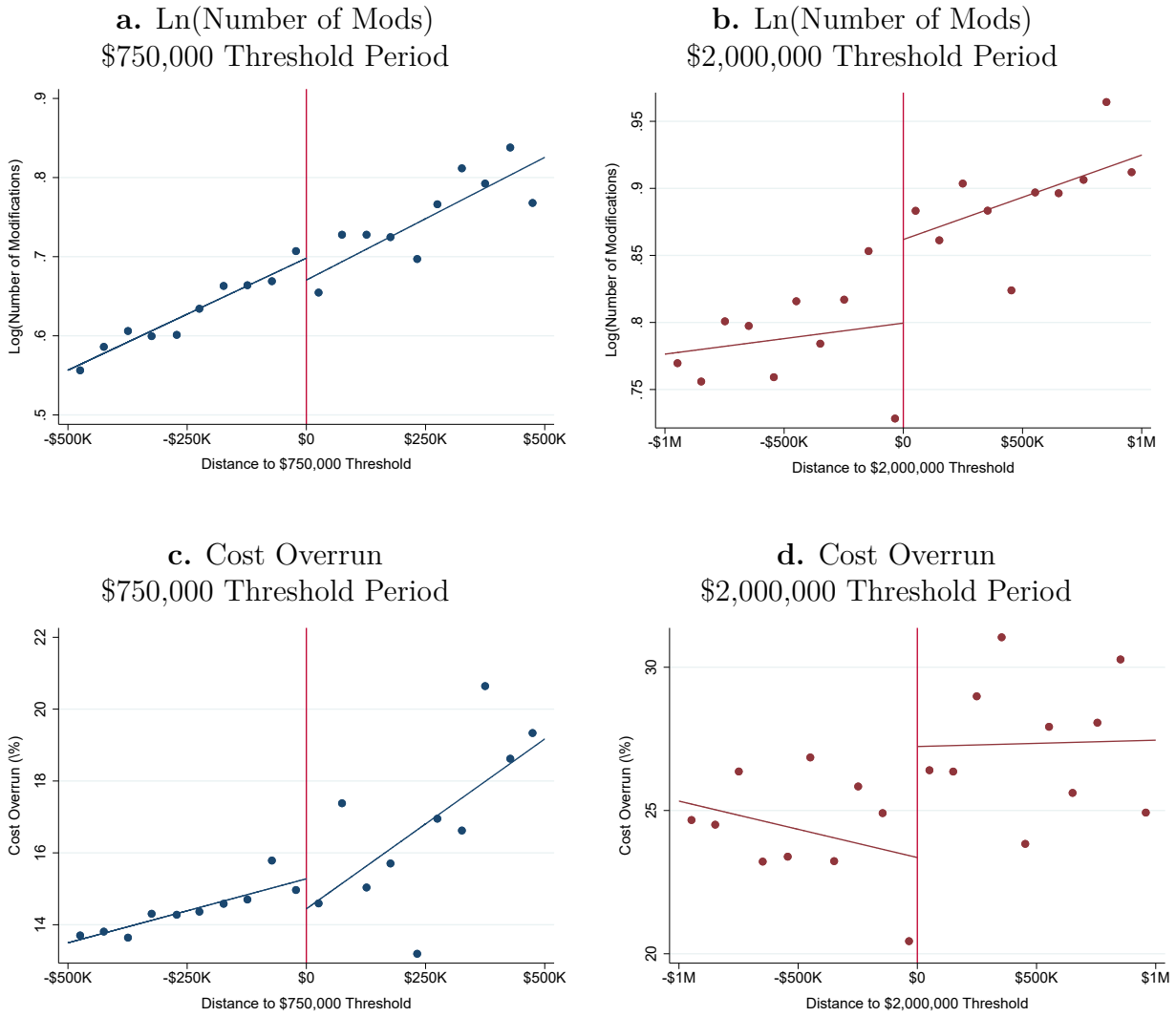
Notes:Binned scatter-plots around the $750,000 and $2,000,000 TINA thresholds while each threshold is in effect, using $50,000 and $100,000 price bins respectively. Each sample is comprised of negotiated, non-commercial, prime contracts awarded by early adopter agencies. *Sole Source* equals 100 if the contract was awarded as part of a sole source solicitation (i.e., where all but one bidder is excluded), and zero otherwise. *Open Competition* equals 100 if the solicitation allowed full and open competition and zero otherwise. Each circle represents the mean of the y-variable across all contracts in the price bin and threshold period shown. The x-axis shows the distance (in dollars) from the center of the price bin shown to the TINA threshold indicated. Panels (a) and (c) contain contracts signed during the $750,000 threshold period and valued between $250,000 and $750,000, while panels (b) and (d) contain contracts signed during the $2,000,000 threshold period and valued between $1,000,000 and $2,000,000. Early adopters are defined as agencies that adopted the $2,000,000 TINA threshold in 2018. See Section 3.3 for the list of early adopter agencies and when the $2,000,000 TINA threshold applied for each agency.

Figure A.4: Regression Discontinuity Plots Around the TINA Thresholds: Realized Competition



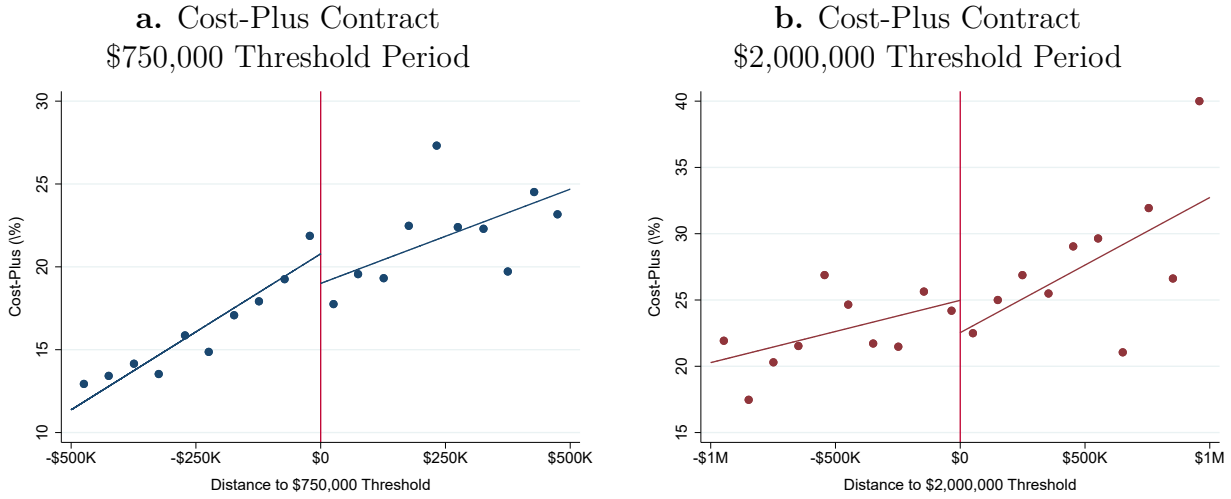
Notes: Binned scatter-plots around the $750,000 and $2,000,000 TINA thresholds while each threshold is in effect, using $50,000 and $100,000 price bins respectively. Each sample is comprised of negotiated, non-commercial, prime contracts awarded by early adopter agencies. *Multiple Offers* equals 100 if the contract received multiple bids and zero otherwise. *Ln(Number of Offers)* equals the natural logarithm of one plus the number of bids. Each circle represents the mean of the y-variable across all contracts in the price bin and threshold period shown. The x-axis shows the distance (in dollars) from the center of the price bin shown to the TINA threshold indicated. Panels (a) and (c) contain contracts signed during the $750,000 threshold period and valued between $250,000 and $750,000, while panels (b) and (d) contain contracts signed during the $2,000,000 threshold period and valued between $1,000,000 and $2,000,000. Early adopters are defined as agencies that adopted the $2,000,000 TINA threshold in 2018. See Section 3.3 for the list of early adopter agencies and when the $2,000,000 TINA threshold applied for each agency.

Figure A.5: Regression Discontinuity Plots Around the TINA Thresholds: Contract Performance



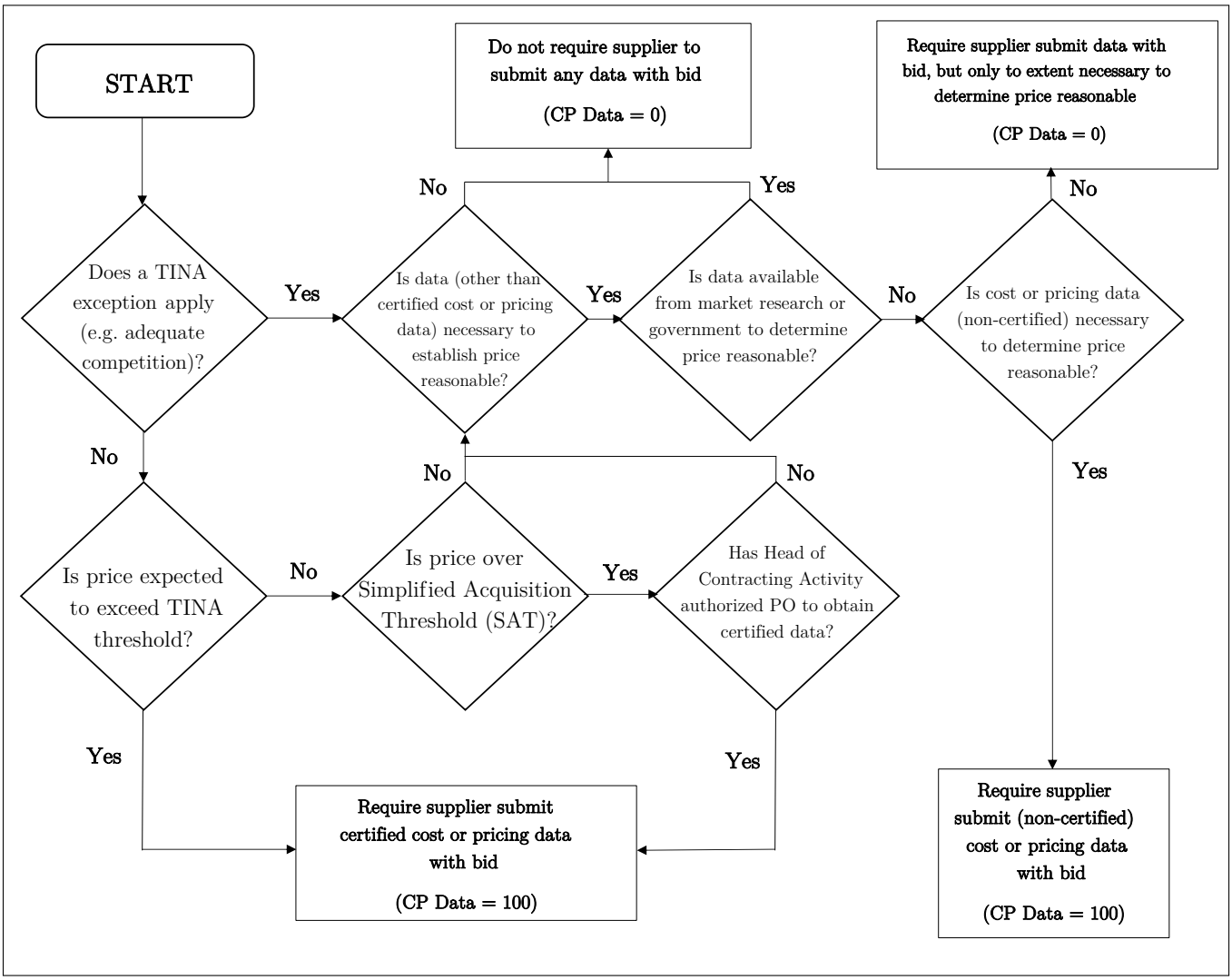
Notes: Binned scatter-plots around the $750,000 and $2,000,000 TINA thresholds while each threshold is in effect, using $50,000 and $100,000 price bins respectively. Each sample is comprised of negotiated, non-commercial, prime contracts awarded by early adopter agencies. *Ln(Number of Mods* is the natural logarithm of one plus the number of modifications on the contract. *Cost Overrun* equals 100 if there was a cost overrun on the contract due to modifications, and zero otherwise. Each circle represents the mean of the y-variable across all contracts in the price bin and threshold period shown. The x-axis shows the distance (in dollars) from the center of the price bin shown to the TINA threshold indicated. Panels (a) and (c) contain contracts signed during the $750,000 threshold period and valued between $250,000 and $750,000, while panels (b) and (d) contain contracts signed during the $2,000,000 threshold period and valued between $1,000,000 and $2,000,000. Early adopters are defined as agencies that adopted the $2,000,000 TINA threshold in 2018. See Section 3.3 for the list of early adopter agencies and when the $2,000,000 TINA threshold applied for each agency.

Figure A.6: Regression Discontinuity Plots Around the TINA Thresholds: Cost-Plus Contracts



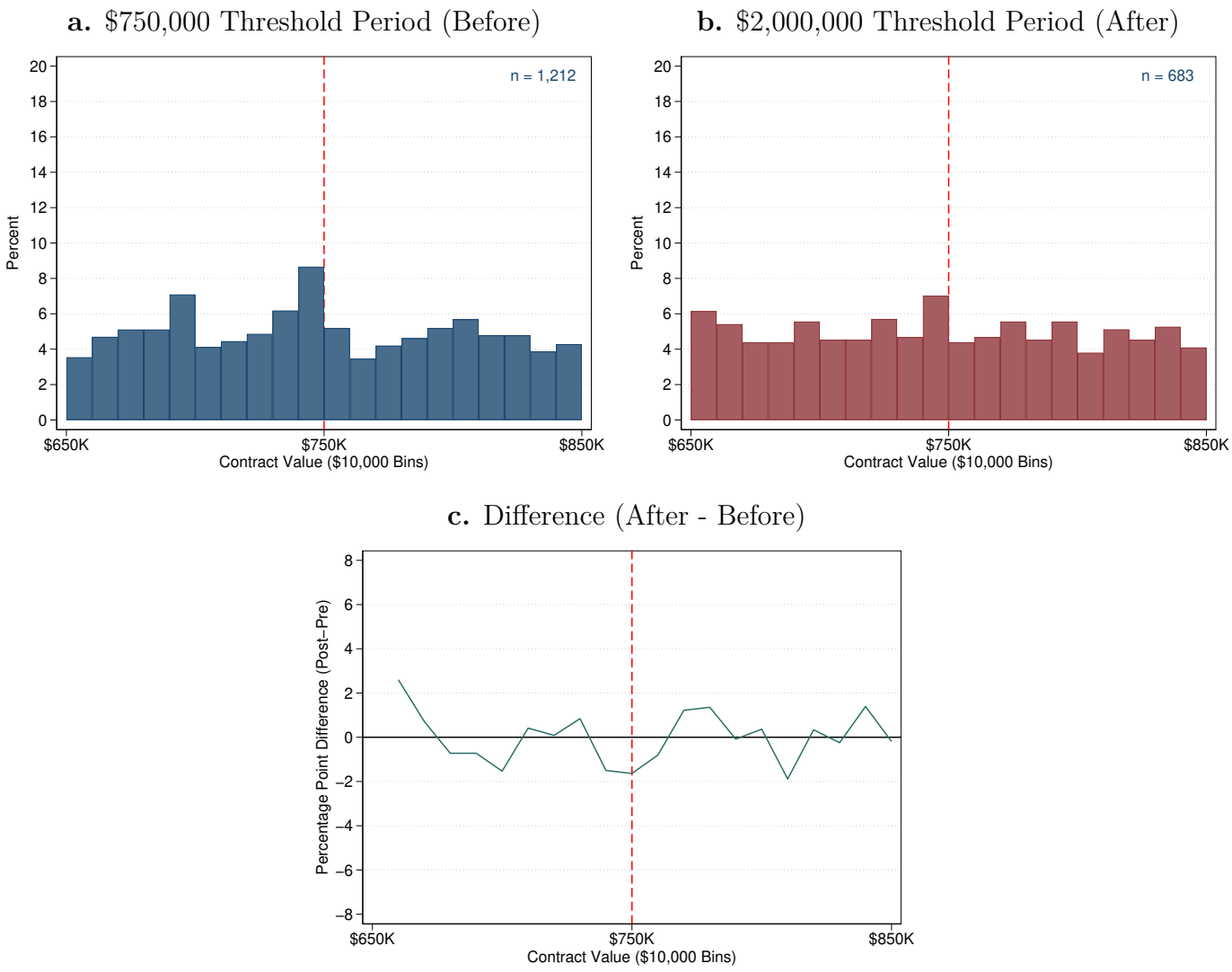
Notes: Binned scatter-plots around the $750,000 and $2,000,000 TINA thresholds while each threshold is in effect, using $50,000 and $100,000 price bins respectively. Each sample is comprised of negotiated, non-commercial, prime contracts awarded by early adopter agencies. *Cost-Plus* equals 100 when the contract is of cost-plus reimbursement type, and zero otherwise. Each circle represents the mean of the y-variable across all contracts in the price bin and threshold period shown. The x-axis shows the distance (in dollars) from the center of the price bin shown to the TINA threshold indicated. Panels (a) and (c) contain contracts signed during the $750,000 threshold period and valued between $250,000 and $750,000, while panels (b) and (d) contain contracts signed during the $2,000,000 threshold period and valued between $1,000,000 and $2,000,000. Early adopters are defined as agencies that adopted the $2,000,000 TINA threshold in 2018. See Section 3.3 for the list of early adopter agencies and when the $2,000,000 TINA threshold applied for each agency.

Figure A.7: Detailed Flow Chart Showing When Cost or Pricing Data Is Required



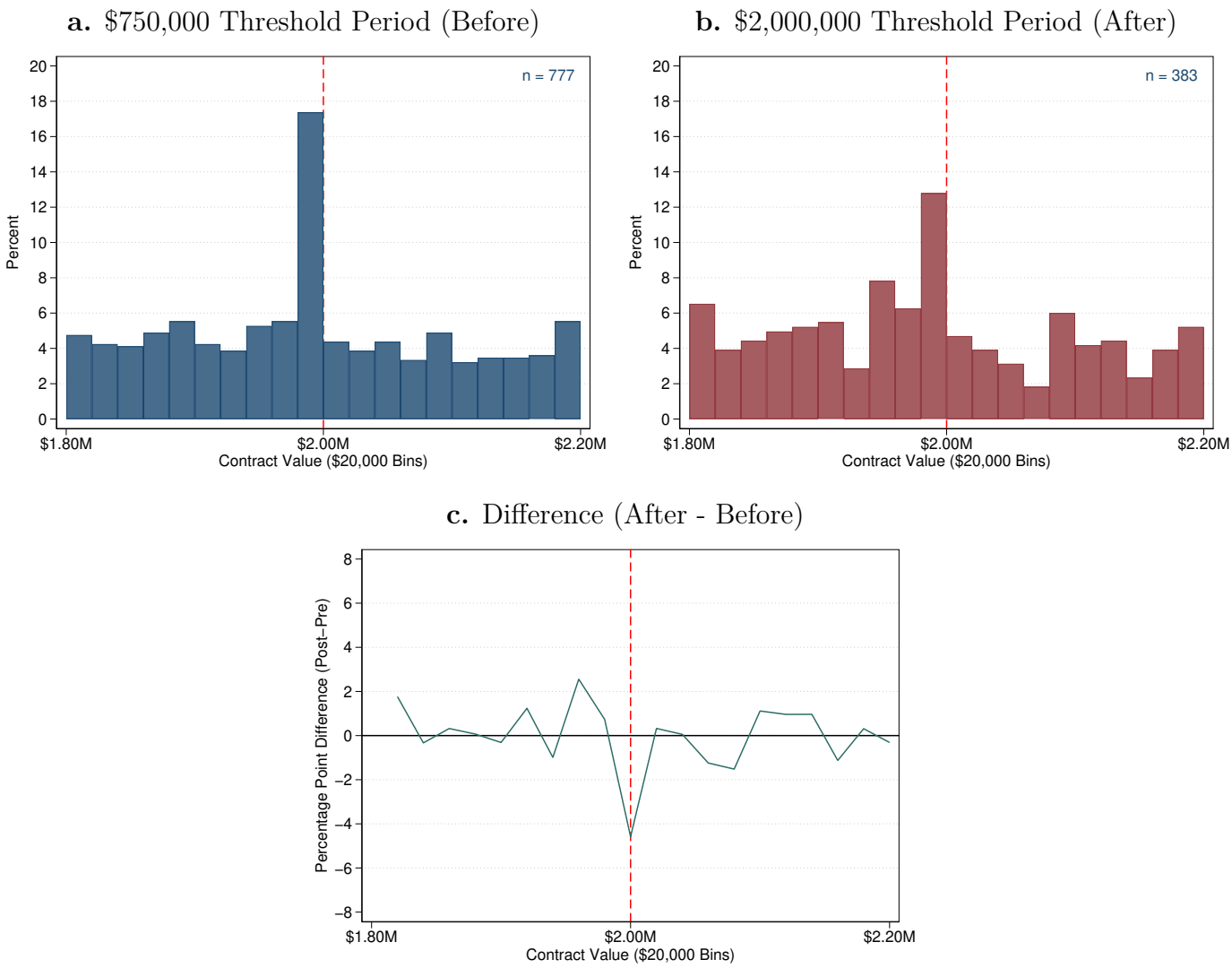
Notes: This figure illustrates when cost or pricing data (or other data) is required to be submitted with suppliers' bids per the FAR (see Section 2 and Section A.1 of the Online Appendix for details). *CP Data* equals 100 when cost or pricing data was required to be submitted by suppliers with the contract proposal, and zero otherwise. Contracts with exceptional case waivers are coded as *CP Data* = 100, since the data was required to be submitted (not shown in the figure). Source: This figure adapts a similar flow chart by the Defense Acquisition University (see `https://www.dau.edu/tools/Lists/DAUTools/Attachments/211/Requiring%20Cost%20or%20Pricing%20Data%20Flowchart.pdf`).

Figure A.8: Bunching: Histograms Around the $750,000 TINA Threshold Before and After the 2018 Threshold Change, for Contracts Requiring Cost or Pricing Data



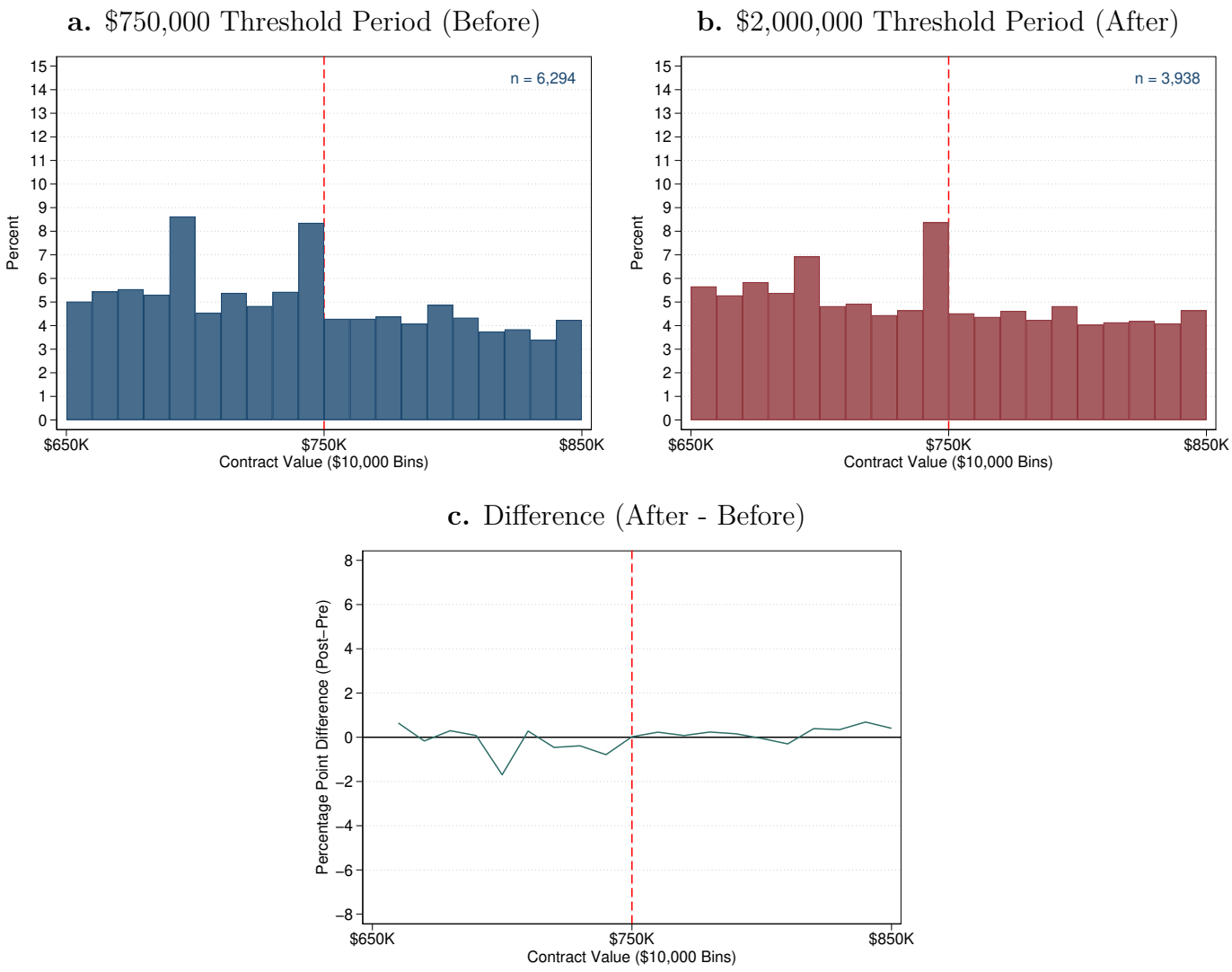
Notes: Price distributions of negotiated, non-commercial, prime contracts that required cost or pricing data and were awarded by early adopters, in a price range centered around $750,000 (i.e., from $650,000 to $850,000). Each panel uses $10,000 right-inclusive price bins. Each bin height represents the percentage of contracts in the full range shown that lay within that bin. Panel (a) shows the distribution for contracts during the $750,000 threshold period (signed between October 1st, 2015 and June 30th, 2018), *before* the threshold changed to $2,000,000. Panel (b) shows the distribution of contracts during the $2,000,000 threshold period, *after* the threshold changed to $2,000,000. Panel (c) shows the percentage point difference between each bin in the "before" and "after" periods. Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.3 for a list of early adopter agencies and when the $2,000,000 TINA threshold applied for each agency.

Figure A.9: Bunching Histograms Around the $2,000,000 TINA Threshold Before and After the 2018 Threshold Change for Contracts Requiring Cost or Pricing Data



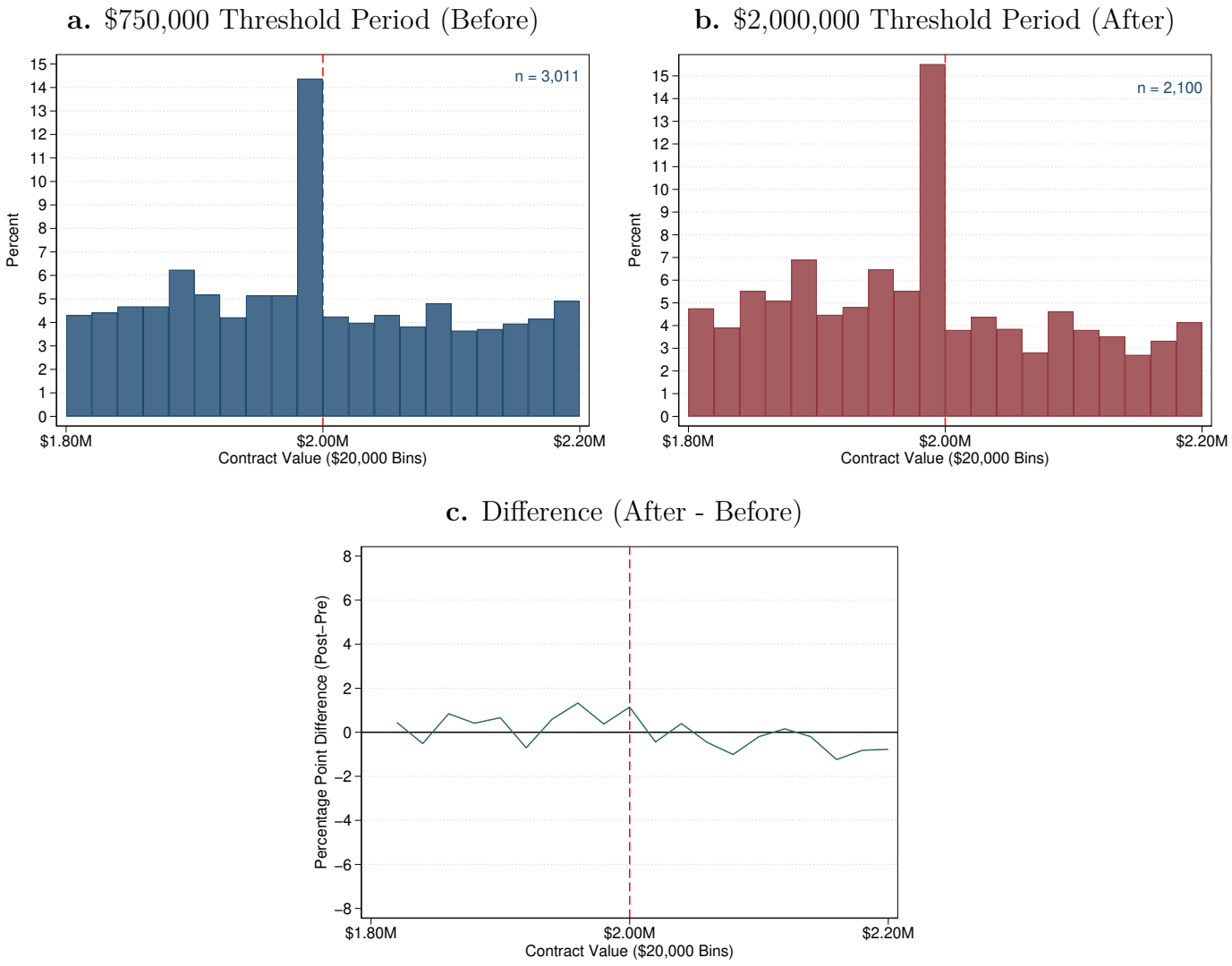
Notes: Price distributions of negotiated, non-commercial, prime contracts that required cost or pricing data and were awarded by early adopters, in a price range centered around $2,000,000 (containing contracts valued between $1,800,000 and $2,200,000). Each panel uses $20,000 right-inclusive price bins. Each bin height represents the percentage of contracts in the full range shown that lay within that bin. Panel (a) shows the distribution for contracts during the $750,000 threshold period (signed between October 1st, 2015 and June 30th, 2018), *before* the threshold changed to $2,000,000. Panel (b) shows the distribution of contracts during the $2,000,000 threshold period, *after* the threshold changed to $2,000,000. Panel (c) shows the percentage point difference between each bin in the "before" and "after" periods. Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.3 for a list of early adopter agencies and when the $2,000,000 TINA threshold applied for each agency.

Figure A.10: Bunching Histograms Around the $750,000 TINA Threshold Before and After the 2018 Threshold Change, All Baseline Contracts



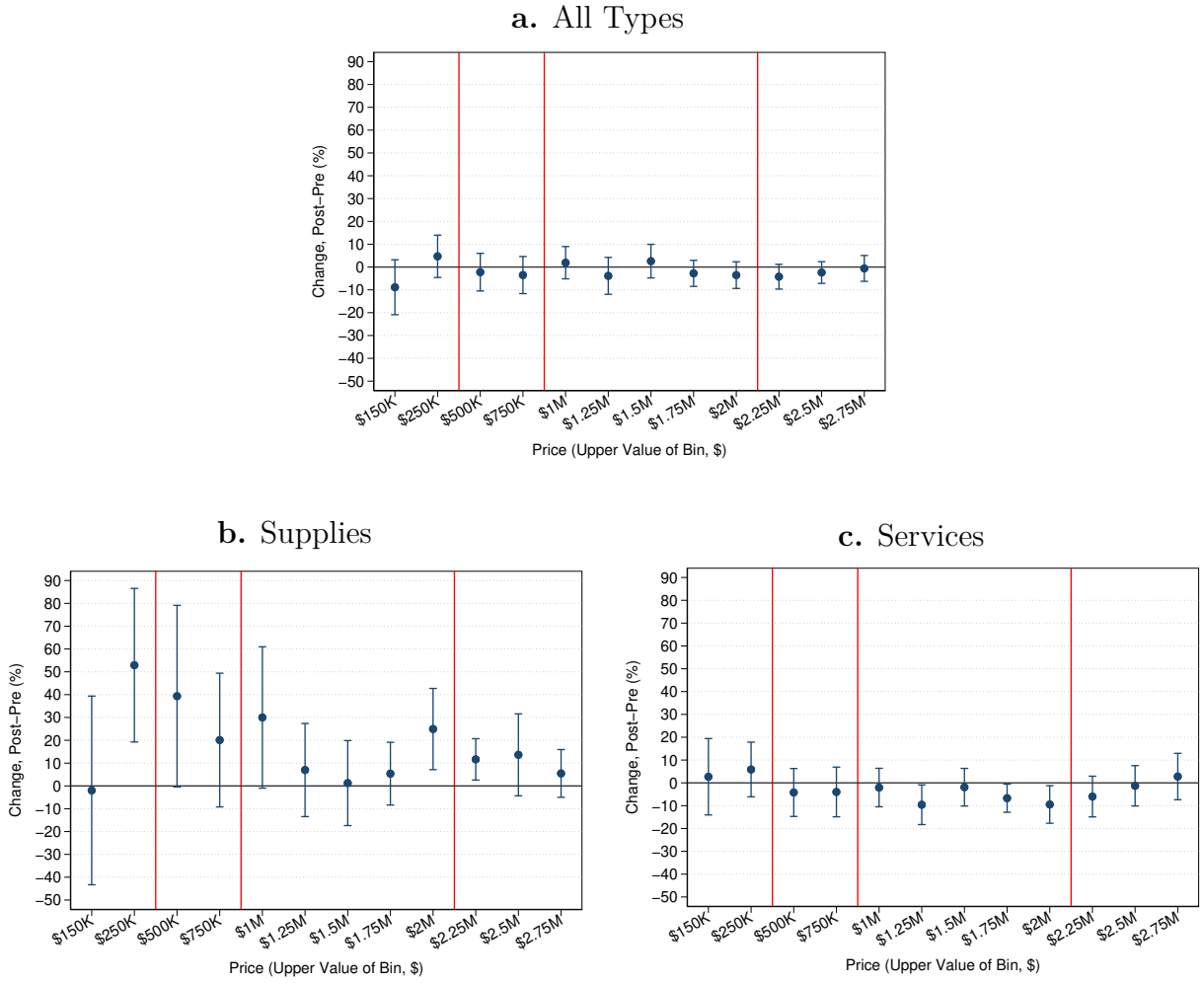
Notes: Price distributions of negotiated, non-commercial, prime contracts awarded by early adopters, in a price range centered around $750,000 (i.e., from $650,000 to $850,000). Each panel uses $10,000 right-inclusive price bins. Each bin height represents the percentage of contracts in the full range shown that lay within that bin. Panel (a) shows the distribution for contracts during the $750,000 threshold period (signed between October 1st, 2015 and June 30th, 2018), *before* the threshold changed to $2,000,000. Panel (b) shows the distribution of contracts during the $2,000,000 threshold period, *after* the threshold changed to $2,000,000. Panel (c) shows the percentage point difference between each bin in the "before" and "after" periods. Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.3 for a list of early adopter agencies and when the $2,000,000 TINA threshold applied for each agency.

Figure A.11: Bunching Histograms Around the $2,000,000 TINA Threshold Before and After the 2018 Threshold Change



Notes: Price distributions of negotiated, non-commercial, prime contracts awarded by early adopters, in a price range centered around $2,000,000 (containing contracts valued between $1,800,000 and $2,200,000). Each panel uses $20,000 right-inclusive price bins. Each bin height represents the percentage of contracts in the full range shown that lay within that bin. Panel (a) shows the distribution for contracts during the $750,000 threshold period (signed between October 1st, 2015 and June 30th, 2018), *before* the threshold changed to $2,000,000. Panel (b) shows the distribution of contracts during the $2,000,000 threshold period, *after* the threshold changed to $2,000,000. Panel (c) shows the percentage point difference between each bin in the "before" and "after" periods. Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.3 for a list of early adopter agencies and when the $2,000,000 TINA threshold applied for each agency.

Figure A.12: Splitting Around the 2018 TINA Threshold Change



Notes: 95% confidence intervals. Features percentage changes in the density of contracts by histogram price bin following the 2018 TINA threshold change from $750,000 to $2,000,000 for early adopters (as well as the change in the simplified acquisition threshold from $150,000 to $250,000 that occurred within the same quarter for most early adopters). Includes $250,000 price bins, except the first two bins which are split into contracts between ($0, $150,000] and ($150,000, $250,000], respectively. Sample is negotiated, non-commercial, prime contracts awarded by early adopters priced between $0 and $3,000,000. Each circle (in blue) represents an estimated δ_k coefficient from equation A.4 capturing the percentage change in contracts for the corresponding price bin out of the contracts in the range shown. Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.3 for a list of early adopter agencies and when the $2,000,000 TINA threshold applied for each agency. See Section A.4 of the Online Appendix for details on this figure.

Table A.1: Descriptive Statistics of Contracts by Cost or Pricing Data Requirement and Whether Multiple Offers Received

	Multiple Offers		Single or Zero Offers	
	(1)	(2)	(3)	(4)
	$750,000 Threshold	$2,000,000 Threshold	$750,000 Threshold	$2,000,000 Threshold
Cost or Pricing Data Required (%)	10.435	7.396	24.743	16.371
	(0.206)	(0.450)	(0.345)	(0.719)
Cost or Pricing Data Waived (%)	0.729	0.769	1.122	0.868
	(0.057)	(0.150)	(0.084)	(0.180)
Cost-Plus Contract (%)	12.251	15.385	21.333	23.086
	(0.221)	(0.621)	(0.327)	(0.819)
Fixed Price Contract (%)	84.099	81.213	75.155	74.727
	(0.246)	(0.672)	(0.345)	(0.844)
Number of Offers Received	10.346	15.316	0.994	0.957
	(0.314)	(1.425)	(0.001)	(0.004)
Sole Source (%)	0.086	0.030	60.871	50.622
	(0.020)	(0.030)	(0.390)	(0.971)
Multiple Offers (%)	100.000	100.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Open Competition (%)	55.471	45.266	24.718	28.782
	(0.334)	(0.856)	(0.344)	(0.879)
Number of Modifications	1.440	1.845	1.610	1.988
	(0.016)	(0.041)	(0.022)	(0.045)
Modification (%)	60.738	69.822	62.222	75.481
	(0.329)	(0.790)	(0.387)	(0.836)
Cost Overrun (%)	15.521	26.627	15.310	26.330
	(0.244)	(0.760)	(0.287)	(0.856)
Initial Duration (Days)	337.262	456.760	324.554	449.619
	(2.160)	(6.122)	(2.212)	(6.943)
Definitive and Purchase Orders (%)	12.740	23.639	23.494	48.057
	(0.224)	(0.731)	(0.338)	(0.971)
Indefinite Delivery Vehicles (IDV's) (%)	87.260	76.361	76.506	51.943
	(0.224)	(0.731)	(0.338)	(0.971)
Supplies (%)	10.380	8.787	24.559	19.578
	(0.205)	(0.487)	(0.344)	(0.771)
Services (%)	83.678	77.367	64.223	64.089
	(0.249)	(0.720)	(0.383)	(0.932)
Research (%)	5.942	13.846	11.218	16.333
	(0.159)	(0.594)	(0.252)	(0.718)
Army, Air Force, and Navy (%)	73.433	74.201	81.344	81.441
	(0.297)	(0.753)	(0.311)	(0.755)
Observations	22,080	3,380	15,689	2,651

Notes: Standard errors in parentheses. Characteristics of negotiated, non-commercial, prime contracts awarded by early adopter agencies in the subsample indicated, with standard errors in parentheses. Columns (1) and (3) split the $750,000 Threshold Baseline sample by whether contracts received multiple offers or not, respectively. Columns (2) and (4) split the $2,000,000 Threshold Baseline sample by whether contracts multiple offers were received or not. The samples in columns (2) and (4) contain contracts from the $2,000,000 threshold period with prices between $1,000,000 and $3,000,000. The samples in columns (1) and (3) contain contracts from the $750,000 threshold period with prices between $250,000 and $1,250,000. Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.2 for the list of early adopter agencies and when the $750,000 and $2,000,000 TINA thresholds applied for each agency. See Appendix A for a list of variable definitions.

Table A.2: Descriptive Statistics of Definitive and Purchase Order and Indefinite Delivery Vehicle Contract Samples

	Definitive and Purchase Orders		Indefinite Delivery Vehicles (IDVs)	
	(1)	(2)	(3)	(4)
	$750,000 Threshold	$2,000,000 Threshold	$750,000 Threshold	$2,000,000 Threshold
Cost or Pricing Data Required (%)	9.155	13.603	19.251	20.691
	(0.358)	(0.753)	(0.209)	(0.442)
Cost or Pricing Data Waived (%)	1.923	1.544	0.755	0.511
	(0.170)	(0.271)	(0.046)	(0.078)
Cost-Plus Contract (%)	11.448	22.238	17.972	25.466
	(0.395)	(0.914)	(0.204)	(0.475)
Fixed Price Contract (%)	79.243	72.455	79.537	72.253
	(0.503)	(0.981)	(0.214)	(0.488)
Number of Offers Received	13.373	19.603	5.025	3.453
	(0.979)	(2.315)	(0.091)	(0.093)
Sole Source (%)	42.822	43.705	23.796	26.725
	(0.614)	(1.090)	(0.226)	(0.482)
Multiple Offers (%)	43.284	38.543	61.615	65.210
	(0.615)	(1.069)	(0.275)	(0.757)
Open Competition (%)	36.067	36.228	42.985	37.344
	(0.596)	(1.056)	(0.263)	(0.527)
Number of Modifications	1.800	2.111	1.352	1.789
	(0.039)	(0.052)	(0.012)	(0.026)
Modification (%)	64.718	77.376	57.429	68.143
	(0.593)	(0.919)	(0.262)	(0.508)
Cost Overrun (%)	15.418	26.676	14.887	25.918
	(0.448)	(0.972)	(0.189)	(0.478)
Initial Duration (Days)	414.533	531.190	316.317	421.486
	(5.465)	(9.228)	(1.405)	(3.393)
Definitive and Purchase Orders (%)	100.000	100.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Indefinite Delivery Vehicles (IDV's) (%)	0.000	0.000	100.000	100.000
	(0.000)	(0.000)	(0.000)	(0.000)
Supplies (%)	23.111	12.446	15.369	17.769
	(0.523)	(0.725)	(0.191)	(0.417)
Services (%)	58.286	56.585	78.351	72.823
	(0.612)	(1.089)	(0.219)	(0.485)
Research (%)	18.603	30.970	6.280	9.407
	(0.483)	(1.016)	(0.129)	(0.318)
Army, Air Force, and Navy (%)	67.333	78.196	79.785	82.231
	(0.582)	(0.907)	(0.213)	(0.417)
Observations	6,499	2,073	35,494	8,419

Notes: Standard errors in parentheses. Characteristics of negotiated, non-commercial, prime contracts awarded by early adopter agencies in the subsample indicated, with standard errors in parentheses. The samples in columns (1) and (3) contain contracts from the $750,000 threshold period with prices between $250,000 and $1,250,000. The samples in columns (2) and (4) contain contracts from the $2,000,000 threshold period with prices between $1,000,000 and $3,000,000. Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.2 for the list of early adopter agencies and when the $750,000 and $2,000,000 TINA thresholds applied for each agency. All variables are defined in Appendix A.

Table A.3: Descriptive Statistics of Supplies, Services, and Commercial Contracts Samples

	Services		Supplies		Commercial Items	
	(1)	(2)	(3)	(4)	(5)	(6)
	$750,000 Threshold	$2,000,000 Threshold	$750,000 Threshold	$2,000,000 Threshold	$750,000 Threshold	$2,000,000 Threshold
Cost or Pricing Data Required (%)	14.957	15.882	22.567	26.625	0.944	1.614
	(0.201)	(0.428)	(0.501)	(1.056)	0.047	0.129
Cost or Pricing Data Waived (%)	0.911	0.534	1.064	1.026	1.065	1.635
	(0.053)	(0.085)	(0.123)	(0.241)	0.050	0.130
Cost-Plus Contract (%)	12.871	17.045	7.978	15.735	0.000	0.000
	(0.188)	(0.440)	(0.325)	(0.870)	0.000	0.000
Fixed Price Contract (%)	83.420	80.175	91.174	83.637	98.806	98.292
	(0.209)	(0.467)	(0.340)	(0.884)	0.053	0.133
Number of Offers Received	5.281	3.380	2.916	2.373	3.014	4.249
	(0.062)	(0.070)	(0.074)	(0.312)	0.026	0.124
Sole Source (%)	21.916	25.151	44.804	50.000	18.187	18.223
	(0.233)	(0.508)	(0.596)	(1.194)	0.187	0.395
Multiple Offers (%)	64.710	60.617	37.299	36.397	50.261	55.565
	(0.283)	(0.744)	(0.617)	(1.685)	0.253	0.639
Open Competition (%)	42.895	35.255	35.173	31.186	40.487	39.589
	(0.278)	(0.559)	(0.573)	(1.106)	0.238	0.501
Number of Modifications	1.395	1.852	1.168	1.578	0.830	1.130
	(0.013)	(0.029)	(0.026)	(0.048)	0.007	0.018
Modification (%)	59.004	69.373	50.683	66.477	43.102	53.023
	(0.277)	(0.539)	(0.599)	(1.128)	0.240	0.511
Cost Overrun (%)	17.219	31.065	7.201	14.139	10.072	18.338
	(0.212)	(0.542)	(0.310)	(0.832)	0.146	0.396
Initial Duration (Days)	325.736	419.046	299.734	422.469	260.991	304.850
	(1.727)	(3.860)	(3.133)	(7.859)	1.567	3.213
Definitive and Purchase Orders (%)	11.988	16.060	21.590	14.709	28.869	24.175
	(0.183)	(0.430)	(0.493)	(0.846)	0.219	0.438
Indefinite Delivery Vehicles (%)	88.012	83.940	78.410	85.291	71.131	75.825
	(0.183)	(0.430)	(0.493)	(0.846)	0.219	0.438
Supplies (%)	0.000	0.000	100.000	100.000	45.087	34.496
	(0.000)	(0.000)	(0.000)	(0.000)	0.241	0.487
Services (%)	100.000	100.000	0.000	0.000	54.335	64.749
	(0.000)	(0.000)	(0.000)	(0.000)	0.241	0.489
Research (%)	0.000	0.000	0.000	0.000	0.578	0.754
	(0.000)	(0.000)	(0.000)	(0.000)	0.037	0.089
Army, Air Force, and Navy (%)	77.328	80.367	79.862	87.913	49.793	52.772
	(0.236)	(0.465)	(0.481)	(0.779)	0.242	0.511
Observations	31,598	7,304	6,957	1,754	0	0

Notes: Standard errors in parentheses. Characteristics of negotiated, prime contracts awarded by early adopter agencies in the sample indicated, with standard errors in parentheses. Columns (1) through (4) contain only non-commercial contracts, while columns (5) and (6) contain only commercial contracts. The samples in columns (1), (3), and (5) contain contracts from the $750,000 threshold period with prices between $250,000 and $1,250,000. The samples in columns (2), (4), and (6) contain contracts from the $2,000,000 threshold period with prices between $1,000,000 and $3,000,000. Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.2 for the list of early adopter agencies and when the $750,000 and $2,000,000 TINA thresholds applied for each agency. All variables are defined in Appendix A.

Table A.4: Regression Discontinuity Design: Effect of the TINA Threshold on Competition Using Alternative Measures

	$750,000 Threshold		$2,000,000 Threshold	
	(1) Log(Number of Offers)	(2) Open Competition (%)	(3) Log(Number of Offers)	(4) Open Competition (%)
Treat$_{\text{TINA}}$	0.061***	3.229***	0.060	1.475
	(0.019)	(0.949)	(0.046)	(1.711)
Distance	-<0.001*	-0.005**	-<0.001	-<0.001
	(<0.001)	(0.002)	(<0.001)	(0.002)
Treat$_{TINA} * Distance$	<0.001	0.004	-<0.001	-<0.001
	(<0.001)	(0.004)	(<0.001)	(0.003)
Controls	Yes	Yes	Yes	Yes
Product Service Code Fixed Effects	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes
Bandwidth (h, $1,000's)	500	500	1,000	1,000
Mean Outcome	1.38	41.91	1.29	37.12
Std. Dev. Outcome	0.83	49.34	0.86	48.32
Observations	37,769	41,993	6,024	10,492

Notes: Standard errors clustered by agency-contracting-office shown in parenthesis. All columns present results from equation 1 in Section 3.3. The coefficient of interest, on $Treat_{TINA}$, represents the discontinuity (i.e., change in level) in the outcome variable at the threshold indicated. *Distance* is the difference (in dollars) between the contract price and the threshold value shown for each column. The regressions in this table include the following controls: *Distance* is the difference (in dollars) between the contract price and the threshold value shown for each column; *Initial Duration* is the expected duration of the contract at signing; a vector of dummies controlling for (1) set asides for small businesses and (2) all other set asides (e.g., women and minority-owned businesses). The dependent variables are defined as follows: *Log(Number of Offers)* equals the logarithm of one plus the number of bids; *Open Competition* equals 100 if the solicitation allowed full and open competition, and 0 otherwise. Contracts are from the threshold-specific Baseline sample indicated (i.e., negotiated, non-commercial, prime contracts awarded by early adopter agencies in the threshold-period and within the bandwidth indicated) in each column. The $750,000 threshold period is between October 1$^{\text{st}}$, 2015 and June 30$^{\text{th}}$, 2018. Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.2 for the list of early adopter agencies and when the $2,000,000 TINA threshold applied for each agency.

Table A.5: RDD Heterogeneity Tests: Effect of the TINA Threshold on Cost or Pricing Data Being Required

	$750,000 Threshold	$2,000,000 Threshold
	(1) CP Data (%)	(2) CP Data (%)
Treat$_{\text{TINA}}$		
Baseline	2.812*	3.851**
	(1.460)	(1.899)
Definitive and Purchase Orders	13.460***	13.068***
	(2.873)	(3.740)
Indefinite Delivery Vehicles (IDV's)	0.293	1.168
	(1.513)	(2.153)
Supplies	10.445**	12.771**
	(4.902)	(5.496)
Services and Works	-1.190	-1.335
	(1.166)	(1.638)
High Single Offer PSC	2.714	3.209
	(2.345)	(3.642)
High Multiple Offers PSC	2.932*	4.571**
	(1.554)	(1.971)
Commercial Items	-0.116	0.232
	(0.258)	(0.478)
Army, Air Force, and Navy	3.405**	5.097**
	(1.732)	(2.261)
Controls	Yes	Yes
Product Service Code Fixed Effects	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes
Bandwidth (h, 1,000's)	500	1,000
Mean Outcome (Baseline, Below Threshold)	22.26	23.07
Std. Dev. Outcome (Baseline)	41.60	42.14
Observations		
Baseline	41,993	10,492
Definitive and Purchase Orders	6,485	2,055
Indefinite Delivery Vehicles (IDV's)	35,491	8,416
Supplies	6,957	1,754
Services and Works	31,598	7,304
High Single Offer PSC	14,585	3,694
High Multiple Offers PSC	27,408	6,798
Commercial Items	42,713	9,543
Army, Air Force, and Navy	32,692	8,541

Notes: Standard errors clustered by agency-contracting-office shown in parenthesis. All columns feature the coefficient on $Treat_{TINA}$ from equation 1 in Section 3.3 for various samples (see Section 5.2) while the TINA threshold indicated in each column is in effect. $Treat_{TINA}$ is an indicator that equals 1 if the contract price is above the threshold indicated and zero otherwise. The regressions in this table include the following controls: *Distance* is the difference (in dollars) between the contract price and the threshold value shown for each column; *Initial Duration* is the expected duration of the contract at signing; a vector of dummies controlling for (1) set asides for small businesses and (2) all other set asides (e.g., women and minority-owned businesses). The dependent variable is defined as follows: *CP Data* equals 100 if cost or pricing data (i.e., comprehensive accounting data) was required to be submitted with the contract proposal and zero otherwise. All samples except the Commercial Items sample are subsamples of the threshold-specific Baseline sample indicated (i.e., negotiated, non-commercial, prime contracts awarded by early adopter agencies in the threshold-period and within the bandwidth indicated) in each column. The Definitive and Purchase Orders, Supplies, Services and Works, and Army, Air Force, and Navy subsamples each restrict contracts to those indicated by the subsample's name. High Single Offer PSC restricts the subsample to product-service codes (PSC's) where at least 50% of contracts had only one offer in the two years prior to the start of the Full Baseline sample, while High Multiple Offer PSC does the same for PSC's where at least 50% of contracts had multiple offers. The $750,000 threshold period is between October 1$^{\text{st}}$, 2015 and June 30$^{\text{th}}$, 2018. Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.2 for the list of early adopter agencies and when the $2,000,000 TINA threshold applied for each agency.

Table A.6: RDD Heterogeneity Tests: Effect of the TINA Threshold on Competition

	$750,000 Threshold		$2,000,000 Threshold	
	(1)	(2)	(3)	(4)
	Sole Source (%)	Multiple Offers (%)	Sole Source (%)	Multiple Offers (%)
Treat$_{\text{TINA}}$				
Baseline	-3.893***	4.388***	-3.927**	6.306**
	(1.092)	(1.136)	(1.992)	(2.625)
Definitive and Purchase Orders	-5.049**	5.131**	-2.153	4.990
	(2.237)	(2.519)	(3.762)	(3.869)
Indefinite Delivery Vehicles (IDV's)	-3.133***	3.416***	-5.090**	7.904***
	(1.131)	(1.188)	(2.087)	(2.893)
Supplies	-3.708	4.265*	-7.754	7.311
	(2.622)	(2.552)	(5.173)	(6.988)
Services and Works	-2.875**	3.842***	-3.650	3.098
	(1.202)	(1.361)	(2.378)	(3.042)
High Single Offer PSC	-4.553**	8.017***	-7.123**	14.736***
	(1.856)	(2.066)	(3.312)	(5.043)
High Multiple Offers PSC	-3.440***	2.177	-1.838	2.686
	(1.334)	(1.368)	(2.487)	(2.839)
Commercial Items	-2.361*	3.685***	1.803	-2.650
	(1.230)	(1.402)	(2.346)	(2.608)
Army, Air Force, and Navy	-3.800***	3.829***	-4.601*	4.692
	(1.286)	(1.247)	(2.384)	(2.991)
Controls	Yes	Yes	Yes	Yes
Product Service Code Fixed Effects	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes
Bandwidth (h, 1,000's)	500	500	1,000	1,000
Mean Outcome (Baseline, Below Threshold)	27.50	58.47	29.81	57.23
Std. Dev. Outcome (Baseline)	44.65	49.28	45.75	49.49
Observations				
Baseline	41,993	37,769	10,492	6,024
Definitive and Purchase Orders	6,485	6,485	2,055	2,055
Indefinite Delivery Vehicles (IDV's)	35,491	31,267	8,416	3,949
Supplies	6,957	6,145	1,754	813
Services and Works	31,598	28,552	7,304	4,310
High Single Offer PSC	14,585	12,645	3,694	1,697
High Multiple Offers PSC	27,408	25,124	6,798	4,327
Commercial Items	42,713	39,089	9,543	6,051
Army, Air Force, and Navy	32,692	28,973	8,541	4,659

Notes: Standard errors clustered by agency-contracting-office shown in parenthesis. All columns feature the coefficient on $Treat_{TINA}$ from equation 1 in Section 3.3 for various samples (see Section 5.2) while the TINA threshold indicated in each column is in effect. $Treat_{TINA}$ is an indicator that equals 1 if the contract price is above the threshold indicated and zero otherwise. The regressions in this table include the following controls: *Distance* is the difference (in dollars) between the contract price and the threshold value shown for each column; *Initial Duration* is the expected duration of the contract at signing; a vector of dummies controlling for (1) set asides for small businesses and (2) all other set asides (e.g., women and minority-owned businesses). The dependent variables are defined as follows: *Sole Source* equals 100 if the contract was awarded as part of a sole source solicitation (i.e., where all but one bidder is excluded), and zero otherwise; *Multiple Offers* equals 100 if the contract received multiple bids and zero otherwise. All samples except the Commercial Items sample are subsamples of the threshold-specific Baseline sample indicated (i.e., negotiated, non-commercial, prime contracts awarded by early adopter agencies in the threshold-period and within the bandwidth indicated) in each column. The Definitive and Purchase Orders, Supplies, Services and Works, and Army, Air Force, and Navy subsamples each restrict contracts to those indicated by the subsample's name. High Single Offer PSC restricts the subsample to product-service codes (PSC's) where at least 50% of contracts had only one offer in the two years prior to the start of the Full Baseline sample, while High Multiple Offer PSC does the same for PSC's where at least 50% of contracts had multiple offers. The $750,000 threshold period is between October 1st, 2015 and June 30th, 2018. Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.2 for the list of early adopter agencies and when the $2,000,000 TINA threshold applied for each agency.

Table A.7: RDD Heterogeneity Tests: Effect of the TINA Threshold on Contract Performance and Completeness

	$750,000 Threshold			$2,000,000 Threshold		
	(1) Log(Number of Modifications)	(2) Cost Overrun (%)	(3) Cost-Plus (%)	(4) Log(Number of Modifications)	(5) Cost Overrun (%)	(6) Cost-Plus (%)
Treat$_{\text{TINA}}$						
Baseline	-0.029**	-1.868**	-0.957	0.024	2.982	-2.612*
	(0.014)	(0.787)	(0.765)	(0.026)	(1.858)	(1.419)
Definitive and Purchase Orders	-0.102***	-2.774*	1.480	0.021	0.154	-0.746
	(0.032)	(1.584)	(1.870)	(0.060)	(3.926)	(3.374)
Indefinite Delivery Vehicles (IDV's)	-0.010	-1.678*	-1.442*	0.025	3.241	-3.369**
	(0.015)	(0.883)	(0.833)	(0.031)	(2.198)	(1.549)
Supplies	-0.028	<0.001	1.008	-0.076	-0.272	-3.813
	(0.030)	(1.508)	(1.428)	(0.056)	(3.090)	(3.033)
Services and Works	-0.027	-2.454***	-1.623*	0.037	3.084	-2.502
	(0.017)	(0.931)	(0.942)	(0.033)	(2.337)	(1.618)
High Single Offer PSC	-0.007	-1.668	-2.597	0.047	3.761	-4.473
	(0.027)	(1.262)	(1.632)	(0.048)	(3.103)	(2.812)
High Multiple Offers PSC	-0.041***	-2.039**	0.114	0.009	2.326	-1.158
	(0.016)	(1.021)	(0.762)	(0.030)	(2.239)	(1.455)
Commercial Items	-0.004	-0.047		0.135***	4.083*	
	(0.016)	(0.815)		(0.035)	(2.421)	
Army, Air Force, and Navy	-0.027*	-1.556*	-0.997	0.025	3.661*	-1.810
	(0.015)	(0.889)	(0.873)	(0.029)	(2.078)	(1.550)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Product Service Code Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Bandwidth (h, 1,000's)	500	500	500	1,000	1,000	1,000
Mean Outcome (Baseline, Below Threshold)	0.74	16.79	22.30	0.87	27.94	28.39
Std. Dev. Outcome (Baseline)	0.69	37.38	41.63	0.68	44.88	45.10
Observations						
Baseline	41,993	41,993	41,993	10,492	10,492	10,492
Definitive and Purchase Orders	6,485	6,485	6,485	2,055	2,055	2,055
Indefinite Delivery Vehicles (IDV's)	35,491	35,491	35,491	8,416	8,416	8,416
Supplies	6,957	6,957	6,957	1,754	1,754	1,754
Services and Works	31,598	31,598	31,598	7,304	7,304	7,304
High Single Offer PSC	14,585	14,585	14,585	3,694	3,694	3,694
High Multiple Offers PSC	27,408	27,408	27,408	6,798	6,798	6,798
Commercial Items	42,713	42,713		9,543	9,543	
Army, Air Force, and Navy	32,692	32,692	32,692	8,541	8,541	8,541

Notes: Standard errors clustered by agency-contracting-office shown in parenthesis. All columns feature the coefficient on $Treat_{TINA}$ from equation 1 in Section 3.3 for various samples (see Section 5.2) while the TINA threshold indicated in each column is in effect. $Treat_{TINA}$ is an indicator that equals 1 if the contract price is above the threshold indicated and zero otherwise. The regressions in this table include the following controls: *Distance* is the difference (in dollars) between the contract price and the threshold value shown for each column; *Initial Duration* is the expected duration of the contract at signing; a vector of dummies controlling for (1) set asides for small businesses and (2) all other set asides (e.g., women and minority-owned businesses). The dependent variables are defined as follows: *Log(Number of Modifications)* is the natural logarithm of one plus the number of modifications; *Cost Overrun* equals 100 if the contract had a modification that resulted in an increase in the contract price and zero otherwise; *Cost-Plus* equals 100 when the contract is of cost-plus reimbursement type, and zero otherwise. All samples except the Commercial Items sample are subsamples of the threshold-specific Baseline sample indicated (i.e., negotiated, non-commercial, prime contracts awarded by early adopter agencies in the threshold-period and within the bandwidth indicated) in each column. The Definitive and Purchase Orders, Supplies, Services and Works, and Army, Air Force, and Navy subsamples each restrict contracts to those indicated by the subsample's name. High Single Offer PSC restricts the subsample to product-service codes (PSC's) where at least 50% of contracts had only one offer in the two years prior to the start of the Full Baseline sample, while High Multiple Offer PSC does the same for PSC's where at least 50% of contracts had multiple offers. The $750,000 threshold period is between October 1st, 2015 and June 30th, 2018. Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.2 for the list of early adopter agencies and when the $2,000,000 TINA threshold applied for each agency.

Table A.8: RDD Placebo Heterogeneity Tests: Effect of the TINA Threshold (When Not in Place) on Cost or Pricing Data

	$750,000 Threshold	$2,000,000 Threshold
	(1)	(2)
	CP Data (%)	CP Data (%)
Treat$_{\text{TINA}}$		
Baseline	1.068	0.473
	(1.232)	(1.695)
Definitive and Purchase Orders	0.412	0.052
	(1.547)	(3.457)
Indefinite Delivery Vehicles (IDV's)	0.647	0.571
	(1.311)	(1.794)
Supplies	7.734***	2.611
	(2.646)	(3.369)
Services and Works	-1.369	-1.092
	(1.373)	(1.802)
High Single Offer PSC	0.500	-2.295
	(2.371)	(2.312)
High Multiple Offers PSC	1.314	2.374
	(1.298)	(2.189)
Commercial Items	-0.119	0.245
	(0.304)	(0.512)
Army, Air Force, and Navy	1.191	0.869
	(1.431)	(2.041)
Controls	Yes	Yes
Product Service Code Fixed Effects	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes
Bandwidth (h, 1,000's)	500	1,000
Mean Outcome (Baseline, Below Threshold)	18.21	24.69
Std. Dev. Outcome (Baseline)	38.59	43.13
Observations		
Baseline	24,958	15,346
Definitive and Purchase Orders	3,987	3,056
Indefinite Delivery Vehicles (IDV's)	20,954	12,268
Supplies	4,085	2,798
Services and Works	18,816	10,575
High Single Offer PSC	7,868	6,270
High Multiple Offers PSC	17,090	9,076
Commercial Items	30,097	11,731
Army, Air Force, and Navy	19,548	12,407

Notes: Standard errors clustered by agency-contracting-office shown in parenthesis. All columns feature the coefficient on $Treat_{TINA}$ from equation 1 in Section 3.3 for various samples (see Section A.2.1 of the Online Appendix), while the TINA threshold indicated is not in effect, as a placebo test. $Treat_{TINA}$ is an indicator that equals 1 if the contract price is above the threshold indicated and zero otherwise. The regressions in this table include the following controls: *Distance* is the difference (in dollars) between the contract price and the threshold value shown for each column; *Initial Duration* is the expected duration of the contract at signing; a vector of dummies controlling for (1) set asides for small businesses and (2) all other set asides (e.g., women and minority-owned businesses). The dependent variables are defined as follows: *CP Data* equals 100 if cost or pricing data (i.e., comprehensive accounting data) was required to be submitted with the contract proposal and zero otherwise. All samples contain negotiated, prime contracts awarded by early adopter agencies within the bandwidth indicated from the threshold value indicated in each column. As placebo tests, the regressions in the $750,000 Threshold columns use contracts signed during the $2,000,000 threshold period, and the regressions in the $2,000,000 Threshold columns use contracts signed during the $750,000 threshold period. All samples contain non-commercial contracts, except the Commercial Items which exclusively contains commercial contracts. The Definitive and Purchase Orders, Supplies, Services and Works, and Army, Air Force, and Navy subsamples each restrict contracts to those indicated by the subsample's name. High Single Offer PSC restricts the subsample to product-service codes (PSC's) where at least 50% of contracts had only one offer in the two years prior to the start of the Full Baseline sample, while High Multiple Offer PSC does the same for PSC's where at least 50% of contracts had multiple offers. The $750,000 threshold period is between October 1st, 2015 and June 30th, 2018. Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.2 for the list of early adopter agencies and when the $2,000,000 TINA threshold applied for each agency.

Table A.9: RDD Placebo Heterogeneity Tests: Effect of the TINA Threshold (When Not in Place) on Competition

	$750,000 Threshold		$2,000,000 Threshold	
	(1) Sole Source (%)	(2) Multiple Offers (%)	(3) Sole Source (%)	(4) Multiple Offers (%)
Treat$_{\text{TINA}}$				
Baseline	-1.021	2.331	-0.181	-0.323
	(1.217)	(1.929)	(1.627)	(1.935)
Definitive and Purchase Orders	-0.948	0.625	-4.062	3.393
	(3.382)	(3.664)	(2.731)	(2.988)
Indefinite Delivery Vehicles (IDV's)	-1.131	2.488	-0.520	-1.133
	(1.157)	(1.798)	(1.771)	(1.937)
Supplies	1.785	1.324	4.678	-5.583*
	(2.942)	(3.932)	(3.052)	(3.305)
Services and Works	-2.062	3.551*	-2.351	1.594
	(1.354)	(1.983)	(1.906)	(2.349)
High Single Offer PSC	-3.376	4.305	1.338	-2.585
	(2.644)	(3.654)	(2.415)	(2.501)
High Multiple Offers PSC	-0.019	1.923	-1.325	1.190
	(1.318)	(2.280)	(2.163)	(2.650)
Commercial Items	0.930	3.877**	0.467	-0.284
	(1.161)	(1.901)	(1.575)	(1.991)
Army, Air Force, and Navy	-1.509	0.881	-0.171	-0.393
	(1.393)	(2.197)	(1.891)	(2.208)
Controls	Yes	Yes	Yes	Yes
Product Service Code Fixed Effects	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes
Bandwidth (h, 1,000's)	500	500	1,000	1,000
Mean Outcome (Baseline, Below Threshold)	28.29	58.01	29.44	56.12
Std. Dev. Outcome (Baseline)	45.04	49.36	45.58	49.63
Observations				
Baseline	24,958	13,021	15,346	13,721
Definitive and Purchase Orders	3,987	3,987	3,056	3,056
Indefinite Delivery Vehicles (IDV's)	20,954	9,013	12,268	10,642
Supplies	4,085	2,178	2,798	2,364
Services and Works	18,816	9,782	10,575	9,574
High Single Offer PSC	7,868	3,270	6,270	5,400
High Multiple Offers PSC	17,090	9,751	9,076	8,321
Commercial Items	30,097	20,996	11,731	10,702
Army, Air Force, and Navy	19,548	8,978	12,407	10,997

Notes: Standard errors clustered by agency-contracting-office shown in parenthesis. All columns feature the coefficient on $Treat_{TINA}$ from equation 1 in Section 3.3 for various samples (see Section A.2.1 of the Online Appendix), while the TINA threshold indicated is not in effect, as a placebo test. $Treat_{TINA}$ is an indicator that equals 1 if the contract price is above the threshold indicated and zero otherwise. The regressions in this table include the following controls: *Distance* is the difference (in dollars) between the contract price and the threshold value shown for each column; *Initial Duration* is the expected duration of the contract at signing; a vector of dummies controlling for (1) set asides for small businesses and (2) all other set asides (e.g., women and minority-owned businesses). The dependent variables are defined as follows:*Sole Source* equals 100 if the contract was awarded as part of a sole source solicitation (i.e., where all but one bidder is excluded), and zero otherwise; *Multiple Offers* equals 100 if the contract received multiple bids and zero otherwise. All samples contain negotiated, prime contracts awarded by early adopter agencies within the bandwidth indicated from the threshold value indicated in each column. As placebo tests, the regressions in the $750,000 Threshold columns use contracts signed during the $2,000,000 threshold period, and the regressions in the $2,000,000 Threshold columns use contracts signed during the $750,000 threshold period. All samples contain non-commercial contracts, except the Commercial Items which exclusively contains commercial contracts. The Definitive and Purchase Orders, Supplies, Services and Works, and Army, Air Force, and Navy subsamples each restrict contracts to those indicated by the subsample's name. High Single Offer PSC restricts the subsample to product-service codes (PSC's) where at least 50% of contracts had only one offer in the two years prior to the start of the Full Baseline sample, while High Multiple Offer PSC does the same for PSC's where at least 50% of contracts had multiple offers. The $750,000 threshold period is between October 1$^{\text{st}}$, 2015 and June 30$^{\text{th}}$, 2018. Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.2 for the list of early adopter agencies and when the $2,000,000 TINA threshold applied for each agency.

Table A.10: RDD Placebo Heterogeneity Tests: Effect of the TINA Threshold (When Not in Place) on Contract Performance and Completeness

	$750,000 Threshold			$2,000,000 Threshold		
	(1) Log(Number of Modifications)	(2) Cost Overrun (%)	(3) Cost-Plus (%)	(4) Log(Number of Modifications)	(5) Cost Overrun (%)	(6) Cost-Plus (%)
Treat$_{\text{TINA}}$						
Baseline	0.019	0.010	0.570	-0.013	1.011	0.557
	(0.019)	(1.229)	(0.953)	(0.022)	(1.177)	(1.488)
Definitive and Purchase Orders	0.091**	3.349	0.711	0.011	-0.044	0.724
	(0.045)	(2.916)	(2.379)	(0.048)	(2.844)	(2.935)
Indefinite Delivery Vehicles (IDV's)	0.011	-0.675	0.371	-0.011	1.130	-0.337
	(0.020)	(1.278)	(1.013)	(0.024)	(1.275)	(1.603)
Supplies	0.001	5.389**	-1.379	-0.002	-2.588	-1.633
	(0.034)	(2.176)	(2.541)	(0.045)	(2.287)	(2.457)
Services and Works	0.009	-1.406	0.481	-0.044*	1.017	-0.007
	(0.022)	(1.485)	(1.020)	(0.026)	(1.576)	(1.681)
High Single Offer PSC	0.041	1.632	-0.116	-0.019	0.628	-0.746
	(0.031)	(2.200)	(2.398)	(0.033)	(1.790)	(2.986)
High Multiple Offers PSC	0.006	-0.844	0.963	-0.007	1.303	1.494
	(0.022)	(1.380)	(0.872)	(0.029)	(1.588)	(1.260)
Commercial Items	-0.036**	-1.720*		-0.010	-0.530	
	(0.017)	(0.988)		(0.026)	(1.373)	
Army, Air Force, and Navy	0.025	-0.287	1.425	0.014	1.897	0.598
	(0.019)	(1.380)	(1.077)	(0.025)	(1.346)	(1.704)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Product Service Code Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Bandwidth (h, 1,000's)	500	500	500	1,000	1,000	1,000
Mean Outcome (Baseline, Below Threshold)	0.72	24.34	19.96	0.93	19.66	27.67
Std. Dev. Outcome (Baseline)	0.65	42.92	39.97	0.77	39.75	44.74
Observations						
Baseline	24,958	24,958	24,958	15,346	15,346	15,346
Definitive and Purchase Orders	3,987	3,987	3,987	3,056	3,056	3,056
Indefinite Delivery Vehicles (IDV's)	20,954	20,954	20,954	12,268	12,268	12,268
Supplies	4,085	4,085	4,085	2,798	2,798	2,798
Services and Works	18,816	18,816	18,816	10,575	10,575	10,575
High Single Offer PSC	7,868	7,868	7,868	6,270	6,270	6,270
High Multiple Offers PSC	17,090	17,090	17,090	9,076	9,076	9,076
Commercial Items	30,097	30,097		11,731	11,731	
Army, Air Force, and Navy	19,548	19,548	19,548	12,407	12,407	12,407

Notes: Standard errors clustered by agency-contracting-office shown in parenthesis. All columns feature the coefficient on $Treat_{TINA}$ from equation 1 in Section 3.3 for various samples (see Section A.2.1 of the Online Appendix), while the TINA threshold indicated is not in effect, as a placebo test. $Treat_{TINA}$ is an indicator that equals 1 if the contract price is above the threshold indicated and zero otherwise. The regressions in this table include the following controls: *Distance* is the difference (in dollars) between the contract price and the threshold value shown for each column; *Initial Duration* is the expected duration of the contract at signing; a vector of dummies controlling for (1) set asides for small businesses and (2) all other set asides (e.g., women and minority-owned businesses). The dependent variables are defined as follows: *Log(Number of Modifications)* is the natural logarithm of one plus the number of modifications; *Cost Overrun* equals 100 if the contract had a modification that resulted in an increase in the contract price and zero otherwise; *Cost-Plus* equals 100 when the contract is of cost-plus reimbursement type, and zero otherwise. All samples contain negotiated, prime contracts awarded by early adopter agencies within the bandwidth indicated from the threshold value indicated in each column. As placebo tests, the regressions in the $750,000 Threshold columns use contracts signed during the $2,000,000 threshold period, and the regressions in the $2,000,000 Threshold columns use contracts signed during the $750,000 threshold period. All samples contain non-commercial contracts, except the Commercial Items which exclusively contains commercial contracts. The Definitive and Purchase Orders, Supplies, Services and Works, and Army, Air Force, and Navy subsamples each restrict contracts to those indicated by the subsample's name. High Single Offer PSC restricts the subsample to product-service codes (PSC's) where at least 50% of contracts had only one offer in the two years prior to the start of the Full Baseline sample, while High Multiple Offer PSC does the same for PSC's where at least 50% of contracts had multiple offers. The $750,000 threshold period is between October 1st, 2015 and June 30th, 2018. Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.2 for the list of early adopter agencies and when the $2,000,000 TINA threshold applied for each agency.

Table A.11: The TINA Threshold and Substitution Between Cost or Pricing Data and Multiple Bids

	$750,000 Threshold	$2,000,000 Threshold	$750,000 (Placebo)	$2,000,000 (Placebo)
	(1)	(2)	(3)	(4)
	CP Data (%)	CP Data (%)	CP Data (%)	CP Data (%)
Treat$_{\text{TINA}}$ * Multiple Bids	-5.305*	-7.376*	-1.992	2.870
	(2.856)	(3.855)	(2.285)	(2.946)
Multiple Bids	-11.746***	-2.527	-0.798	-20.280***
	(2.442)	(2.745)	(1.594)	(3.136)
Treat$_{\text{TINA}}$	6.053**	9.556***	0.524	-0.818
	(2.413)	(3.318)	(1.966)	(2.825)
Price Controls	Yes	Yes	Yes	Yes
Other Controls	Yes	Yes	Yes	Yes
Product Service Code Fixed Effects	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes
Bandwidth (h, $1,000's)	500	1,000	500	1,000
Mean Outcome (Base Group)	22.19	11.98	11.43	36.78
Std. Dev. Outcome	41.55	32.48	31.82	48.23
Observations	37,769	6,024	13,021	13,721

Notes: Standard errors clustered by agency-contracting-office shown in parenthesis. All columns present results from equation 1 in Section 3.3. $Treat_{TINA}$ is an indicator that equals 1 if the contract price is above the threshold indicated and zero otherwise. *Multiple Bids* equals 100 if a contract received multiple bids and zero otherwise. The omitted group is below-threshold contracts without multiple bids. The dependent variable is defined as follows: *CP Data* equals 100 if cost or pricing data (i.e., comprehensive accounting data) was required to be submitted with the contract proposal and zero otherwise. Contracts are from the threshold-specific Baseline sample indicated (i.e., negotiated, non-commercial, prime contracts awarded by early adopter agencies in the threshold-period and within the bandwidth indicated) in each column. The $750,000 threshold period is between October 1$^{\text{st}}$, 2015 and June 30$^{\text{th}}$, 2018. Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.2 for the list of early adopter agencies and when the $2,000,000 TINA threshold applied for each agency.

Table A.12: Difference-in-Discontinuities: Effect of the 2018 TINA Threshold Change on Cost or Pricing Data Being Required

	$750,000 Threshold	$2,000,000 Threshold
	(1)	(2)
	CP Data (%)	CP Data (%)
Post $*$ Treat$_{\mathbf{R}}$	-2.456	-3.890
	(1.781)	(2.496)
Distance	0.005**	-<0.001
	(0.002)	(0.002)
Treat$_R$	3.549**	-0.221
	(1.490)	(1.728)
Treat$_R$ $*$ *Distance*	-0.005	<0.001
	(0.004)	(0.003)
Post	<0.001	<0.001
	(.)	(.)
Post * Distance	-0.005*	0.005
	(0.003)	(0.003)
Treat$_R$ $*$ *Post* $*$ *Distance*	0.005	-0.007*
	(0.005)	(0.004)
Controls	Yes	Yes
Product Service Code Fixed Effects	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes
Bandwidth (h, $1,000's)	500	1,000
Mean Outcome (Base Group)	15.76	24.07
Std. Dev. Outcome	36.44	42.75
Observations	57,776	22,583

Notes: Standard errors clustered by agency-contracting-office shown in parenthesis. All columns present results from equation A.2 in Section 5.4. *Post* equals 1 if the contract was signed after the 2018 TINA threshold change on July 1st, 2018 and 0 otherwise (October 6th, 2018 for Department of Veteran Affairs contracts). $Treat_R$ equals 1 if the contract is valued greater or equal to $750,000 and less than $2,000,000. *Distance* is the difference (in dollars) between the contract price and the threshold value indicated. The regressions in this table include the following controls: *Initial Duration* is the expected duration of the contract at signing; a vector of dummies controlling for (1) set asides for small businesses and (2) all other set asides (e.g., women and minority-owned businesses). The dependent variable is defined as follows: *CP Data* equals 100 if cost or pricing data (i.e., comprehensive accounting data) was required to be submitted with the contract proposal and zero otherwise. The sample is negotiated, non-commercial, prime contracts awarded by early adopter agencies in the two event-years before and after the 2018 threshold change for each agency, within the bandwidth indicated in each column. The $750,000 threshold was effective prior to July 1st, 2018. Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.2 for the list of early adopter agencies and when the $2,000,000 TINA threshold applied for each agency.

Table A.13: Difference-in-Discontinuities: Effect the of 2018 TINA Threshold Change on Competition

	$750,000 Threshold		$2,000,000 Threshold	
	(1) Sole Source (%)	(2) Multiple Offers (%)	(3) Sole Source (%)	(4) Multiple Offers (%)
Post $*$ Treat$_R$	3.454**	-2.298	4.158*	-8.413**
	(1.642)	(2.363)	(2.485)	(3.670)
Distance	0.009***	-0.011***	-0.003	0.003
	(0.003)	(0.003)	(0.002)	(0.003)
Treat$_R$	-4.651***	4.872***	-0.535	2.028
	(1.239)	(1.301)	(1.878)	(2.353)
Treat$_R$ $*$ *Distance*	-0.006	0.009	0.002	-0.003
	(0.005)	(0.005)	(0.003)	(0.003)
Post	<0.001	<0.001	<0.001	<0.001
	(.)	(.)	(.)	(.)
Post * Distance	-0.007**	0.013***	0.004	-0.010**
	(0.003)	(0.005)	(0.004)	(0.005)
Treat$_R$ $*$ *Post* $*$ *Distance*	0.001	-0.016*	-<0.001	0.006
	(0.007)	(0.009)	(0.004)	(0.006)
Controls	Yes	Yes	Yes	Yes
Product Service Code Fixed Effects	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes
Bandwidth (h, $1,000's)	500	500	1,000	1,000
Mean Outcome (Base Group)	26.77	58.21	29.62	55.82
Std. Dev. Outcome	44.28	49.32	45.66	49.67
Observations	57,776	41,644	22,583	16,501

Notes: Standard errors clustered by agency-contracting-office shown in parenthesis. All columns present results from equation A.2 in Section 5.4. *Post* equals 1 if the contract was signed after the 2018 TINA threshold change on July 1st, 2018 and 0 otherwise (October 6th, 2018 for Department of Veteran Affairs contracts). $Treat_R$ equals 1 if the contract is valued greater or equal to $750,000 and less than $2,000,000. *Distance* is the difference (in dollars) between the contract price and the threshold value indicated. The regressions in this table include the following controls: *Initial Duration* is the expected duration of the contract at signing; a vector of dummies controlling for (1) set asides for small businesses and (2) all other set asides (e.g., women and minority-owned businesses). The dependent variables are defined as follows: *Sole Source* equals 100 if the contract was awarded as part of a sole source solicitation (i.e., where all but one bidder is excluded), and zero otherwise; *Multiple Offers* equals 100 if the contract received multiple bids and zero otherwise. The sample is negotiated, non-commercial, prime contracts awarded by early adopter agencies in the two event-years before and after the 2018 threshold change for each agency, within the bandwidth indicated in each column. The $750,000 threshold was effective prior to July 1st, 2018. Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.2 for the list of early adopter agencies and when the $2,000,000 TINA threshold applied for each agency.

Table A.14: Difference-in-Discontinuities: Effect of the 2018 TINA Threshold Change on Contract Performance and Completeness

	$750,000 Threshold			$2,000,000 Threshold		
	(1) Log(Number of Modifications)	(2) Cost Overrun (%)	(3) Cost-Plus (%)	(4) Log(Number of Modifications)	(5) Cost Overrun (%)	(6) Cost-Plus (%)
Post * Treat$_R$	0.047**	2.339	1.850	-0.021	-1.351	2.919
	(0.023)	(1.660)	(1.304)	(0.034)	(2.221)	(2.034)
Distance	<0.001***	0.007***	0.008***	<0.001***	0.004	0.002
	(<0.001)	(0.002)	(0.002)	(<0.001)	(0.002)	(0.002)
Treat$_R$	-0.030**	-2.298**	-1.271	-0.003	-1.308	-0.184
	(0.015)	(0.998)	(0.877)	(0.025)	(1.512)	(1.435)
Treat$_R$ * *Distance*	<0.001	0.008*	-0.004	-<0.001	-0.005*	-<0.001
	(<0.001)	(0.004)	(0.004)	(<0.001)	(0.003)	(0.003)
Post	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	(.)	(.)	(.)	(.)	(.)	(.)
Post * Distance	-<0.001	0.003	-0.005**	-<0.001*	-0.003	0.004
	(<0.001)	(0.003)	(0.002)	(<0.001)	(0.003)	(0.003)
Treat$_R$ * *Post* * *Distance*	-<0.001	-0.010*	0.003	<0.001	0.006	-0.002
	(<0.001)	(0.006)	(0.005)	(<0.001)	(0.004)	(0.003)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Product Service Code Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Bandwidth (h, $1,000's)	500	500	500	1,000	1,000	1,000
Mean Outcome (Base Group)	0.56	18.48	14.85	0.84	24.83	27.37
Std. Dev. Outcome	0.61	38.82	35.56	0.74	43.21	44.59
Observations	57,776	57,776	57,776	22,583	22,583	22,583

Notes: Standard errors clustered by agency-contracting-office shown in parenthesis. All columns present results from equation A.2 in Section 5.4. *Post* equals 1 if the contract was signed after the 2018 TINA threshold change on July 1st, 2018 and 0 otherwise (October 6th, 2018 for Department of Veteran Affairs contracts). $Treat_R$ equals 1 if the contract is valued greater or equal to $750,000 and less than $2,000,000. *Distance* is the difference (in dollars) between the contract price and the threshold value indicated. The regressions in this table include the following controls: *Distance* is the difference (in dollars) between the contract price and the threshold value shown for each column; *Initial Duration* is the expected duration of the contract at signing; a vector of dummies controlling for (1) set asides for small businesses and (2) all other set asides (e.g., women and minority-owned businesses). The dependent variables are defined as follows: *Log(Number of Modifications)* is the natural logarithm of one plus the number of modifications; *Cost Overrun* equals 100 if the contract had a modification that resulted in an increase in the contract price and zero otherwise; *Cost-Plus* equals 100 when the contract is of cost-plus reimbursement type, and zero otherwise. The sample is negotiated, non-commercial, prime contracts awarded by early adopter agencies in the two event-years before and after the 2018 threshold change for each agency, within the bandwidth indicated in each column. The $750,000 threshold was effective prior to July 1st, 2018. Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.2 for the list of early adopter agencies and when the $2,000,000 TINA threshold applied for each agency.

Table A.15: Bunching: Estimated Change in Density Due to the 2018 TINA Threshold Change

	$750,000 Threshold			$2,000,000 Threshold		
	(1)	(2)	(3)	(4)	(5)	(6)
	0.0125	0.025	0.05	0.0125	0.025	0.05
γ_{-1}	0.055***	-0.008	-0.021	0.091***	0.139***	0.117***
	(0.012)	(0.014)	(0.018)	(0.015)	(0.016)	(0.018)
γ_{-2}	-0.110***	-0.043***	0.007	0.243***	0.056***	0.115***
	(0.012)	(0.014)	(0.018)	(0.015)	(0.016)	(0.018)
γ_{-3}	-0.040***	-0.043***	0.035*	0.189***	0.123***	0.081***
	(0.012)	(0.014)	(0.018)	(0.015)	(0.016)	(0.018)
Fixed Effects:						
Bin	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Excess Mass (%)	-1.5	-2.9	0.7	15.9	12.0	11.1
Excess Mass (Contracts)	-17	-65	31	133	172	286
P-Value ($\gamma_{-1} + \gamma_{-2} + \gamma_{-3} = 0$)	0.009	0.024	0.694	<0.001	<0.001	<0.001
Observations	540	270	140	400	200	100

Notes: Coefficient estimates are interpreted as (exp($\hat{\gamma}$) - 1) x 100 percentage change. Standard errors clustered at the histogram price bin level shown in parenthesis. All columns present γ coefficients from equation A.3 in Section A.3.2 of the Online Appendix. Contracts include negotiated, non-commercial, prime contracts awarded by early adopter agencies. Each γ coefficient corresponds with one of the three price bins below the TINA threshold, which contain contracts that are suspected of having prices manipulated by suppliers to undercut the threshold. Each bin is calculated as indicated (either 1.25%, 2.5%, or 5% of the threshold's value). Estimates of the excess mass below the threshold, expressed as both the number of contracts and as a percentage of all contracts in suspect bins, are provided. The $750,000 Threshold Baseline sample includes contracts between $250,000 and $1,250,000 that were signed between October 1st, 2015 and June 30th, 2018. The $2,000,000 Threshold Baseline sample includes contracts between $1,000,000 and $3,000,000 signed during the $2,000,000 TINA threshold period. Early adopters are defined as agencies that deployed the $2,000,000 TINA threshold in 2018. See Section 3.2 for the list of early adopter agencies and when the $2,000,000 TINA threshold applied for each agency. All variables are defined in Appendix A.

B Certificate of Current Cost or Pricing Data

15.406-2 Certificate of Current Cost or Pricing Data.

(a) When certified cost or pricing data are required, the contracting officer shall require the contractor to execute a Certificate of Current Cost or Pricing Data, using the format in this paragraph, and must include the executed certificate in the contract file.

Certificate of Current Cost or Pricing Data

This is to certify that, to the best of my knowledge and belief, the cost or pricing data (as defined in section 2.101 of the Federal Acquisition Regulation (FAR) and required under FAR subsection 15.403-4) submitted, either actually or by specific identification in writing, to the Contracting Officer or to the Contracting Officer's representative in support of _____* are accurate, complete, and current as of _____**. This certification includes the cost or pricing data supporting any advance agreements and forward pricing rate agreements between the offeror and the Government that are part of the proposal.

Firm _____

Signature _____

Name _____

Title _____

Date of execution***_____

* Identify the proposal, request for price adjustment, or other submission involved, giving the appropriate identifying number (*e.g.,* RFP No.).

** Insert the day, month, and year when price negotiations were concluded and price agreement was reached or, if applicable, an earlier date agreed upon between the parties that is as close as practicable to the date of agreement on price.

***Insert the day, month, and year of signing, which should be as close as practicable to the date when the price negotiations were concluded and the contract price was agreed to.

(End of certificate)

(b) The certificate does not constitute a representation as to the accuracy of the contractor's judgment on the estimate of future costs or projections. It applies to the data upon which the judgment or estimate was based. This distinction between fact and judgment should be clearly understood. If the contractor had information reasonably available at the time of agreement showing that the negotiated price was not based on accurate, complete, and current data, the contractor's responsibility is not limited by any lack of personal knowledge of the information on the part of its negotiators.

(c) The contracting officer and contractor are encouraged to reach a prior agreement on criteria for establishing closing or cutoff dates when appropriate in order to minimize delays associated with proposal updates. Closing or cutoff dates should be included as part of the data submitted with the proposal and, before agreement on price, data should be updated by the contractor to the latest closing or cutoff dates for which the data are available. Use of cutoff dates coinciding with reports is acceptable, as certain data may not be reasonably available before normal periodic closing dates (*e.g.,* actual indirect costs). Data within the contractor's or a subcontractor's organization on matters significant to contractor management and to the Government will be treated as reasonably available. What is significant depends

upon the circumstances of each acquisition.

(d) Possession of a Certificate of Current Cost or Pricing Data is not a substitute for examining and analyzing the contractor's proposal.

(e) If certified cost or pricing data are requested by the Government and submitted by an offeror, but an exception is later found to apply, the data shall not be considered certified cost or pricing data and shall not be certified in accordance with this subsection.