Financially Constrained Procurement

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Abstract

We investigate how local governments' financial constraints affect competition in public procurement and real outcomes. Using detailed procurement data from Brazilian municipalities and population-based discontinuities in federal transfers, we find that higher transfers increase tender frequency, size, and local governments' ability to pay suppliers on time. In turn, this encourages smaller suppliers' entry into the bidding process and increases competition, resulting in lower procurement prices. Supplier competition induces large price reductions for essential goods, public services, and healthcare products, suggesting pass-through effects to local populations.

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1 Introduction

Local governments play a crucial role in the purchase and distribution of essential goods and services.[1] Especially in developing economies, however, procurement is severely hampered by financial constraints: local governments often lack resources to finance basic goods and fail to pay their suppliers on time (World Bank, 2017, 2025), making firms reluctant to participate in the bidding process (OECD, 2018). In turn, low competition in the procurement market may reduce its efficiency (Kang and Miller, 2021), and some of the associated losses may be borne by local populations. Despite the economic relevance of these issues, systematic evidence of how local governments' financial constraints affect procurement competition and outcomes remains scarce. This gap likely persists due to empirical difficulties: governments' financial constraints are typically endogenous to economic conditions, complicating causal inference. Moreover, detailed data on municipal procurement outcomes—such as supplier competition, prices, and quantities—are rarely available.

In this paper, we exploit a unique laboratory in Brazil that allows us to overcome these challenges. We leverage discontinuous changes in federal funding allocations based on the population of Brazilian municipalities and granular procurement auction data at the product level to study how changes in municipalities' financial constraints affect municipal procurement competition and outcomes. We find that jumps in funding allocations are associated with higher supplier participation in municipal procurement: our estimates imply that a 10% increase in transfers leads to a 4-6% increase in the number of bidders per auction. Higher participation decreases incumbents' market shares and improves competition, ultimately resulting in lower prices paid by local governments for procurement goods. We document more intense supplier competition and lower prices especially in the auctions of essential goods and services (e.g., healthcare),

[1] Government procurement accounts for 13% of GDP for the average OECD country (OECD, 2024), and 62.5% of total government procurement takes place at the local (subnational) level (OECD, 2025).

suggesting that reducing local governments' financial constraints may have significant pass-through benefits to local populations in developing economies.

Our empirical strategy relies on the *Fundo de Participação dos Municípios* (FPM) program, with which the Brazilian federal government determines and transfers funds to local municipalities every year. The FPM federal transfers are economically substantial—constituting around 31% of municipal revenues on average—and they represent a crucial source of financial flexibility, as federal laws restrict Brazilian municipalities' local taxation and borrowing opportunities. As part of the FPM program, federal transfers to municipalities increase when municipalities cross predetermined population thresholds, exhibiting jumps in tranfers of, on average, 20%.[2]

Our empirical tests implement a fuzzy regression discontinuity design (RDD) that instruments actual transfers with their law-implied values to capture quasi-exogenous variation in transfers around the FPM population thresholds (Brollo et al., 2013; Corbi et al., 2019). We combine this identification strategy with granular procurement auction data at the item level, covering over 4 million procurement observations from 853 municipalities in *Minas Gerais*, the largest Brazilian state, between 2014 and 2020. This dataset includes detailed information on auction participants, winning suppliers, procurement prices, quantities purchased, and payment timing, allowing us to examine both the intensive and extensive margins of procurement competition.

In our main tests, we use the fuzzy RDD to examine how procurement competition and outcomes (e.g., number of auction participants or auction prices) vary as municipalities are assigned discontinuously higher federal transfers around the FPM thresholds. The RDD identification strategy mainly leverages cross-sectional variation by comparing outcomes for the procurement *of the same item* between municipalities just above and below the FPM population thresholds, but also time-series variation as some municipal-

[2]The assignment of municipalities to different population buckets is performed annually at the federal level, leaving little room for municipalities to manipulate their population size to secure more federal funds.

ities cross these thresholds over time. In our procurement pricing tests, we also include supplier-item-FPM cutoff fixed effects, which allow us to ask whether the same supplier charges different prices for the same item to municipalities just below and just above an FPM cutoff.

Our main findings show that higher federal transfers lead to increased supplier competition in the municipal procurement market. Our estimates imply that a 10% increase in federal transfers for municipalities just above the average FPM threshold leads to a 3.9-6.7% increase in the number of bidders per procurement auction, suggesting that a relaxation in local governments' financial constraints directly affects suppliers' willingness to participate in public procurement. These baseline findings survive a series of robustness tests. For example, McCrary density tests confirm the absence of population manipulation around the FPM thresholds, and other sources of municipal revenue appear to be balanced around these thresholds. Our baseline results are also robust when we study the evolution of procurement outcomes as the same municipality crosses an FPM threshold, and as we experiment with different RDD polynomial orders, kernels, and bandwidths.

Lower municipal financial constraints also change the *composition* of both the bidder and the winner pools. We document higher participation by small suppliers, young suppliers, and suppliers new to public procurement. Overall, we find that higher supplier participation decreases the concentration of input markets, the market shares of incumbent suppliers, and ultimately the prices that local governments pay in procurement: a 10% increase in transfers leads to up to a 4.6% reduction in the price that *the same supplier* charges for *the same item* to municipalities just above and just below the average FPM threshold in our sample.

What is the most likely economic mechanism underlying our empirical findings? Our evidence suggests that prospective and incumbent suppliers internalize municipalities' financial constraints while deciding their procurement participation and bidding strate-

gies. Consistent with this hypothesis, we find that jumps in federal transfers around the FPM thresholds allow local governments to increase the size and the frequency of their procurement tenders: a 10% increase in transfers is associated with a 0.4% increase in the number of auctions, an with a 5.7% higher average quantity purchased per item. Additionally, municipalities receiving higher transfers also demonstrate improved payment reliability: a 10% increase in FPM transfers decreases supplier payment times by approximately 11.4% (2.16 days on average). Together with our previous findings, these estimates suggest that small and young suppliers' procurement participation decisions may be susceptible to buyers' purchase size, frequency, and payment timeliness. In the cross-section, we also find economically larger effects for smaller municipalities and for municipalities with higher levels of debt around the same cutoff, confirming that financial constraints indeed prevent some municipalities from attracting suppliers to public procurement.

We find little evidence in support of alternative hypotheses. For example, our findings are unlikely to be driven by direct transfers to local suppliers (e.g., via tax cuts or other subsidies), as we find similar effects across local and non-local suppliers. Additionally, suppliers' pricing strategies are unlikely to be solely motivated by an effort to establish a market presence, as we observe comparable price reductions from new and existing suppliers. Finally, while bulk purchasing and associated discounts could theoretically explain lower prices when the average tender size increases, we do not find evidence of price reductions in single-bidder auctions, supporting competition as a primary mechanism.

Our paper documents three sets of positive effects on local economies. First, we argue that enhanced competition creates opportunities for local economic development, as smaller companies gain access to government contracts previously dominated by larger suppliers. Second, we show that even if small suppliers do not win a procurement auction, their participation is still beneficial: It pushes larger firms to lower the prices they

charge to local governments. Third, and most importantly, the estimated competitive and pricing effects are particularly pronounced for essential public goods and services such as infrastructure and healthcare, suggesting potentially significant pass-through effects to local communities. More broadly, our results suggest that the benefits of fiscal transfers may operate not only through direct spending channels but also indirectly by enhancing procurement efficiency and the effective purchasing power of local governments.

Our study contributes to three strands of the literature. First, we contribute to the literature studying how local governments' financial constraints affect public goods provision and employment (e.g., Corbi et al., 2019; Adelino et al., 2021; Yi, 2021; Agrawal and Kim, 2022; Dagostino, 2024). We complement this literature by showing that, by affecting supplier participation in procurement and competition, financial constraints can also impact input market competition and prices. To the extent to which procurement efficiency affects the transmission of financial shocks to the real economy (e.g., by increasing governments' purchasing power), our findings suggest that the channel proposed in this paper may contribute to some of the real effects documented in the previous literature.

Second, we contribute to a vast literature on the economics of public procurement (e.g., Duggan and Morton, 2006; Bandiera et al., 2009; Bosio et al., 2022; Ferraz et al., 2022; Best et al., 2023), and more specifically to the strand of this literature that studies how procurement prices vary with competition (e.g., Li and Zheng, 2009; Coviello and Mariniello, 2014), auction design (e.g., Duggan and Morton, 2006; Bandiera et al., 2009; Athey et al., 2011), and institutional quality (Bosio et al., 2022). We complement this literature by demonstrating buyers' financial constraints as an important yet understudied mechanism affecting procurement competition and prices.[3]

[3]A related strand of the public procurement literature also shows how government purchases generate significant real effects on firm growth (Ferraz et al., 2022), productivity (di Giovanni et al., 2022), healthcare access (Barkley, 2023; Fazio and Zaldokas, 2024), and infrastructure investment (Liscow et al., 2023). Our

Third, our work also relates to an extensive literature that studies the impact of financial constraints on corporate outcomes (e.g., Fazzari et al., 1988; Hubbard, 1998; Almeida et al., 2004; Acemoglu et al., 2009; Fonseca and van Doornik, 2022), and on customer-supplier relationships in particular (e.g., Fisman and Love, 2003; Fabbri and Menichini, 2010; Costello, 2020). To the best of our knowledge, our paper is the first in the literature to document how suppliers internalize buyers' financial constraints, and how this, in turn, may affect input market competition and prices.

2 Background of the FPM Program in Brazil

The *Fundo de Participação dos Municípios* (FPM) is a major Federal transfer program in Brazil that allocates funds to municipalities based on their population. Introduced in 1965 and codified in its current form by the 1988 Federal Constitution, the FPM is a crucial source of revenue for local municipalities, especially smaller ones. The scheme's design creates sharp discontinuities in the transfers that the Federal government assigns to individual municipalities at predetermined population thresholds, which provides a quasi-experimental setting to study the effects of Federal transfers on local economic outcomes.

The FPM allocation mechanism works as follows. Every year, the central government determines the total fund pool as a fixed percentage (22.5%, since 1993) of the total revenue from Federal income taxes (*Imposto de Renda*, IR) and industrial products taxes (*Imposto de Produtos Industrializados*, IPI). This total fund pool is assigned to individual states based on time-invariant shares that were determined in 1989 based on state-level population and per capita income. Within each state, individual municipalities are then assigned to local population brackets based on estimates issued by the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatisticas*, IBGE) before the

findings suggest that, if the input market changes we document in this paper are passed through, financial constraints can also have effects on these real economic outcomes.

end of October every year.

Using the IBGE estimates, the Federal Budget Court publishes FPM coefficients for all municipalities in Brazil, which determine the extent of Federal transfers to the municipal governments. Higher population brackets are associated with larger FPM coefficients, and hence larger FPM transfers. Based on the Federal Budget Court's FPM coefficients, municipalities then form their budgets, which are approved by municipal councils by year-end. After approval, FPM funds are transferred to municipalities throughout the following year.

FPM transfers are nonlinearly increasing in the local population. First, transfer amounts are calculated by multiplying the state's total FPM allocation by the ratio of each municipality's FPM coefficient to the sum of all coefficients within that state. Since more densely populated municipalities have larger FPM coefficients, they receive a larger share of the state-level FPM allocation than smaller municipalities. Second, the population brackets that determine the FPM coefficients are precisely defined at the Federal level (Law no. 1,881/1981), and the discrete nature of the allocation mechanism creates large jumps in transfers as municipalities cross predetermined population cutoffs. For example, the first three cutoffs are set at 10,188, 13,584, and 16,980 residents, implying a bracket width of 3,396 inhabitants between each cutoff pair. For all municipalities larger than 16,981 residents, the bracket width doubles to 6,792 residents. That is, the third and fourth cutoffs are set at 23,773 and 30,565 residents, respectively. Overall, crossing a threshold results in an average 20% increase in FPM transfers in our sample.

The importance of FPM transfers for municipal budgets cannot be overstated. In our sample, FPM transfers account for about 31% of total municipal revenues, which is large and at the same time comparable to the municipal budget revenue shares in other countries.[4] Finally, Brazilian municipalities have limited ability to change local

[4]Federal support constitutes a significant share of sub-national government revenues across both developed and developing economies, ranging from about 20-30% in advanced economies like the United States (27.5% of state and local revenue), Australia (19% of local revenue), and Germany (36% of municipal

taxes, whose impact on municipalities' revenues is already low: on average, local taxes represent only 6% of total revenues for smaller municipalities with less than 50,000 residents. Moreover, institutional constraints prevent municipalities from borrowing and overspending, typically resulting in balanced budgets. These constraints are primarily enforced through Brazil's Fiscal Responsibility Law (Lei de Responsabilidade Fiscal, LRF), enacted in 2000.[5] This rigorous framework effectively constrains municipal financial management, promoting fiscal responsibility and typically resulting in balanced budgets. In sum, the discontinuous changes in Federal transfers around the population cutoffs we study in this paper have a large impact on municipal governments' budgets, and they represent one of the few sources of financial flexibility available to local administrations.

3 Empirical Setting

3.1 Data

Our data comes from two main sources. First, we use data on procurement outcomes from the Open Data Portal of the State Court of Accounts (*Portal de Dados Abertos do Tribunal de Contas do Estado*). This portal provides detailed information on procurement outcomes for all municipalities in Minas Gerais, the largest state in Brazil by number of municipalities. The dataset includes variables such as procurement prices, quantities

revenue), to higher shares in emerging markets like India (40% of state revenue), Turkey (70% of local revenue), and Mexico and Argentina (over 80% of sub-national revenue). For more information, see Internet Appendix Table A.1.

[5]The LRF is a comprehensive framework designed to improve fiscal management across all levels of government, including municipalities. It mandates fiscal targets, imposes spending limits, and requires regular, transparent reporting of financial management. For municipalities, the LRF imposes strict limits on debt and spending. It caps personnel expenses at 60% of net current revenue and prohibits creating continuous new expenses without corresponding revenue increases or spending cuts. The law also mandates triennial fiscal targets and imposes additional restrictions in election years. Non-compliance can result in institutional penalties, such as the suspension of voluntary transfers from higher levels of government, as well as personal sanctions for administrators.

purchased, number of bidders participating in procurement auctions, detailed item descriptions, identities of winning suppliers, dates of contract awards and payments, and payment timelines for each municipal purchase. To the best of our knowledge, our paper is among the first to use this dataset on municipal procurement.

The dataset spans from 2014 to 2022, and it includes 15.5 million procurement auctions covering approximately 900,000 distinct items purchased from 115,000 unique suppliers. For the purpose of this study, items are defined as the interaction of the product/service description (i.e., apples) with their associated unit of measure (e.g., kilograms). Table A.2 in the Internet Appendix provides a list of selected products and services.

The state of Minas Gerais is an excellent setting for our study due to its size and diversity. With 853 municipalities, the state includes approximately 15% of all Brazilian municipalities and 10% of the total Brazilian population. The state encompasses a wide range of socioeconomic conditions, ranging from highly urbanized areas (e.g., Belo Horizonte and Uberlandia) to rural communities (e.g., Paracatu and Santo Antonio do Amparo), which allows us to examine the effects of Federal transfers across different economic areas within a single state. The Minas Gerais municipal procurement data also covers a wide range of goods and services purchased by municipalities, which allows us to conduct a detailed analysis of how financial constraints affect procurement processes in the cross-section of product types.

Our second main data source is the IBGE's population estimates, which we use to determine the municipal population thresholds that determine FPM transfer amounts to Minas Gerais municipalities. These population figures enable us to identify and compare outcomes in municipalities just above and below the FPM thresholds. Following Corbi et al. (2019), we complement this primary source with information on actual FPM transfers from the Brazilian National Treasury. This data provides the exact amounts transferred to each municipality, allowing us to precisely measure the variation in the

financial resources available to local governments. Figure 1 presents heat maps of FPM transfers and population across Minas Gerais municipalities. Figure 1 provides evidence of large geographical variation within the state: the largest municipalities in the state have, on average, more than six times the population of smallest municipalities, and they receive on average more than twice as large Federal transfers.

Following Corbi et al. (2019), we focus on Minas Gerais municipalities in the bottom nine population cutoffs (i.e., municipalities with less than 61,128). This sample includes around 90% of all the municipalities in Minas Gerais, and thus reduces small sample and local continuity concerns around larger population thresholds. Additionally, smaller municipalities allow us to focus on smaller, more financially constrained municipalities, where the marginal impact of FPM transfers may be larger.

Our final dataset is a procurement auction-product-level panel of around 4.44 million observations over the 2014-2020 period. Table 1 provides the sample summary statistics for the main variables in the paper.

3.2 Estimation

The primary purpose of the study is to use FPM transfer variation across Brazilian municipalities to study how relaxing financial constraints affects the outcomes of public procurement such as input market structure and quantities purchased, ultimately translating into equilibrium price changes. Preliminary in-sample evidence suggests that relaxing local municipalities' financial constraints through FPM transfers may indeed affect these input market outcomes. For example, Panel (a) of Figure 2 shows a positive correlation between FPM transfers and local procurement spending, even after controlling for time-varying local and aggregate economic conditions, confirming the intuitive prediction that larger budgets should on average be associated with larger spending.[6] In

[6]The residual log budget on the vertical axis of this panel is the difference between the log-transformed budget at the municipality-year level and its average over cutoffs and years. Similarly, the residual log

a similar spirit, Panel (b) of Figure 2 shows a positive correlation between FPM transfers and average quantities purchased in individual procurement auctions, suggesting that larger budgets also allow municipalities to tender larger amounts.

While Figure 2 documents an intuitive positive relationship between transfers and quantities, Figure 3, Panel (a), documents a *decreasing* relationship between FPM transfers and the average effective prices paid on procurement goods. This negative relationship is perhaps surprising, as we would normally expect higher demand by local municipalities to be associated with higher prices, holding supply constant. At the same time, Figure 3, Panel (b), suggests that lower financial constraints and higher purchase quantities may affect suppliers' incentives to bid in procurement auctions, ultimately resulting in lower procurement prices.

A plausible alternative is that the findings presented in Figures 2 and 3 may be spuriously driven by observable or unobservable characteristics simultaneously correlated to procurement prices, quantities, and municipality size rather than by relaxed financial constraints as the FPM transfers increase. For example, larger municipalities are plausibly characterized by lower financial constraints and higher procurement efficiency, which complicates measurement and identification. More generally, identifying the causal effects of financial constraints on procurement outcomes is challenging: financial constraints are typically endogenous to local economic conditions, which can independently affect procurement processes. Reverse causality is also a potential concern, as municipalities may end up being financially constrained as a result of high procurement costs.

To address these identification challenges and study how financial constraints affect procurement outcomes, we exploit quasi-experimental variation in Federal transfers induced by the FPM's threshold-based allocation mechanism—specifically, the large dis-

FPM transfer on the horizontal axis is the difference between the log-transformed FPM transfer and its average over cutoffs and years.

continuities in FPM transfers around predetermined population thresholds described in the section. Figure 4 provides a visual representation of such discontinuities in our sample using 2018 FPM transfer data (in millions of Brazilian Reals, BRL). The figure confirms large jumps in FPM transfers around the population thresholds. For example, for the first cutoff of the 10,188 population, the average transfer magnitude just below the threshold is about BRL 7 million, while just above the threshold, this number jumps to BRL 9 million.

Figure A.4 confirms that the FPM threshold-based allocation mechanism creates large discontinuities in transfer amounts, creating sharp discontinuities in transfer amounts at predetermined population thresholds. This feature allows us to implement a regression discontinuity design (RDD) in which we compare procurement outcomes on either side of these cutoffs while exploiting the rich variation offered by our data. Specifically, we can compare procurement outcomes in municipalities just above and just below a given population threshold, exploiting cross-sectional variation in municipalities just above a population cutoff (and thus receiving larger transfers) while being otherwise similar to those just below the same cutoff. Second, we can compare procurement outcomes in the same municipality before and after it crosses a population threshold and thus exploit time series variation as the municipality obtains discontinuously larger FPM transfers over time.

Actual transfers may deviate slightly from their law-implied amounts due to imperfect enforcement. As a result, we follow Corbi et al. (2019) and implement a two-stage fuzzy RDD where we instrument actual transfers with their law-implied values to capture quasi-exogenous transfer variation around population thresholds. Formally, our second stage RDD specification takes the form

$$Y_{i(c)pt} = \alpha + \beta T_{i(c)t} + f(P_{i(c)t} - P_c) + \delta_i + \gamma_{cpt} + \epsilon_{i(c)pt}, \tag{1}$$

where $Y_{i(c)pt}$ is the relevant procurement outcome (e.g., price paid, number of procurement auction bidders) for item p in municipality i (with population around cutoff c) in year t; $T_{i(c)t}$ represents the FPM transfer for municipality i in year t; $P_{i(c)t}$ is municipality i's population in year t, P_{ct} is the nearest cutoff at time t; $f(.)$ is a flexible polynomial of the distance between local population and nearest cutoff, $\delta_{i(c)}$ are municipality-cutoff fixed effects, and γ_{cpt} are cutoff-item-time fixed effects.

Additionally, to capture quasi-exogenous variation in transfers around the FPM population cutoffs, in the first stage, we instrument $T_{i(c)t}$ with its law-implied counterpart $\tilde{T}_{i(c)t}$:

$$T_{i(c)t} = \tilde{\alpha} + \tilde{\beta}\tilde{T}_{i(c)t} + g(P_{i(c)t} - P_c) + \tilde{\delta}_i + \tilde{\gamma}_{cpt} + \tilde{\epsilon}_{i(c)pt}, \tag{2}$$

where $g(.)$ is a flexible polynomial, and all the other variables have the same meaning as in equation (1).

The two-stage RDD specifications (1)-(2) are akin to an RDD based on population thresholds (e.g., Gagliarducci and Nannicini, 2013; Casas-Arce and Saiz, 2015; Grembi et al., 2016, Asher and Novosad (2020), Agarwal et al. (2023) among others), with the only difference that we replace the standard RDD indicator for inclusion in different population brackets around the cutoff with the actual transfer T received by the municipality, instrumented by its law-implied counterpart $\tilde{T}$ to capture quasi-exogenous variation in the transfer (Corbi et al., 2019). Since FPM transfers typically differ around each cutoff, this two-stage provides an intuitive interpretation of our estimates in terms of elasticities as opposed to an average of treatment effects across multiple cutoffs associated with potentially large differences in FPM transfer jumps. Additionally, financial constraints are typically nonbinary (Kaplan and Zingales, 1997; Whited and Wu, 2006; Hadlock and Pierce, 2010), which further motivates our focus on elasticities as opposed to average treatment effects around the FPM cutoffs.[7]

[7] In robustness tests, we also provide evidence from RDD specifications using indicators for inclusion in higher-FPM population brackets around each cutoff as opposed to transfer amounts around each cutoff

The coefficient of interest in Equation (1) is β, which captures the average local elasticity of procurement outcomes to FPM transfers for municipalities around the FPM population cutoffs. By focusing on discontinuous changes in FPM transfers while controlling for smooth population polynomials, these specifications also allow us to isolate the effect of transfers from other population-related factors that might influence procurement processes. We estimate equations (1)-(2) using two-stage least squares (2SLS) within narrow bandwidths around the population cutoffs. Our specifications use rule-of-thumb population bandwidths of 10% above and below each cutoff (similar to Corbi et al., 2019), as well as optimal bandwidths calculated using the procedure in Calonico et al. (2014) around each cutoff.

A causal interpretation of our estimates of the coefficient β relies on two identifying assumptions. First, municipalities should not be allowed to manipulate their population to obtain larger transfers. We argue that this possibility is highly unlikely to be verified in our setting, as population estimates are independently determined at the Federal level by the IBGE, thus significantly reducing the opportunity for local manipulation. Additionally, standard McCrary tests do not reject the null hypothesis that the density of observations is continuous at the threshold (see Internet Appendix Figure A.1), suggesting no systematic manipulation of the running variable (p-value of 0.46). Finally, Corbi et al. (2019) also finds no evidence of manipulation around the FPM population thresholds, further supporting the validity of this first identifying assumption.

Second, our estimates of β should not result from indirect effects of other outcomes that the literature has previously linked to jumps in FPM transfers (e.g., private sector employment, as in Corbi et al., 2019). However, since we focus on primary market spending by the first recipients of the FPM transfers, and since we document increases in procurement spending of similar magnitude as the transfers, this concern is arguably reduced in our setting—any competing confounding channel needs to work through

in Table A.5.

municipalities' use of their FPM transfers in procurement. Nonetheless, we examine whether our results may be affected by alternative confounding channels in section 4.1.1 below.

4 Results

4.1 Federal Transfers and Procurement Competition

Competition is a fundamental determinant of procurement efficiency, directly affecting both the prices governments pay and the quality of goods and services they receive. We therefore begin our analysis by examining whether municipal financial constraints affect suppliers' willingness to participate in public procurement auctions, as this represents one of the most direct channel through which fiscal transfers could improve procurement outcomes.

We start our analysis by establishing a causal relationship between FPM transfers on procurement competition using the fuzzy regression discontinuity design described in Section 3.2 Our identification strategy leverages quasi-exogenous variation in FPM transfers around predetermined population thresholds, instrumenting actual transfers with their law-implied values to estimate the elasticity of procurement competition with respect to federal funding. The coefficient of interest, β in equation (1)-(2), captures the percentage change in the number of auction participants for a one percent increase in FPM transfers among municipalities near the population cutoffs.

Table 2 presents our main results using the natural logarithm of the number of auction participants as the dependent variable. The estimates provide strong evidence that relaxing municipal financial constraints significantly increases competition in procurement markets. Our baseline specification in Column I yields an elasticity of 0.663, implying that a 10% increase in FPM transfers leads to a 6.63% increase in the number

of bidders per procurement auction. This effect remains robust and economically significant across all specifications, with elasticities ranging from 0.391 to 0.667 depending on the fixed effects structure. Given the average 20% FPM transfer discontinuity in our sample, municipalities just above the population thresholds experience approximately 8-13% more bidders per auction compared to those just below the thresholds.

Our findings are robust to progressively including more restrictive fixed effects that address potential confounding factors. Column II includes fixed effects for the winner cutoff year, allowing us to compare procurement outcomes for the same winning supplier selling to municipalities just above and below the population threshold within the same year. This specification mitigates concerns that our results reflect changes in the composition of winning suppliers around the cutoffs rather than genuine competition effects. Column III incorporates fixed effects for the mesoregion cutoff year, focusing on identification of adjacent municipalities with homogeneous geographic, economic and social characteristics. Column IV combines both sets of additional controls, providing our most demanding specification that exploits variation within narrowly defined comparison groups. The persistence of large, statistically significant coefficients across all specifications strengthens our confidence in a causal interpretation.

The economic mechanism underlying these results suggests that suppliers internalize municipalities' financial health when making participation decisions. Higher federal transfers signal improved payment reliability, higher potential contract values, and reduced counterparty risk, making municipal procurement more attractive to potential bidders. This channel is particularly salient in developing economies where local government financial constraints are pervasive and suppliers may rationally avoid engaging with cash-strapped municipalities due to payment delays or default concerns.

We corroborate these findings with visual evidence in Figure 5, which presents a regression discontinuity plot showing a clear discontinuous increase in the number of procurement participants at the population cutoffs. The figure plots residual log number

of participants against the distance from municipalities' populations to their nearest FPM cutoffs, with the vertical line representing the pooled population thresholds. The sharp upward jump at the threshold provides compelling visual confirmation of our regression results, demonstrating that the increase in competition is concentrated precisely at the points where federal transfers discontinuously increase.

4.1.1 Robustness

The competition effects documented in Table 2 survive a comprehensive battery of robustness tests detailed in the Internet Appendix, each designed to address specific threats to our identification strategy and causal interpretation.

Manipulation of the Running Variable: A key concern in regression discontinuity designs is that agents might manipulate the running variable—in our case, population—to influence treatment assignment. To address this, Figure A.1 presents McCrary density tests showing no evidence of systematic population manipulation around FPM thresholds, with a p-value of 0.46, confirming that municipalities cannot strategically position themselves to receive higher transfers. The smooth distribution of population around cutoffs validates our identifying assumption that treatment assignment is quasi-random in a neighborhood of the thresholds.

Outliers and Influential Observations: Our results might be driven by a small number of municipalities with unusual characteristics. Figure A.2 addresses this concern by showing the distribution of estimated coefficients when we sequentially remove individual municipalities from the sample, demonstrating that no single municipality drives our results. The tight distribution of coefficient estimates around our baseline results confirms that our findings reflect systematic patterns rather than outlier effects.

Misclassification Near Cutoffs: Measurement error in population data could lead to misclassification of treatment status for municipalities very close to thresholds. Figure

A.2 presents "donut" regression discontinuity results where we exclude observations within 0.1% to 3% of each population threshold. The persistence of our results when excluding these potentially problematic observations confirms that measurement error does not bias our estimates.

First-Stage Validity: The credibility of our instrumental variables approach depends on a strong first-stage relationship between law-implied and actual transfers. Figure A.4 provides visual confirmation by presenting regression discontinuity plots for federal transfers themselves, showing clear discontinuous jumps at population thresholds that validate our first-stage relationship and confirm that the FPM formula generates meaningful variation in actual transfers.

Confounding from Other Transfers: Our results might reflect concurrent changes in other funding sources rather than FPM transfers specifically. Figure A.5 addresses this concern by demonstrating that other federal and state transfers are balanced around the FPM cutoffs, ruling out the possibility that our results are driven by simultaneous changes in alternative revenue sources.

Cross-Sectional vs. Time-Series Variation: Our baseline results primarily exploit cross-sectional variation across municipalities near different thresholds, raising concerns about unobserved heterogeneity. Table A.3 addresses this by including municipality-cutoff fixed effects, focusing identification solely on municipalities that cross population thresholds over time within our sample period. The coefficients remain positive and statistically significant (elasticities ranging from 0.11 to 0.50), confirming that our findings hold when exploiting only within-municipality variation over time.

Functional Form Assumptions: Regression discontinuity estimates can be sensitive to polynomial order and bandwidth choices. Table A.4 addresses these concerns systematically. Panel A demonstrates robustness across polynomial orders (zero-order through cubic), with coefficients remaining significant and ranging from 0.08 to 0.64. Panel B confirms stability across different kernel weighting schemes (triangular, Epanechnikov, and

uniform), providing elasticities between 0.55 and 0.82. These tests ensure our findings are not artifacts of particular functional form assumptions.

Continuous vs. Discrete Treatment: Our instrumented transfer approach might differ from standard RDD implementations. Table A.5 addresses this by presenting results using threshold dummy variables rather than instrumented transfers, yielding comparable effect sizes and confirming that our instrumental variables approach produces estimates consistent with standard RDD methods.

Distributional Assumptions: Our log-linear specifications assume particular error distributions that may be inappropriate for count data. Table A.6 employs Poisson regressions designed for count outcomes, confirming our log-linear results while using distributional assumptions more appropriate for the number of participants.

Sample Selection: Our results might be sensitive to the optimal bandwidth selection procedure. Table A.7 demonstrates robustness when using the entire sample with uniform 10% bandwidth around each threshold rather than optimal bandwidth selection, showing that our findings are not driven by the particular observations selected by the bandwidth algorithm.

Alternative Identification Strategy: As a final check on our identification approach, Table A.8 provides evidence from a stacked difference-in-differences design that exploits the timing of threshold crossings. Importantly, this specification shows that financially constrained municipalities (measured by pre-determined loan ratios) experience particularly large increases in competition when they receive transfer increases, providing additional evidence for the financial constraints mechanism underlying our results while using a completely different identification strategy.

Collectively, these robustness tests demonstrate that the competition effects of federal transfers are not artifacts of particular econometric choices, sample definitions, or identification assumptions. The consistency of results across multiple approaches strengthens our confidence that municipal financial constraints genuinely affect supplier participa-

tion in procurement markets, with important implications for procurement efficiency and local welfare.

4.2 Federal Transfers and Market Structure

We next examine how this enhanced competition affects market structure and the distribution of procurement contracts. Table 3 investigates whether the additional bidders documented in Table 2 translate into meaningful changes in market concentration and supplier market power, key indicators of competitive intensity in procurement markets.

The results in Table 3 provide evidence that increased federal transfers lead to more competitive market structures. Column I shows that a 10% increase in FPM transfers reduces individual winning suppliers' market share by 0.57 percentage points, which is 57% over the average market share of 1%. While this effect may appear modest in absolute terms, it reflects meaningful changes in market dynamics when considered relative to the baseline concentration levels in our sample.

The results for market-level concentration measures presented in Columns II and III, which examine Herfindahl-Hirschman Indices (HHI) calculated at different levels of aggregation. Column II shows that a 10% increase in transfers reduces the municipality-level HHI by 12.7%, indicating a substantial decrease in market concentration as measured by the sum of squared supplier market shares within each municipality-year. Column III presents results for the municipality-item-year HHI, providing an even more granular view of competitive dynamics. Here, we find that higher transfers reduce concentration by 3.8%, suggesting that the competition effects operate not only at the aggregate municipal level but also within specific product categories.

The economic interpretation of these results is that federal transfers fundamentally alter the competitive landscape of municipal procurement. The reduction in market concentration indicates that incumbent suppliers lose market share as new entrants and

smaller competitors gain access to procurement opportunities. This shift away from concentrated markets toward more fragmented supplier bases suggests that the financial constraints of municipalities had previously created barriers to entry for smaller suppliers, who may have been deterred by payment risks or the inability of cash-strapped municipalities to offer attractive contract terms.

In procurement markets, even modest reductions in concentration can translate into significant improvements in competitive pressure, as the threat of entry and the presence of additional competitors constrain incumbent suppliers' pricing power. The fact that we observe concentration reductions at both the aggregate municipality level and within specific product categories suggests that the competitive effects are broad-based rather than concentrated in particular sectors.

These findings complement our earlier results on bidder participation by demonstrating that the additional competitors attracted by higher federal transfers do not merely represent marginal players but actually succeed in winning contracts and gaining meaningful market share. This market share redistribution from incumbent to new and smaller suppliers represents a key mechanism through which improved municipal finances translate into enhanced procurement efficiency and potentially lower prices, which we examine in our subsequent analysis.

The substantial increase in competition provides the basis for our subsequent analysis of how increased participation of bidders translates into procurement pricing, efficiency, and ultimately welfare effects for local populations served by these municipalities.

4.3 Federal Transfers and Procurement Prices

The increased competition and reduced market concentration documented in Tables 2 and 3 raise the natural question of whether these structural changes in procurement markets translate into tangible benefits for municipalities through lower procurement

prices. Existing literature predicts that enhanced competition should reduce prices as suppliers compete more aggressively for contracts and lose pricing power (Li and Zheng (2009), Costello (2020) among others). Table 4 tests this hypothesis by examining how federal transfers affect the prices municipalities pay for procurement goods.

The results in Table 4 provide evidence that the competition effects identified in our previous analysis generate substantial cost savings for municipalities. Column I shows that a 10% increase in FPM transfers leads to a 4.39% reduction in procurement prices, representing a large and statistically significant elasticity. This effect is remarkably robust across specifications, with coefficients ranging from -0.26 to -0.46 depending on the fixed effects structure. Even our most demanding specification in Column IV, which includes both winner-cutoff-year and mesoregion-cutoff-year fixed effects, yields a price reduction of 4.54% for a 10% increase in transfers.

The inclusion of winner$\times$cutoff$\times$year fixed effects in Columns II and IV is particularly important for identification, as it allows us to compare prices charged by the same supplier for the same item to municipalities just above and below the FPM thresholds. This specification effectively asks whether identical suppliers charge different prices to otherwise similar municipalities that differ only in their federal transfer receipts. The persistence of large negative coefficients in these specifications provides compelling evidence that the price reductions reflect genuine competitive effects rather than changes in the composition of suppliers or products being procured.

The economic magnitude of these price effects is substantial. Given the average 20% FPM transfer jump at population thresholds in our sample, municipalities just above the cutoffs pay approximately 8-10% less for identical goods compared to those just below the thresholds. To put this in perspective, if we consider that procurement represents a significant share of municipal expenditures, these price reductions translate into meaningful budget savings that can be redirected toward additional public services or infrastructure investments.

The additional bidders and reduced market concentration documented in Tables 2 and 3 intensify competitive pressure on suppliers, forcing them to offer more aggressive pricing to win contracts. The fact that we observe significant price reductions even when comparing the same supplier selling to different municipalities suggests that suppliers cannot simply segment markets based on municipal characteristics but must respond to the competitive environment they face in each procurement auction.

Importantly, the price reductions we document are unlikely to reflect quality deterioration, as our empirical design compares procurement of identical items across similar municipalities. Instead, these findings suggest that financially constrained municipalities had previously been paying supra-competitive prices due to limited supplier participation and market concentration. The improvement in municipal financial health through federal transfers breaks this cycle by attracting more competitors and restoring competitive pricing.

These results demonstrate that a federal transfers can enhance competition which lower procurement prices, thereby suggesting that fiscal transfers generate efficiency gains that extend beyond their direct budgetary impact. The price reductions represent pure welfare gains for municipalities and, by extension, the local populations they serve, as the same public goods and services can be obtained at lower cost, freeing resources for additional public investments.

4.4 Mechanism: Procurement Scale and Payment Reliability

We next turn to understanding the underlying economic mechanisms that drive supplier participation decisions. Table 5 examines two key channels through which improved municipal finances might attract more bidders: larger procurement scales and more reliable payment terms.

Procurement Scale and Contract Attractiveness: The first mechanism operates through

the scale and frequency of procurement opportunities. Columns I and II of Table 5 show that higher federal transfers enable municipalities to conduct more procurement and purchase larger quantities per auction. Specifically, a 10% increase in FPM transfers leads to a 0.45% increase in the number of auctions at the municipality-item-year level and a substantial 5.69% increase in the quantity purchased per item. These effects suggest that improved financial resources allow municipalities to consolidate smaller, ad-hoc purchases into larger, more systematic procurement processes.

From suppliers' perspective, larger and more frequent procurement opportunities reduce the fixed costs of participation relative to potential revenues. Bidding in procurement auctions involves substantial preparation costs—understanding technical specifications, calculating bids, and completing paperwork—that are largely independent of contract size. When municipalities can offer larger contracts due to improved financial capacity, these fixed costs become more economically justifiable for potential suppliers. Moreover, larger contracts may enable suppliers to achieve economies of scale in production or service delivery, making participation attractive to a broader range of firms, including smaller suppliers who might find tiny contracts uneconomical.

Payment Reliability and Default Risk: The second mechanism operates through reduced counterparty risk and improved payment terms. Column III provides compelling evidence that municipalities receiving higher federal transfers pay their suppliers significantly faster. A 10% increase in FPM transfers reduces payment delays by 11.39%, representing approximately 2.16 days on average. However, for municipalities where delays are on the higher end around 90 days, the additonal waiting time is around 10 more days. While this might appear modest in absolute terms, payment timing is crucial for supplier cash flow management, particularly for smaller firms with limited working capital.

The economic importance of payment reliability extends beyond simple timing considerations. Late payments impose real costs on suppliers through increased financing

needs, opportunity costs of tied-up capital, and uncertainty about cash flows. In developing economy contexts where credit markets are often imperfect, these costs can be particularly burdensome for smaller suppliers who lack access to formal credit. When municipalities demonstrate improved payment reliability through faster settlement of invoices, they signal lower default risk and reduced financing costs for potential suppliers, making procurement participation more attractive across the supplier size distribution.

4.4.1 Heterogeneity by Municipal Financial Constraints

The mechanisms we identify should operate most strongly for municipalities facing the tightest financial constraints, where marginal improvements in fiscal capacity have the largest impact on procurement practices. We test this prediction by examining heterogeneity across two proxies for baseline financial constraints: municipality size and existing debt levels.

Table 6 presents results by municipality size, grouping smaller municipalities (around population thresholds 1-3) and larger municipalities (around thresholds 4-8). The results strongly support our mechanism: the competition effects are concentrated among smaller municipalities, with elasticities of 0.68 for small municipalities compared to statistically insignificant effects for larger ones. Similarly, the price reduction effects are six times larger for smaller municipalities (-0.63% vs. 0.12%). This pattern aligns with our theoretical expectations, as smaller municipalities typically face tighter budget constraints and have fewer alternative financing sources, making them more sensitive to federal transfer variations.

The quantity and payment timing effects show similar patterns, with smaller municipalities exhibiting much larger responses to transfer increases. The elasticity of procurement quantity is 1.03 for small municipalities but only 0.19 for larger ones, while payment delays fall by 1.56% for small municipalities compared to a statistically insignificant effect for larger ones. These findings confirm that the mechanisms we

identify—improved procurement scale and payment reliability—operate most strongly where financial constraints are most binding.

Additional evidence for the financial constraints mechanism comes from Table A.8, which examines heterogeneity by pre-determined debt levels using a stacked difference-in-differences design. The table shows that municipalities with high loan ratios (measured prior to receiving transfer increases) experience significantly larger competition effects when they cross population thresholds. While municipalities with low baseline debt show no significant response to transfer increases (coefficient of -0.05 to -0.25), those with high pre-determined loan ratios exhibit substantial increases in procurement competition (coefficients of 0.68 to 0.94 across different window specifications). This pattern strongly supports our hypothesis that federal transfers work primarily through relaxing binding financial constraints rather than through general income effects.

The debt heterogeneity results are particularly compelling because they exploit pre-determined measures of financial stress, addressing potential concerns that debt levels might be endogenous to procurement outcomes. High debt levels signal potential payment difficulties to suppliers, who may demand risk premia or avoid participation altogether. Federal transfers that improve these municipalities' fiscal position have disproportionate effects on supplier confidence and participation, precisely as our mechanism predicts.

The mechanisms documented in Table 5 and the heterogeneity evidence from Tables 6 and A.8 provide a coherent explanation for our main competition and pricing results. When federal transfers relax municipal financial constraints, the dual improvement in procurement scale and payment reliability makes municipal contracts significantly more attractive to suppliers. The larger contract sizes justify the fixed costs of bid preparation and enable economies of scale, while faster payment reduces financing costs and default risk. These improvements are particularly valuable for smaller suppliers who may have been previously deterred from participating in municipal procurement.

The concentration of effects among financially constrained municipalities—whether measured by size or debt levels—validates our identification strategy and confirms that federal transfers work precisely through the financial constraint channel we hypothesize. The fact that larger, less constrained municipalities and those with low debt burdens show minimal responses to transfer variations suggests that our results reflect genuine relaxation of binding constraints rather than income effects or other alternative mechanisms.

These findings have important policy implications, suggesting that fiscal transfers to sub-national governments can generate efficiency gains that extend well beyond their direct budgetary impact through improved procurement market functioning and enhanced competition.

5 Economic Implications

5.1 Supplier composition

The increased competition documented in our previous analysis raises important questions about which types of suppliers benefit from improved municipal finances. Existing studies suggests that financial constraints may create particularly high barriers to entry for smaller suppliers, who face greater difficulties absorbing payment delays, managing cash flow uncertainty, and bearing the fixed costs of procurement participation (Ferraz et al. (2022), Costello (2020) among others). This section examines how federal transfers affect the composition of both bidders and winners in municipal procurement, with particular attention to the market access implications for small and young firms.

Table 7 provides compelling evidence that federal transfers disproportionately attract smaller suppliers to municipal procurement markets. Column I shows that a 10% increase in FPM transfers leads to a 0.44 percentage point increase in the fraction of

small participants across procurement auctions. Given that small firms comprise approximately 85% of participants in our baseline sample, this represents a meaningful shift in market composition toward smaller suppliers. This effect is economically significant, suggesting that improved municipal financial health reduces barriers that had previously deterred small firms from bidding.

The economic mechanism underlying this result reflects the particular vulnerabilities of small suppliers to municipal financial constraints. Small firms typically operate with limited working capital and restricted access to external financing, making them especially sensitive to payment delays and default risk. When municipalities demonstrate improved financial capacity through higher federal transfers, the reduction in perceived counterparty risk disproportionately benefits these constrained suppliers. Large firms, with their superior access to credit markets and greater ability to absorb payment delays, are less sensitive to municipal financial health.

Columns II and III of Table 7 reveal that federal transfers also attract younger and less experienced suppliers to municipal procurement. A 10% increase in transfers reduces average participant age by approximately 4.9% and average procurement experience by 0.40%. These effects indicate that improved municipal finances enable market entry by firms that had previously been excluded from public procurement, potentially due to their inability to bear the risks associated with financially constrained government clients.

The entry of younger firms is economically important because these suppliers may bring innovation, competitive pricing, and fresh approaches to government procurement. However, their limited experience with government contracting processes and weaker balance sheets make them particularly vulnerable to payment delays and administrative uncertainties. By improving municipal financial reliability, federal transfers reduce these barriers and enable a more diverse supplier base to participate in public procurement.

Table 8 examines whether the changes in bidder composition translate into actual

contract awards. The results show that federal transfers not only attract more small bidders but also increase their success rates. Column I demonstrates that a 10% increase in transfers leads to a 0.71 percentage point increase in the probability that a small supplier wins the procurement contract. This effect is larger than the corresponding participation effect, suggesting that small suppliers become more competitive when municipal financial constraints are relaxed.

The fact that small suppliers not only participate more but also win more contracts indicates that their increased participation represents genuine competition rather than merely symbolic bidding. This pattern is consistent with small suppliers being able to offer more aggressive pricing when they face reduced payment risk, enabling them to compete more effectively against larger incumbents.

The differential impact on small vs. large suppliers provides additional validation for our financial constraints mechanism while generating important economic development benefits. If federal transfers operated primarily through income effects, we would expect proportional increases across all supplier types; instead, the concentration of effects among small, young, and inexperienced suppliers confirms that municipal financial constraints had created specific entry barriers for these firms. This market share redistribution toward smaller suppliers enhances overall efficiency through increased competitive pressure, potential innovation from newer entrants, and democratized access to government contracts that can serve as crucial revenue sources for small business development. The pattern aligns with theoretical work emphasizing how financing frictions lead to market concentration and exclusion of efficient smaller firms (Acemoglu et al. (2009)), while our results demonstrate that improved municipal finances can meaningfully support small enterprise development through enhanced access to public sector opportunities.

5.1.1 Pricing Effects by Supplier Size

Having established that federal transfers disproportionately benefit smaller suppliers in terms of market access and contract awards, we examine whether these compositional changes affect the pricing benefits documented in our earlier analysis. Table 9 investigates how the price reductions from enhanced competition vary across different supplier sizes, providing insight into whether small suppliers' increased participation translates into differential pricing effects.

Table 9 presents results from specifications that interact FPM transfers with supplier size categories, where suppliers are classified as micro firms (size = 1), small firms (size = 2), and large firms (size = 3) based on official government classifications. The results show striking heterogeneity in pricing responses. For micro firms, a 10% increase in FPM transfers leads to price reductions of 3.24% to 2.96% depending on the specification. Small firms show similar pricing responses with statistically insignificant interaction coefficients. However, large firms exhibit substantially larger price responses, with interaction coefficients ranging from -0.36 to -0.46 percentage points, implying total price reductions of 7.3% to 7.5% for a 10% increase in transfers.

The larger price reductions among large suppliers reflects the erosion of their market power as municipal financial improvements attract additional small competitors. When municipal financial constraints previously limited small firm participation, large suppliers could extract rents through higher prices. As improved municipal finances enable greater small firm participation, large suppliers must reduce their prices substantially to maintain market positions, representing a classic competitive response where previously protected firms face new competitive pressure.

The differential pricing effects demonstrate that federal transfers generate efficiency gains through multiple channels simultaneously: direct competition among small suppliers and competitive pressure that reduces large suppliers' market power. While

small suppliers reduce prices modestly, their increased participation forces large suppliers—who handle a disproportionate share of procurement volume—to make substantial price concessions. This dual effect ensures that price reductions occur across the full spectrum of procurement activities regardless of which supplier category ultimately wins contracts, maximizing the competitive benefits of improved municipal financial health and generating broad-based efficiency improvements in public sector purchasing.

5.2 Local Economic Effects

The price reductions documented in Table 4 generate significant local economic effects, with the benefits varying substantially across product categories in ways that have important implications for consumer welfare and local development. Figures 6 and 7 reveal that the efficiency gains from improved municipal finances are concentrated precisely in those sectors that most directly affect local population welfare.

Figure6 presents the estimated effects of federal transfers on both competition (Panel A) and procurement prices (Panel B) across ten major product categories, distinguishing between Population Benefit Products and Government Consumption Products. The results show that healthcare and medical products experience the largest increases in competition, with elasticities exceeding 1.0, and correspondingly exhibit the most substantial price reductions of approximately 50 basis points for a 10% increase in transfers. Public health services, public infrastructure, and environmental services show similarly large effects, all categories that directly impact local quality of life.

This concentration of effects among Population Benefit Products has profound implications for local welfare. Lower procurement prices for medical equipment and healthcare products enable municipalities to expand health service provision, improve service quality, or serve more residents within existing budgets. Similarly, reduced costs for public infrastructure materials allow municipalities to undertake more extensive road

repairs, water system improvements, or school construction projects. These efficiency gains translate directly into enhanced public service delivery that benefits local populations.

Figure 7 makes explicit the relationship between competition and consumer benefits by plotting the correlation between competition effects and price effects across product categories. The clear negative correlation demonstrates that products experiencing the largest increases in competition systematically exhibit the greatest price reductions, providing direct evidence that enhanced supplier participation drives the welfare gains for local consumers.

This competitive mechanism has broader implications for local economic development beyond direct procurement savings. The increased participation of small suppliers documented in our earlier analysis suggests that federal transfers help democratize access to government contracts, enabling local small businesses to compete for municipal procurement opportunities. This can stimulate local entrepreneurship, create employment, and retain economic activity within municipal boundaries rather than concentrating benefits among large, potentially non-local suppliers.

The heterogeneous effects across product categories indicate that municipal financial constraints had created particularly severe inefficiencies in the provision of basic public goods. When financially constrained municipalities struggle to attract competitive bids for essential services like healthcare equipment or infrastructure materials, the resulting inflated prices effectively tax local populations by reducing the quantity or quality of public services available. Our results demonstrate that federal transfers break this cycle, generating welfare improvements that compound over time as municipalities can stretch their budgets further and provide enhanced services to residents.

The smaller effects observed for Government Consumption Products, such as administrative materials and IT equipment, confirm that the primary beneficiaries of improved procurement efficiency are local populations rather than government operations them-

selves. This pattern suggests that federal transfers optimize resource allocation toward citizen-facing services, maximizing the public welfare impact of improved municipal financial health and creating a direct channel through which fiscal policy generates measurable improvements in local living standards.

6 Conclusion

Our study provides novel evidence that local government financial constraints significantly impede procurement efficiency, with important implications for public service delivery and local welfare. Using quasi-experimental variation from Brazil's FPM transfer program and detailed procurement data from Minas Gerais municipalities, we demonstrate that relaxing financial constraints through federal transfers substantially improves procurement competition and outcomes.

Our main findings attempt to provide a causal chain from improved municipal finances to enhanced market efficiency. Federal transfers increase the number of procurement bidders and reduce procurement prices through two primary mechanisms: larger and more frequent procurement opportunities that justify suppliers' participation costs, and improved payment reliability that reduces counterparty risk. The benefits are concentrated among financially constrained municipalities and disproportionately attract smaller, younger suppliers who had previously been excluded from public procurement markets.

The economic implications of these findings extend well beyond direct fiscal effects. The largest competition and price improvements occur for essential public goods—healthcare, public infrastructure, and social services—that directly impact local populations. This suggests that municipal financial constraints create particularly severe inefficiencies in basic public service provision, effectively taxing residents through inflated procurement costs that reduce the quantity and quality of available services.

Our results contribute to understanding how financial constraints affect public goods provision, advance the economics of public procurement by identifying buyer financial health as a key determinant of market structure, and provide new evidence on how suppliers internalize customer financial constraints in their business decisions. From a policy perspective, our findings suggest that the benefits of fiscal transfers to subnational governments may be substantially larger than their direct budgetary impact, as improved procurement market functioning generates efficiency gains that multiply the effective purchasing power of local governments.

The analysis also highlights the potential for fiscal policy to serve broader economic development objectives. Our evidence that improved municipal finances enhance market access for small suppliers suggests that supporting local government financial health can stimulate small business development and democratize access to government contracting opportunities. Our findings ultimately demonstrate that municipal financial health is a crucial determinant of public sector efficiency, and that in contexts where local governments face binding financial constraints, federal transfers can generate substantial welfare improvements by restoring competitive market functioning and enabling more efficient public service delivery.

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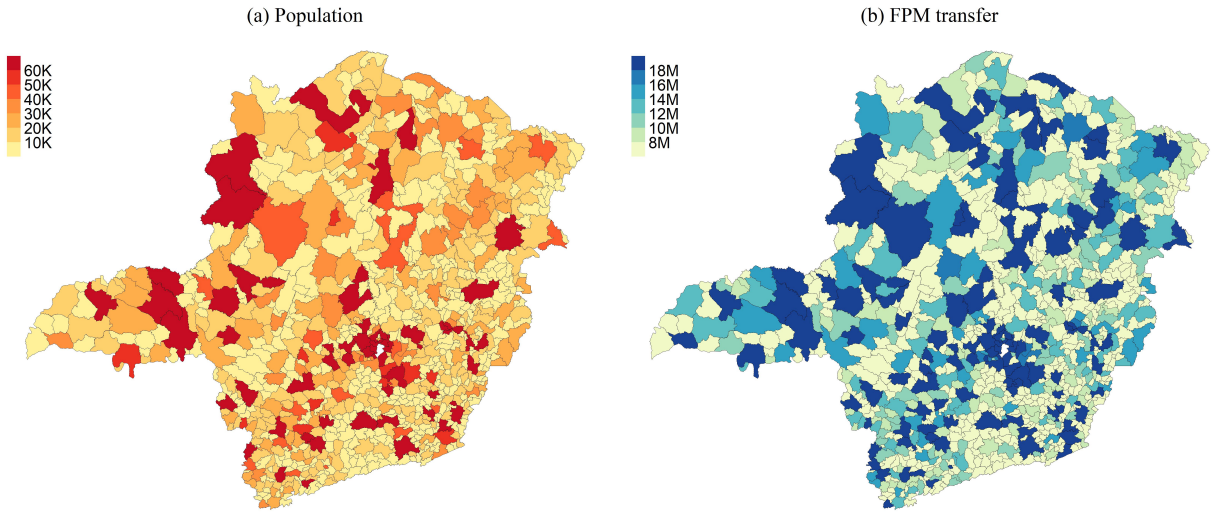
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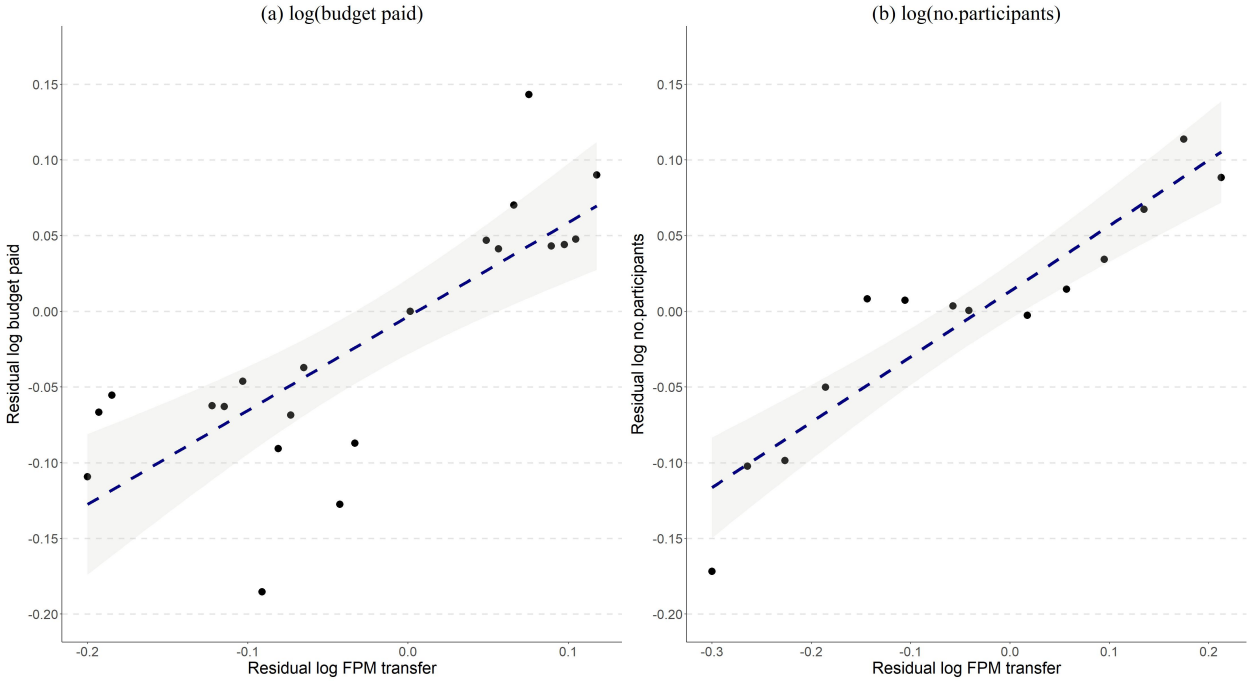
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Figure 1: Heatmap of Population and Federal Transfer



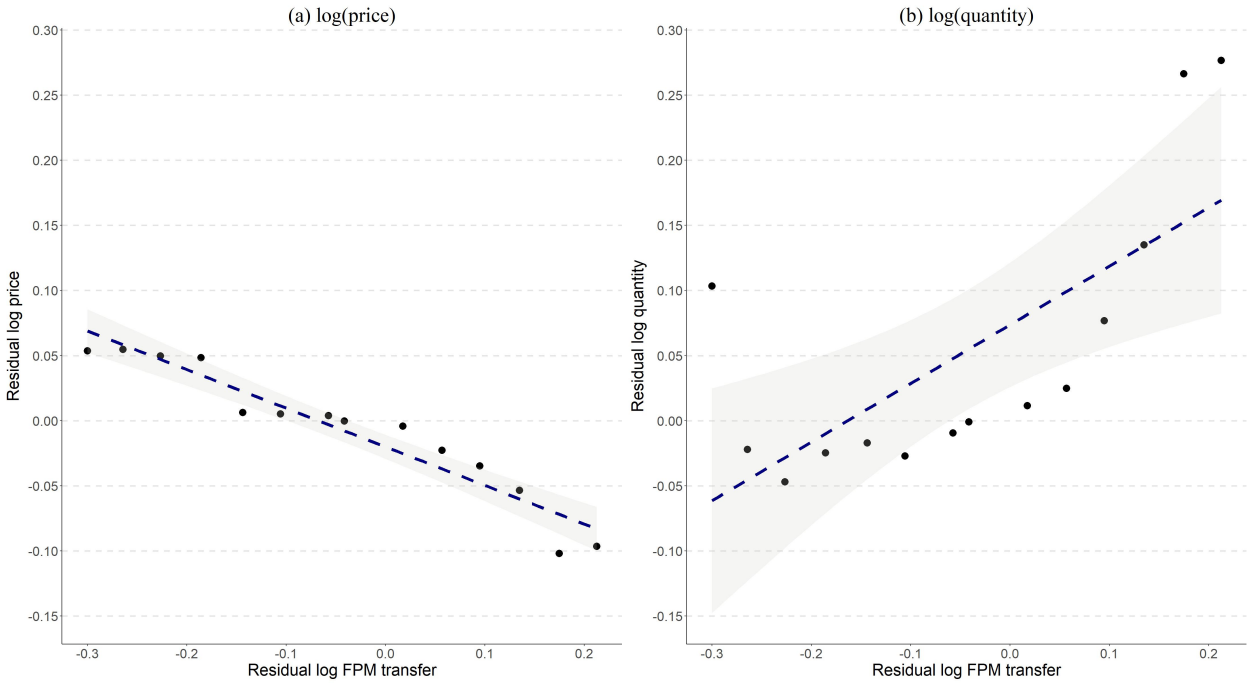
Notes: This figure shows the heatmap of average population (a) and Federal transfer (FPM transfer) (b) from 2014 to 2020 for municipalities in the State Minas Gerais.

Figure 2: Federal Transfers, Budget Capacity, and Procurement Participants



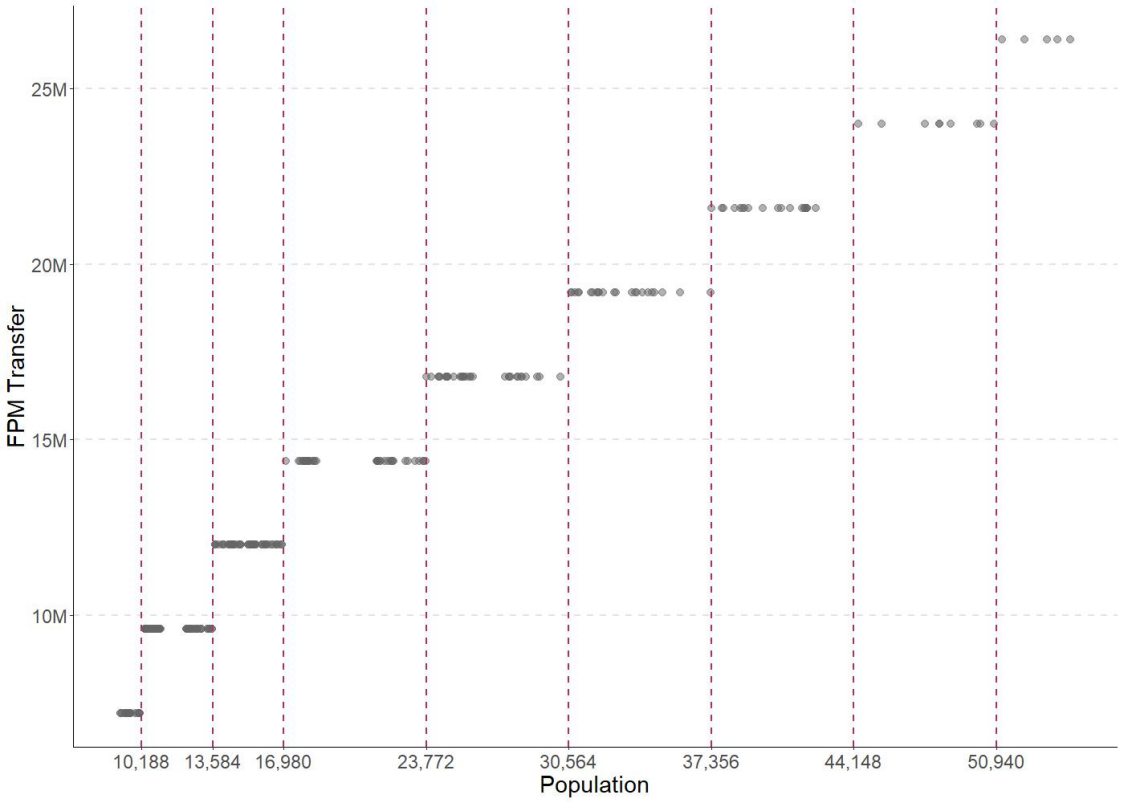
Notes: This figure presents the bin scatter plot between municipality-level Federal transfer (FPM transfer), budget capacity, and number of participants for each auction. In panel (a), the unit of observation is the budget or FPM transfer for a municipality of a particular year. Budget capacity is measured by the value paid across all purchases for a municipality over a year. For Panel (a), we calculate residualized variables by first taking the natural logarithm of budget and FPM transfers, then subtracting the mean of these log values for each cutoff-year group. For Panel (b), where we observe the number of participants of individual auction by municipalities in each year, we calculate residualized variable (number of participants and FPM transfer) by taking its natural logarithm and subtracting the mean of its log values calculated for the same items, cutoffs, and years. The sample includes municipalities within a 10% bandwidth around their nearest population cutoffs. We fit linear regression lines with 95% confidence intervals.

Figure 3: Federal Transfers, Product Prices, and Purchase Quantity



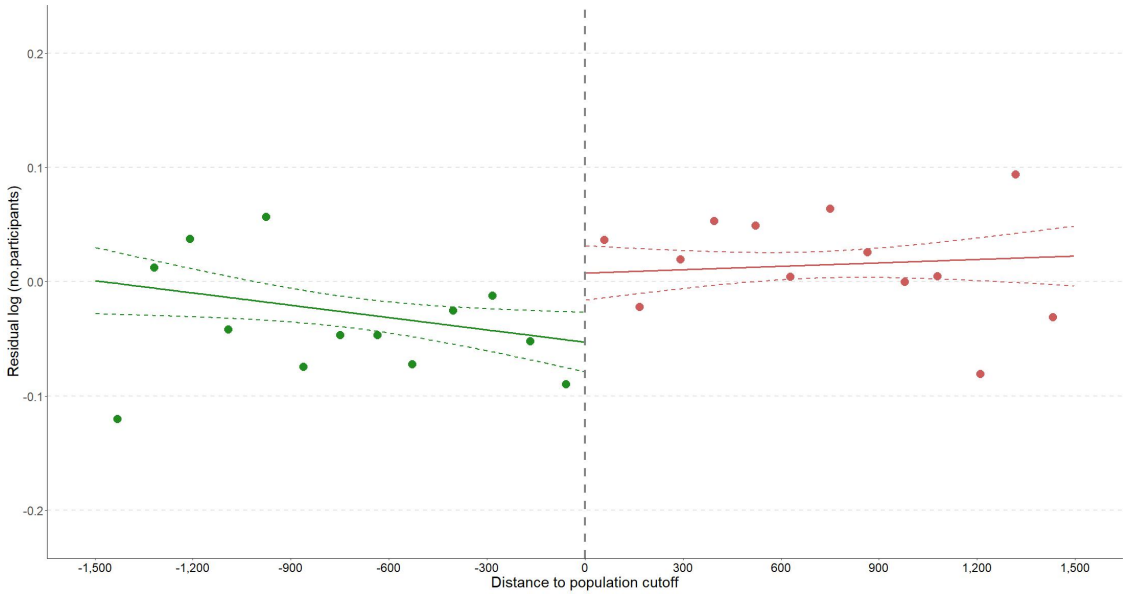
Notes: This figure shows bin scatter plots examining the relationship between Federal transfers (FPM) and municipal purchase characteristics. Panel (a) plots price against FPM transfers, while Panel (b) plots the purchasing quantities against FPM transfers. Each observation represents a specific purchase by a municipality in a given year. For each variable (price, quantities, and FPM transfers), we calculate residuals by first taking its natural logarithm and then subtracting the mean of its log values for the same item, cutoff, and year. The sample includes municipalities within a 10% bandwidth around their nearest population cutoffs. We fit linear regression lines with 95% confidence intervals.

Figure 4: Federal Transfers and Population Thresholds



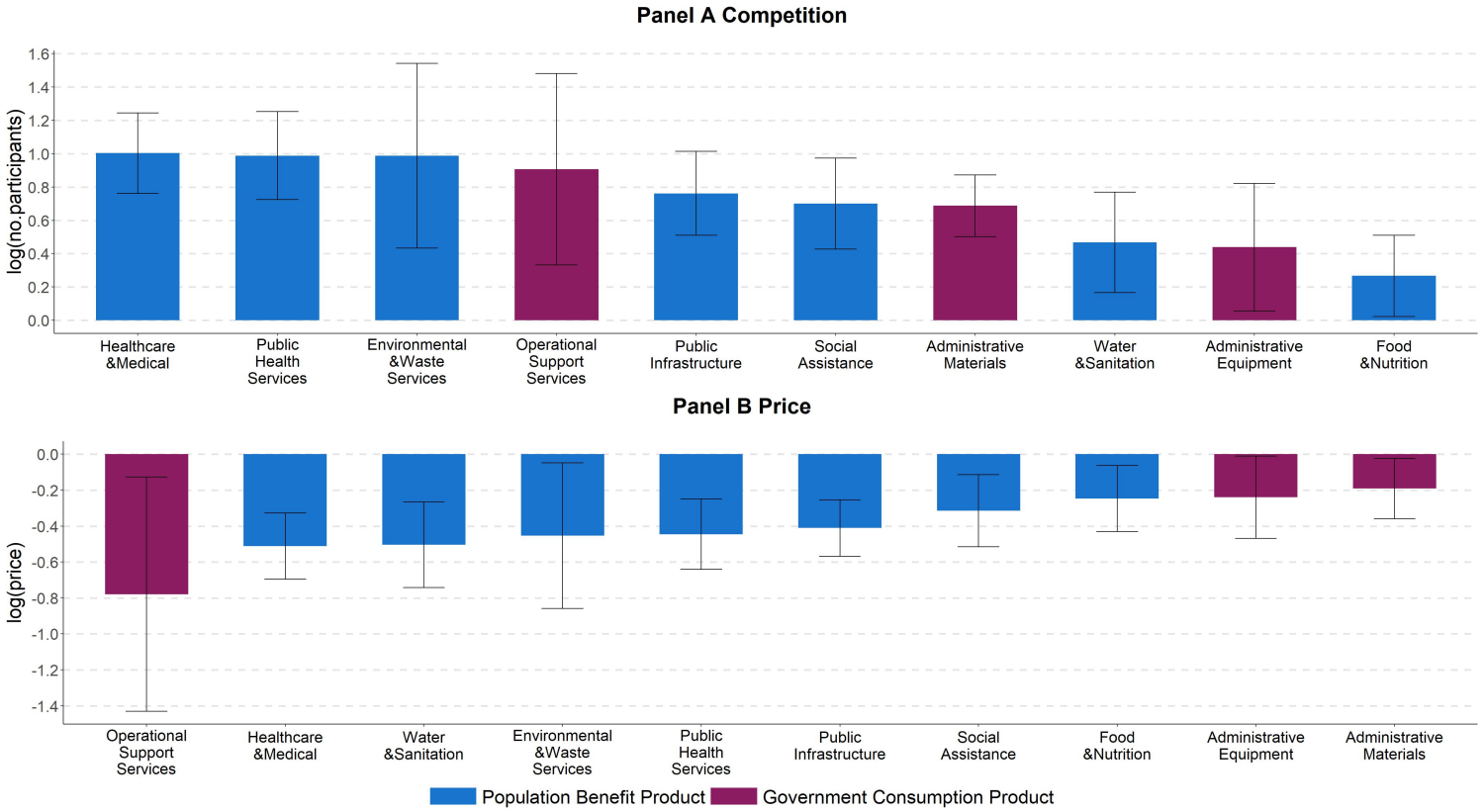
Notes: This graph shows the Federal transfer (FPM transfer) across different population thresholds for municipalities in 2018. Each dot denotes a municipality within a 10% bandwidth around its nearest population cutoff. Vertical red lines indicate population cutoffs as in the policy.

Figure 5: RD Plot for Procurement Participant



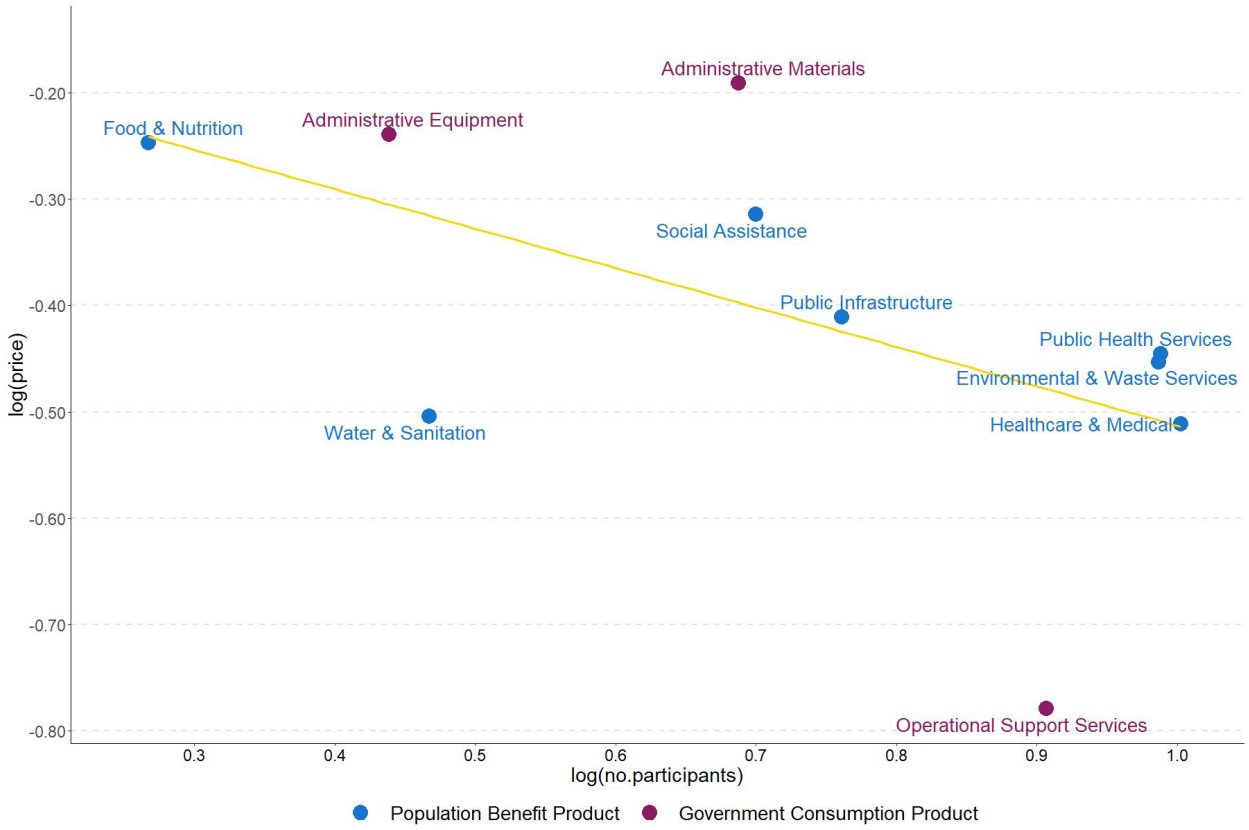
Notes: This figure presents RD plots for the number of participants for 26 bins along the running variable, distance to population cutoffs. Linear lines are fitted below and above thresholds with 95% confidence intervals. The unit of observation is the average participants across auctions at the municipality year level. Residual log no.participants is the difference between the log-transformed average number of participants minus the averaged log(no.participants) over cutoffs, years, and mesoregions. Green dots indicate purchases without increased funding (population below cutoffs), and red dots denote purchases with more Federal transfers (population above cutoffs). Within each bin, we take the weighted average (by the FPM transfer jump at different cutoffs) of log (no. participants). The sample includes municipalities within a 10% bandwidth around their nearest population cutoffs.

Figure 6: Competition and Product Pricing: The Pass-Through



Notes: This figure shows the estimated effects for our preferred specifications in Table 2 columns III on two dependent variables: the number of participants (Panel A) and the purchasing price (Panel B) by two broad product classifications: **Population Benefit Products** (blue) and **Government Consumption Products** (maroon). Within each panel, products are ranked by the magnitude of estimated changes across products. All dependent variables are log-transformed. Detailed product descriptions are in Table A.14, and all estimates are in Table A.15.

Figure 7: Correlation Between Competition and Price



Notes: This figure presents the correlation between competition and price for products with significant changes in both price and number of participants after the federal transfer, using our preferred specifications in Table 2 columns III. Products are categorized/colored into two broad classifications: **Population Benefit Products** (blue) and **Government Consumption Products** (maroon). Detailed product descriptions are in Table A.14, and all estimates are in Table A.15.

Table 1: Summary Statistics

	Mean	Standard Deviation	Min	Median	Max	Observation
Panel A. Auction-Year Level						
No.participants	4.18	3.28	1	3	18	1,803,716
Price	245.26	993.55	0.08	15.80	8,300.00	2,658,780
Fraction of small participants	0.85	0.28	0	1	1	1,957,877
Average participant age	13.47	6.90	1.00	13.00	36.50	2,103,658
Average participant procurement age	2.05	1.61	0.00	2.00	6.00	2,017,310
p(Small winning supplier)	0.85	0.36	0	1	1	2,077,790
Winning supplier age	13.66	10.28	0	11	44	2,308,386
Winning supplier procurement age	2.16	1.87	0	2	6	3,234,856
Panel B. Winner-Year level						
Winning supplier market share	0.01	0.02	0.00	0.00	0.11	169,211
Panel C. Procurement-Year level						
Delays (days)	19.20	19.49	0.67	13.00	107.00	32,802
Panel D. Municipality-Item-Year level						
No.auctions	1.64	1.59	1	1	11	1,875,959
Quantity	1,988.40	8,585.80	1	66	70,000	1,755,338
Herfindahl-Hirschman Index	0.95	0.14	0.41	1	1	1,483,211
Panel E. Municipality-Year level						
Herfindahl-Hirschman Index	0.08	0.11	0.02	0.05	0.79	1,833
Federal/FPM transfer	13,693,138	5,217,942	5,613,685	12,491,187	28,698,240	1,891*
Expenses	50,092,440	41,394,992	3,817,772	37,065,310	423,607,446	1,866*
Revene	61,769,744	52,008,070	2,591,040	45,326,371	565,281,123	1,865*
Population	22,506	12,912	9,174	16,791	59,857	1,891*

This table reports summary statistics for variables in our data from 2014 to 2020. Sample sizes vary across variables; for each, we report the effective number of observations used in the regressions, based on the optimal bandwidth selection method from Calonico et al. (2014). Observations with (*) are summary statistics of the entire sample, 10% population distance around each threshold.

Table 2: Federal Transfer Effect on Procurement Participants

	log(no.participants)			
	I	II	III	IV
Log FPM transfer	0.6627***	0.3914***	0.6672***	0.5119***
	(0.0371)	(0.0386)	(0.0400)	(0.0426)
Observations	1,803,716	1,803,716	1,803,716	1,803,716
R2	0.67716	0.90894	0.71447	0.91292
Bandwidth	Optimal	Optimal	Optimal	Optimal
Item-Cutoff-Year FE	Yes	Yes	Yes	Yes
Winner-Cutoff-Year FE		Yes		Yes
MesoRegion-Cutoff-Year FE			Yes	Yes

This table reports the effects of federal transfers on the number of participants in the auctions of items procured by each municipality, using a Regression Discontinuity (RD) analysis. The dependent variable is the natural logarithm of the number of participants. Log FPM transfer is the natural logarithm of the Federal transfers, instrumented by the predicted transfer according to pre-defined rules based on population cutoffs. All specifications include item-threshold-year fixed effects with additional fixed effects: firms that win the public contract (columns II and IV), and meso-region (columns III and IV). We use a first-order polynomial (linear) fit around the threshold. The table shows the effective sample size, determined using the optimal bandwidth selection method from Calonico et al. (2014). The sample size varies depending on the dependent variable. Standard errors are clustered at the item-municipality-threshold level. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Table 3: Federal Transfer Effect on Procurement Market Concentration

	Winning Supplier Market Share	Herfindahl-Hirschman Index (Municipality)	Herfindahl-Hirschman Index (Municipality-Item)
	I	II	III
Log FPM transfer	-0.0057**	-0.1267**	-0.0379***
	(0.0023)	(0.0508)	(0.0049)
Observations	169,211	1,833	1,483,211
R2	0.04019	0.32510	0.58346
Bandwidth	Optimal	Optimal	Optimal
Cutoff-Year FE	Yes	Yes	
Item-Cutoff-Year FE			Yes
MesoRegion-Cutoff-Year FE	Yes	Yes	Yes

This table reports the effects of federal transfers on the winning supplier market share and market concentration, using a Regression Discontinuity (RD) analysis. In column I, the dependent variable is the winner's market share, defined as the total purchasing value from the supplier divided by the municipality's total procurement in a given year. Column II shows results for the municipality-year Herfindahl-Hirschman Index (HHI), calculated as the sum of squared supplier market shares. Column III reports estimates for the municipality-item-year HHI, defined as the sum of squared supplier market shares at the municipality-item-year level. Log FPM transfer is the natural logarithm of the Federal transfers, instrumented by the predicted transfer according to pre-defined rules based on population cutoffs. All specifications include threshold-year and threshold-year-mesoregion fixed effects with additional fixed effect at the item level (column III). We use a first-order polynomial (linear) fit around the threshold. The table shows the effective sample size, determined using the optimal bandwidth selection method from Calonico et al. (2014). The sample size varies depending on the dependent variable. Standard errors are clustered at the municipality-threshold level in columns I & II, and item-municipality-threshold level in columns III. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Table 4: Federal Transfer Effect on Procurement Purchasing Prices

	log(price)			
	I	II	III	IV
Log FPM transfer	-0.4386***	-0.4647***	-0.4561***	-0.4541***
	(0.0262)	(0.0401)	(0.0297)	(0.0428)
Observations	2,658,780	2,658,780	2,658,780	2,658,780
R2	0.91655	0.93581	0.91860	0.93693
Bandwidth	Optimal	Optimal	Optimal	Optimal
Item-Cutoff-Year FE	Yes	Yes	Yes	Yes
Winner-Cutoff-Year FE		Yes		Yes
MesoRegion-Cutoff-Year FE			Yes	Yes

This table reports the effects of federal transfers on prices in the auctions of items procured by each municipality, using a Regression Discontinuity (RD) analysis. The dependent variable is the natural logarithm of prices. Log FPM transfer is the natural logarithm of the Federal transfers, instrumented by the predicted transfer according to pre-defined rules based on population cutoffs. All specifications include item-threshold-year fixed effects with additional fixed effects: firms that win the public contract (columns II and IV), and meso-region (columns III and IV). We use a first-order polynomial (linear) fit around the threshold. The table shows the effective sample size, determined using the optimal bandwidth selection method from Calonico et al. (2014). The sample size varies depending on the dependent variable. Standard errors are clustered at the item-municipality-threshold level. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Table 5: Federal Transfer Effect on Number of Auctions, Purchasing Quantity, and Speed of Payment

	log(no.auctions)	log(quantity)	log(days until payment)
	I	II	III
Log FPM transfer	0.0445**	0.5694***	-1.139**
	(0.0183)	(0.0488)	(0.5254)
Observations	1,875,959	1,755,338	32,802
R2	0.69974	0.88491	0.13314
Bandwidth	Optimal	Optimal	Optimal
Item-Cutoff-Year FE	Yes	Yes	
Cutoff-Year FE			Yes
MesoRegion-Cutoff-Year FE	Yes	Yes	Yes

This table reports the effects of federal transfers on the number of auctions, and quantity of items procured by municipalities, as well as procurement level speed of payment, using a Regression Discontinuity (RD) analysis. In column I, the dependent variable is the natural logarithm of the number of auctions at the municipality-item-year level. Column II shows results for the natural logarithm of the purchasing quantity aggregated at the municipality-item-year level. In column III, the dependent variable is the natural logarithm of days of payment after delivery at the municipality-procurement-year level. Log FPM transfer is the natural logarithm of the Federal transfers, instrumented by the predicted transfer according to pre-defined rules based on population cutoffs. All specifications include threshold-year, and threshold-year-mesoregion fixed effects, with additional fixed effect at the item level (column I & II). The table shows the effective sample size, determined using the optimal bandwidth selection method from Calonico et al. (2014). The sample size varies depending on the dependent variable. Standard errors are clustered at the item-municipality-threshold level in columns I & II, and municipality-threshold level in columns III. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Table 6: Financial Constraint: Heterogeneity Effects by Municipality Size

	log(no.participants)	log(price)	log(quantity)	log(days until payment)
	I	II	III	IV
Log FPM transfer · Cutoffs 1-3 (Small)	0.6800***	-0.6272***	1.031***	-1.564*
	(0.0449)	(0.0434)	(0.0742)	(0.8200)
Log FPM transfer · Cutoffs 4-8 (Big)	-0.1913	0.1224	0.1856	-0.6038
	(0.1912)	(0.1036)	(0.1808)	(0.9806)
p-value	0.0000	0.0000	0.0000	0.4525
Observations	1,803,716	2,658,780	1,755,338	31,913
R2	0.71467	0.91863	0.88497	0.13326
Bandwidth	Optimal	Optimal	Optimal	Optimal
Item-Cutoff-Year FE	Yes	Yes	Yes	
Cutoff-Year FE				Yes
MesoRegion-Cutoff-Year FE	Yes	Yes	Yes	Yes

This table reports the heterogeneous effects of federal transfers by municipality size, using a Regression Discontinuity (RD) analysis. The dependent variables are the natural logarithm of the number of participants (column I), the natural logarithm of prices (column II), the natural logarithm of aggregated purchasing quantity at the municipality-item-year level (column III), and the natural logarithm of days of payment after delivery (column IV). Log FPM transfer is the natural logarithm of the Federal transfers, instrumented by the predicted transfer according to pre-defined rules based on population cutoffs. Following Corbi et al. (2019), we group municipalities into relatively small (around population thresholds 1-3) and relatively big municipalities (around population thresholds 4-8). Each dependent variable utilizes the preferred specifications as in main tables: all specifications include Mesoregion-threshold-year fixed effects with additional fixed effects item-threshold-year (columns I-III) and threshold-year fixed effects (column IV). We use a first-order polynomial (linear) fit around the threshold. The table shows the effective sample size, determined using the optimal bandwidth selection method from Calonico et al. (2014). The sample size varies depending on the dependent variable. Standard errors are clustered at the item-municipality-threshold level (columns I-III), and municipality-threshold level (column IV). ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Table 7: Federal Transfer Effect on Participant Characteristics

	Fraction of Small Participants	Average Participant Age	Average Participant Procurement Age
	I	II	III
Log FPM transfer	0.0436***	-4.895***	-0.4019***
	(0.0093)	(0.4114)	(0.0403)
Observations	1,957,877	2,103,658	2,017,310
R2	0.81778	0.64934	0.90987
Bandwidth	Optimal	Optimal	Optimal
Item-Cutoff-Year FE	Yes	Yes	Yes
MesoRegion-Cutoff-Year FE	Yes	Yes	Yes

This table reports the effects of federal transfers on participants' size and age, using a Regression Discontinuity (RD) analysis. In column I, the dependent variable is the fraction of small participants (small or micro-sized firms) across auctions. The firm size classification comes from the official government classification at the firm registry (*Receita Federal*). Column II shows results for the average participant age since establishment, and column III shows the average participant age since first entering public procurement. Log FPM transfer is the natural logarithm of the Federal transfers, instrumented by the predicted transfer according to pre-defined rules based on population cutoffs. All specifications include item-threshold-year, and threshold-year-meso-region fixed effects, with a first-order polynomial (linear) fit around the threshold. The table shows the effective sample size, determined using the optimal bandwidth selection method from Calonico et al. (2014). The sample size varies depending on the dependent variable. Standard errors are clustered at the item-municipality-threshold level. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Table 8: Federal Transfer Effect on the Winning Supplier Characteristics

	p(Small Winning Supplier)	Winning Supplier Age	Winning Supplier Procurement Age
	I	II	III
Log FPM transfer	0.0713***	-4.298***	-0.3986***
	(0.0137)	(0.4701)	(0.0403)
Observations	2,077,790	2,308,386	3,234,856
R2	0.72620	0.55441	0.80415
Bandwidth	Optimal	Optimal	Optimal
Item-Cutoff-Year FE	Yes	Yes	Yes
MesoRegion-Cutoff-Year FE	Yes	Yes	Yes

This table reports the effects of federal transfers on winner size and age, using a Regression Discontinuity (RD) analysis. In column I, the dependent variable is the a dummy equal to 1 if the winning supplier is a small or micro-sized firm. This size classification comes from the official government classification at the firm registry (*Receita Federal*). Column II shows results for the winner's age since establishment and column III shows the winner's age since first participating in the public procurement. Log FPM transfer is the natural logarithm of the Federal transfers, instrumented by the predicted transfer according to pre-defined rules based on population cutoffs. All specifications include item-threshold-year, and threshold-year-meso-region fixed effects, with a first-order polynomial (linear) fit around the threshold. The table shows the effective sample size, determined using the optimal bandwidth selection method from Calonico et al. (2014). The sample size varies depending on the dependent variable. Standard errors are clustered at the item-municipality-threshold level. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Table 9: Federal Transfer Effect on Prices by Winning Supplier Size

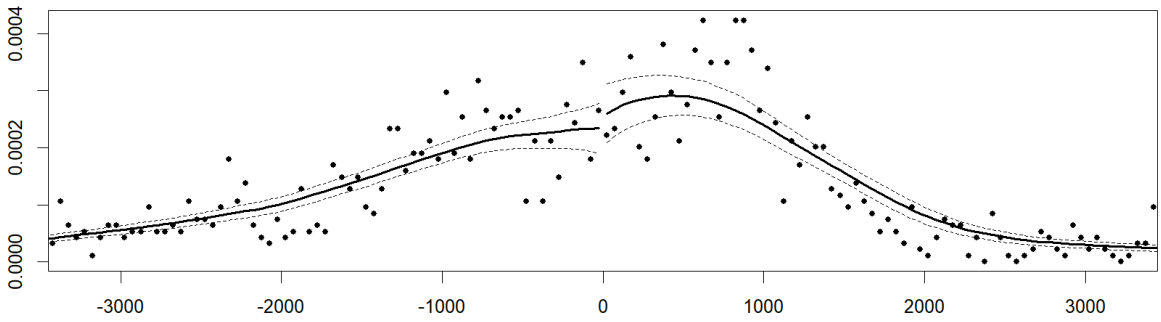
	log(price)			
	I	II	III	IV
Log FPM Transfer	-0.3241***	-0.3746***	-0.2899***	-0.2958***
	(0.0357)	(0.0380)	(0.0658)	(0.0659)
Log FPM Transfer · Supplier Size = 2 (Small Firm)	-0.0819	-0.0629	-0.0843	-0.0975
	(0.0512)	(0.0502)	(0.0831)	(0.0822)
Log FPM Transfer · Supplier Size = 3 (Large Firm)	-0.4970***	-0.3627***	-0.4598***	-0.4048***
	(0.0680)	(0.0644)	(0.0972)	(0.0924)
Observations	2,648,831	2,648,831	2,648,831	2,648,831
R2	0.91642	0.91843	0.93533	0.93646
Bandwidth	Optimal	Optimal	Optimal	Optimal
Item-Cutoff-Year FE	Yes	Yes	Yes	Yes
SupplierSize-Cutoff-Year FE	Yes	Yes		
Winner-Cutoff-Year FE			Yes	Yes
MesoRegion-Cutoff-Year FE		Yes		Yes

This table reports the heterogeneous effects of federal transfers on prices by winner's size, using a Regression Discontinuity (RD) analysis. The dependent variable is the natural logarithm of prices. Log FPM transfer is the natural logarithm of the Federal transfers, instrumented by the predicted transfer according to pre-defined rules based on population cutoffs. Supplier size equals 1 for micro firms, 2 for small firms, and 3 for large firms. This classification comes from the official government classification at the firm registry (*Receita Federal*). All specifications include item-threshold-year fixed effects, with additional winner size-threshold-year fixed effects (columns I and II), meso-region (columns II and IV), and firms that win the public contract (columns III and IV). We use a first-order polynomial (linear) fit around the threshold. The table shows the effective sample size, determined using the optimal bandwidth selection method from Calonico et al. (2014). The sample size varies depending on the dependent variable. Standard errors are clustered at the item-municipality-threshold level. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Internet Appendix for "Financially Constrained Procurement"

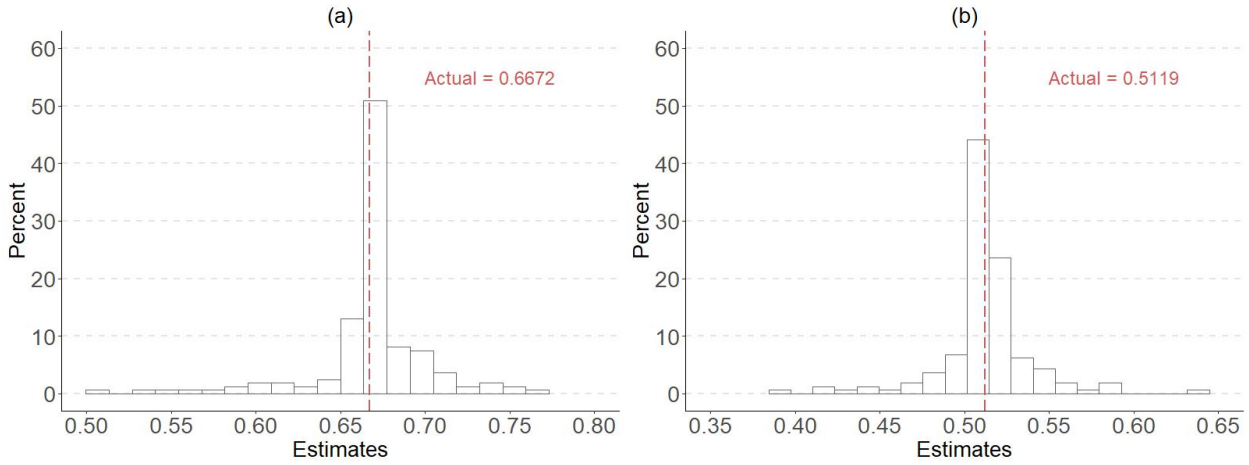
Intended for online publication only

Figure A.1: Federal Transfers, Budget Capacity, and Purchase Quantity



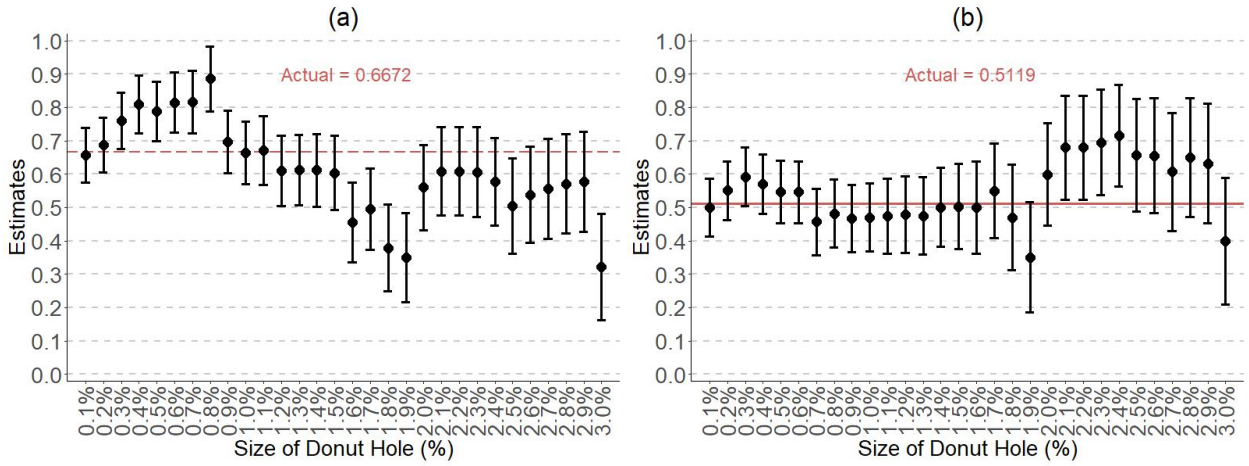
Notes: The plot displays density estimation of excess mass in the McCrary test.

Figure A.2: Robustness Test: Removing Individual Municipalities from the Sample



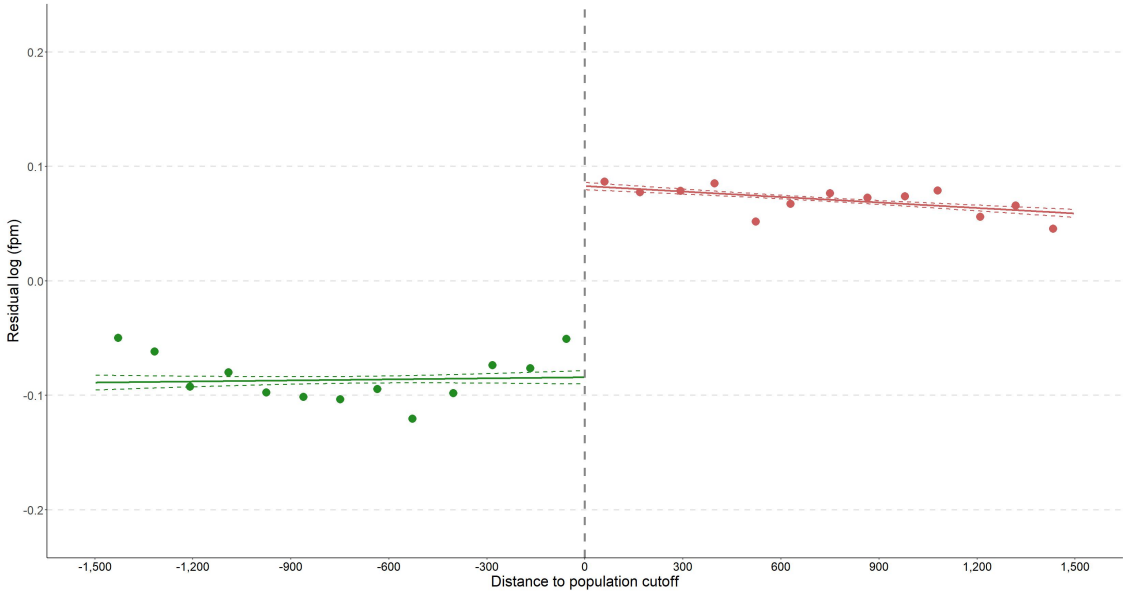
Notes: The figure shows the distribution of robustness estimates for our preferred specification in Table 2 columns III, with the additional test for Table 2 column IV, by removing one municipality at a time from the sample. The red dotted lines in (a) & (b) are the coefficients reported in Table 2 columns III and IV.

Figure A.3: Robustness Test: Donut Regression Discontinuity



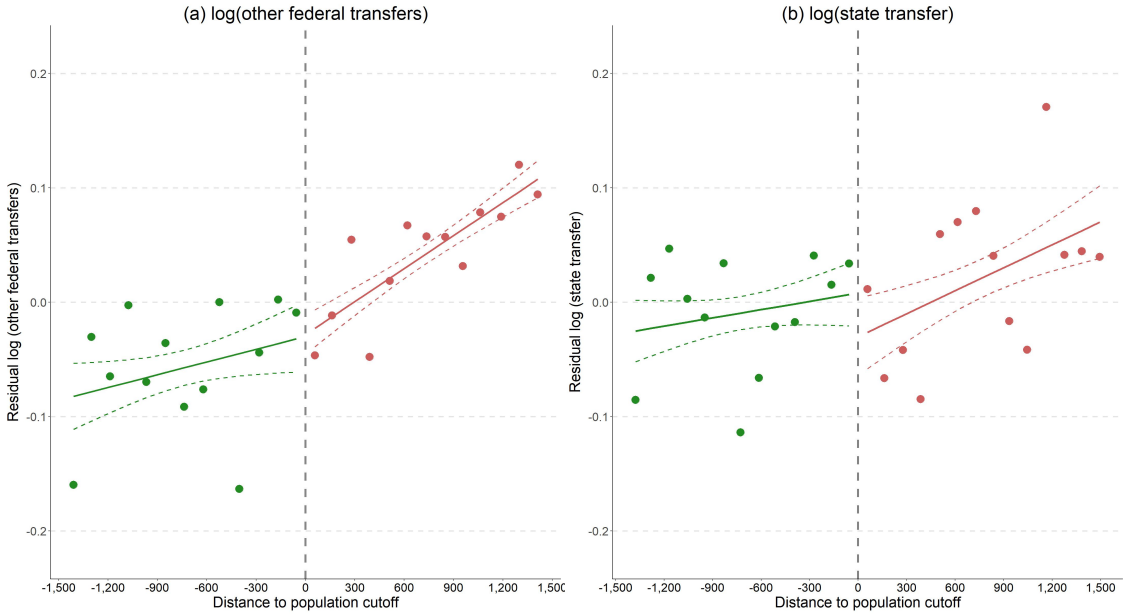
Notes: The figure shows the estimates (with 95% confidence interval) for our preferred specification in Table 2 columns III, with the additional test for Table 2 column IV, by dropping data points around each population threshold. The size of the donut hole ranges from 0.1% to 3%. The red lines in (a) & (b) are the coefficients reported in Table 2 columns III and IV.

Figure A.4: RD Plot for Federal Transfers



Notes: This figure presents RD plots for the federal transfer for 26 bins along the running variable, distance to population cutoffs. Linear lines are fitted below and above thresholds with 95% confidence intervals. The unit of observation is the federal transfers at the municipality year level. Residual log fpm transfer is the difference between the log-transformed fpm minus the averaged log(fpm) over cutoffs, years, and mesoregions. Within each bin, we take the average of log(fpm). Green dots indicate municipalities without increased funding (population below cutoffs), and red dots denote municipalities with more Federal transfers (population above cutoffs). The sample includes municipalities within a 10% bandwidth around their nearest population cutoffs.

Figure A.5: Covariate Balance Test: Other Federal and State Transfers



Notes: This figure presents RD plots for the other transfers for 26 bins along the running variable, distance to population cutoffs. Linear lines are fitted below and above thresholds with 95% confidence intervals. The unit of observation is the other transfers at the municipality year level. In (a), residual log other federal transfers is the difference between log-transformed non-FPM federal transfer minus the averaged log(non-FPM federal transfers) over cutoffs, years, and mesoregions. In (b), residual log state transfers is the difference between log-transformed state transfer minus the averaged log(state transfers) over cutoffs, years, and mesoregions. Within each bin, we take the average of log(non-FPM federal transfers) in (a) and log(state transfers) in (b). Green dots indicate municipalities without increased funding (population below cutoffs), and red dots denote municipalities with more Federal transfers (population above cutoffs). The sample includes municipalities within a 10% bandwidth around their nearest population cutoffs.

Table A.1: Federal Transfers Across Countries

Country	Federal Transfers	Source Information
United States	27.5% of state and local government revenue (2021)	U.S. Census Bureau (2021)
Australia	19% of local government revenue (2022-23)	Victorian Auditor-General's Office
Germany	36% of municipal revenue (2021)	Federal Ministry Report
Turkey	Around 70% of local government revenue (2016)	World Bank (2023)
India	40% of state government revenue	Khemani (2007)
Mexico	85% of sub-national government revenue	OECD Working Papers
Argentina	60.6% of provincial revenue (2014)	World Bank Working Papers

This table presents the share of Federal transfers in sub-national government revenues across different countries. Sub-national governments include state, provincial, and local governments depending on the country's administrative structure. All percentages are reported as shares of total revenue for the respective government level.

Table A.2: List of Items

item description	unit
Petrol	liter
Banana	kg
Watermelon	kg
Mineral water 500ml	unit
Protective eyewear	unit
Nails	kg
USB flash drive, 16GB	unit
Ibuprofen, 600 mg	pill
Rubbing alcohol	liter
Toilet fixture	unit
Nasal Cannula	unit
20W Fluorecent lamp	unit
Bleach	liter
35mm Padlock	unit
Digital Thermometer	unit

Table A.3: Robustness Test: Compare Within Same Municipality

	log(no.participants)			
	I	II	III	IV
Log FPM transfer	0.1137**	0.3470***	0.3073***	0.5037***
	(0.0523)	(0.0578)	(0.0658)	(0.0671)
Observations	1,803,716	1,803,716	1,803,716	1,803,716
R2	0.74140	0.91807	0.74920	0.92004
Bandwidth	Optimal	Optimal	Optimal	Optimal
Item-Cutoff-Year FE	Yes	Yes	Yes	Yes
Winner-Cutoff-Year FE		Yes		Yes
MesoRegion-Cutoff-Year FE			Yes	Yes
Municipality-Cutoff FE	Yes	Yes	Yes	Yes

This table reports robustness test of Table 2, where we compare within the same municipality, using a Regression Discontinuity (RD) analysis. The dependent variable is the natural logarithm of the number of participants. Log FPM transfer is the natural logarithm of the Federal transfers, instrumented by the predicted transfer according to pre-defined rules based on population cutoffs. All specifications include item-threshold-year and municipality-threshold fixed effects with additional fixed effects: firms that win the public contract (columns II and IV), and meso-region (columns III and IV). We use a first-order polynomial (linear) fit around the threshold. The table shows the effective sample size, determined using the optimal bandwidth selection method from Calonico et al. (2014). The sample size varies depending on the dependent variable. Standard errors are clustered at the item-municipality-threshold level. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Table A.4: Robustness Test: Polynomial Order & Kernel Weight

	log(no.participants)					
	I	II	III	IV	V	VI
	Panel A. Polynomial Order					
Log FPM transfer	0.4178***	0.0800***	0.6348***	0.5139***	0.6020***	0.2282***
	(0.0218)	(0.0216)	(0.0401)	(0.0426)	(0.0471)	(0.0517)
Observations	1,803,716	1,803,716	1,803,716	1,803,716	1,803,716	1,803,716
R2	0.71378	0.91266	0.71457	0.91292	0.71455	0.91297
Polynomial Order	Zero	Zero	Quadratic	Quadratic	Cubic	Cubic
	Panel B. Kernel Weight					
Log FPM transfer	0.8165***	0.5653***	0.7546***	0.5501***	0.6672***	0.5119***
	(0.0416)	(0.0447)	(0.0413)	(0.0441)	(0.0400)	(0.0426)
Observations	1,803,716	1,803,716	1,803,716	1,803,716	1,803,716	1,803,716
R2	0.70888	0.91085	0.70695	0.91012	0.71447	0.91292
Kernel	Triangular	Triangular	Epanechnikov	Epanechnikov	Uniform	Uniform
Bandwidth	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
Item-Cutoff-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Winner-Cutoff-Year FE		Yes		Yes		Yes
MesoRegion-Cutoff-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

This table reports robustness tests of our preferred specification in Table 2 Columns III, with additional tests for Table 2 column IV, using a Regression Discontinuity (RD) analysis. Panel A shows our results with different polynomial functional forms: zero, quadratic, and cubic. Panel B reports estimates with different kernel weights: triangular, Epanechnikov, and uniform as in Table 2 Columns III and IV for comparison. The dependent variable is the natural logarithm of the number of participants. Log FPM transfer is the natural logarithm of the Federal transfers, instrumented by the predicted transfer according to pre-defined rules based on population cutoffs. All specifications include item-threshold-year and mesoregion (Columns I, III, and V) with additional fixed effects: firms that win the public contract (columns II, IV, and VI). We use a first-order polynomial (linear) fit around the threshold. The table shows the effective sample size, determined using the optimal bandwidth selection method from Calonico et al. (2014). The sample size varies depending on the dependent variable. Standard errors are clustered at the item-municipality-threshold level. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Table A.5: Robustness Test: Average Above the Threshold Effect

	log(no.participants)			
	I	II	III	IV
Above Threshold	0.1064***	0.0668***	0.1429***	0.1086***
	(0.0083)	(0.0095)	(0.0093)	(0.0107)
Observations	1,803,716	1,803,716	1,803,716	1,803,716
R2	0.67613	0.90885	0.71359	0.91281
Bandwidth	Optimal	Optimal	Optimal	Optimal
Item-Cutoff-Year FE	Yes	Yes	Yes	Yes
Winner-Cutoff-Year FE		Yes		Yes
MesoRegion-Cutoff-Year FE			Yes	Yes

This table reports the effects of Federal transfers on the number of participants in the auctions of items procured by each municipality, using a Regression Discontinuity (RD) analysis. The dependent variable is the natural logarithm of the number of participants. Above Threshold is a dummy variable equal to 1 if the municipality is above the FPM threshold, and 0 otherwise. All specifications include item-threshold-year fixed effects with additional fixed effects: firms that win the public contract (columns II and IV), and mesoregion (columns III and IV). We use a first-order polynomial (linear) fit around the threshold. The table shows the effective sample size, determined using the optimal bandwidth selection method from Calonico et al. (2014). The sample size varies depending on the dependent variable. Standard errors are clustered at the item-municipality-threshold level. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Table A.6: Robustness Test: Poisson Regressions

	I	II	III	IV
	Panel A: no.participants			
Above Threshold	0.1271***	0.0408***	0.2095***	0.0744***
	(0.0072)	(0.0076)	(0.0086)	(0.0082)
Observations	1,810,073	1,810,073	1,810,073	1,810,073
R2	0.68401	0.89672	0.73276	0.90489
	Panel B: price			
Above Threshold	-0.1085***	-0.0726***	-0.0897***	-0.0519***
	(0.0174)	(0.0184)	(0.0203)	(0.0198)
Observations	2,211,138	2,211,138	2,211,138	2,211,138
R2	0.88041	0.94695	0.88403	0.94774
Bandwidth	Optimal	Optimal	Optimal	Optimal
Item-Cutoff-Year FE	Yes	Yes	Yes	Yes
Winner-Cutoff-Year FE		Yes		Yes
MesoRegion-Cutoff-Year FE			Yes	Yes

This table reports the effects of Federal transfers on the number of participants, and purchasing price in the auctions of items procured by each municipality using a Poisson Regression. The dependent variable is the raw number of participants in panel A, and prices in panel B. Above Threshold is a dummy variable equal to 1 if the municipality is above the FPM threshold, and 0 otherwise. All specifications include item-threshold-year fixed effects with additional fixed effects: firms that win the public contract (columns II and IV), and mesoregion (columns III and IV). We use a first-order polynomial (linear) fit around the threshold. The table shows the effective sample size, determined using the optimal bandwidth selection method from Calonico et al. (2014). The sample size varies depending on the dependent variable. Standard errors are clustered at the item-municipality-threshold level. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Table A.7: Robustness Test: Entire Sample

	log(no.participants)			
	I	II	III	IV
Log FPM transfer	0.3217***	0.0472**	0.3531***	0.1172***
	(0.0196)	(0.0197)	(0.0208)	(0.0204)
Observations	4,567,944	4,567,944	4,567,944	4,567,944
R2	0.67739	0.89948	0.70499	0.90306
Bandwidth	10%	10%	10%	10%
Item-Cutoff-Year FE	Yes	Yes	Yes	Yes
Winner-Cutoff-Year FE		Yes		Yes
MesoRegion-Cutoff-Year FE			Yes	Yes

This table reports the robustness tests of our baseline results in Table 2 using the entire sample, 10% population distance around each threshold. The dependent variable is the natural logarithm of the number of participants. Log FPM transfer is the natural logarithm of the Federal transfers, instrumented by the predicted transfer according to pre-defined rules based on population cutoffs. All specifications include item-threshold-year fixed effects with additional fixed effects: firms that win the public contract (columns II and IV), and meso-region (columns III and IV). We use a first-order polynomial (linear) fit around the threshold. The table shows the effective sample size, determined using the optimal bandwidth selection method from Calonico et al. (2014). The sample size varies depending on the dependent variable. Standard errors are clustered at the item-municipality-threshold level. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Table A.8: Financial Constraint: Higher Debt Ratio

	log(no.participants)		
	I	II	III
Δ Log(fpm) · Post	-0.0515	-0.2465	-0.0634
	(0.1515)	(0.1603)	(0.3199)
Δ Log(fpm) · Post · High Loan Ratio (Pre-Determined)	0.6844***	0.9523***	0.9433**
	(0.2490)	(0.2787)	(0.4501)
Window	2 years	3 years	4 years
Observations	1,070,072	1,431,219	1,688,916
R2	0.82238	0.79166	0.77634
Bandwidth	Optimal	Optimal	Optimal
Cutoff-Year-Cohort FE	Yes	Yes	Yes
Municipality-Item-Cutoff-Cohort FE	Yes	Yes	Yes

This table reports the effects of Federal transfers on the number of participants in a Stacked difference-in-differences design. For each treated municipality, we select control municipalities within the same year. We stack these events in a "stacked" DID design as in the following equation:

$$Y_{i(c)pet} = \alpha_{i(c)pe} + \gamma_{(c)et} + \beta \log(\text{fpm})_{i(c)e} \cdot \text{Post}_{et} + \beta \log(\text{fpm})_{i(c)e} \cdot \text{Post}_{et} \cdot (\text{High Loan Ratio})_{i(c)et-1} + \epsilon_{i(c)pet}$$

where the dependent variable $Y_{i(c)pet}$ is the natural logarithm of the number of procurement participants for item p, in municipality i, threshold c, cohort e, and year t. $\Delta \log(\text{fpm})_{i(c)e}$ is the changes in transfer for municipality i, at threshold c, in cohort e. Post_{et} is a dummy equal to one after the transfer occurred and 0, otherwise. Municipalities are grouped into high and low financially constrained groups using a median split of the pre-determined loan ratio. $\text{High Loan Ratio}_{i(c)et-1}$ is a dummy that equals one if the municipality i, at threshold c, in cohort e, falls into the top median group loan ratio at one year before $t-1$. All regressions include threshold-cohort-year and municipality-item-threshold-cohort fixed effects. Columns I to III use a 2-year, 3-year, 4-year window around each event. The table shows the effective sample size, determined using the optimal bandwidth selection method from Calonico et al. (2014). The sample size varies depending on the dependent variable. Standard errors are clustered at the municipality-cohort level and shown in parentheses. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Table A.9: Federal Transfer Effect on Aggregate Spending and Revenue

Panel A	log(Procurement Value)				Revenue-to-Expense Ratio			
	I	II	III	IV	V	VI	VII	VIII
Log FPM transfer	0.1313	0.8580**	0.2403	0.7573*	0.0293	0.0816	0.0360	0.0704
	(0.3490)	(0.4359)	(0.3721)	(0.4295)	(0.0252)	(0.0719)	(0.0257)	(0.0734)
Obs	21,424	21,424	18,581	18,581	1,865	1,865	1,694	1,694
R2	0.09962	0.19235	0.09117	0.18195	0.22509	0.44647	0.22770	0.44634
Bandwidth	10%	10%	Optimal	Optimal	10%	10%	Optimal	Optimal
Cutoff-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cutoff-municipality		Yes		Yes		Yes		Yes
Panel B	log(expenses)				log(revenue)			
	IX	X	XI	XII	XIII	XIV	XV	XVI
Log FPM transfer	0.3436*	0.4898***	0.3361*	0.4878***	0.3489*	0.5080***	0.3542*	0.4944***
	(0.1855)	(0.0986)	(0.1977)	(0.0951)	(0.1862)	(0.1059)	(0.1981)	(0.1042)
Obs	1,866	1,866	1,724	1,724	1,865	1,865	1,708	1,708
R2	0.8108	0.98504	0.77707	0.98221	0.81126	0.98662	0.78100	0.98437
Bandwidth	10%	10%	Optimal	Optimal	10%	10%	Optimal	Optimal
Cutoff-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cutoff-municipality		Yes		Yes		Yes		Yes

This table reports the effects of Federal transfers on various municipal outcomes using a Regression Discontinuity (RD) analysis. The dependent variables are log(Procurement Value) in columns I to IV, Revenue-to-Expense Ratio in columns V to VIII, log(expenses) in columns IX to XII, and log(revenue) in columns XIII to XVI. Log FPM transfer is the natural logarithm of the Federal transfers, instrumented by the predicted transfer according to pre-defined rules based on population cutoffs. All specifications include threshold-year fixed effects. We also add threshold-municipality fixed effects in even-numbered columns. The first two columns for each variable include specifications with the entire sample, while the third and fourth columns use the optimal bandwidth selection of Calonico et al. (2014). The first variable uses procurement data, while the others use data from the Brazilian municipality finances (Finbra) dataset provided by the Treasury. Standard errors are clustered at the municipality-threshold level. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Table A.10: Federal Transfer Effect on Local Firms Within Same Municipality

	Fraction of Local Participants	p(Local Winning Supplier)
	I	II
Log FPM transfer	-0.1458***	-0.1252***
	(0.0212)	(0.0260)
Observations	1,313,025	1,545,623
R2	0.82435	0.72145
Bandwidth	Optimal	Optimal
Item-Cutoff-Year FE	Yes	Yes
MesoRegion-Cutoff-Year FE	Yes	Yes

This table reports the effects of Federal transfers on local firms or firms established within the same municipality using a Regression Discontinuity (RD) analysis. The dependent variables are the fraction of local participants in columns I and p(local winning supplier) in column II. Log FPM transfer is the natural logarithm of the Federal transfers, instrumented by the predicted transfer according to pre-defined rules based on population cutoffs. All specifications include item-threshold-year and mesoregion-threshold-year fixed effects. We use a first-order polynomial (linear) fit around the threshold. The table shows the effective sample size, determined using the optimal bandwidth selection method from Calonico et al. (2014). The sample size varies depending on the dependent variable. Standard errors are clustered at the item-municipality-threshold level. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Table A.11: Federal Transfer Effects on Prices: Local Winning Supplier

	log(price)			
	I	II	III	IV
Log FPM transfer	-0.4550***	-0.4579***	-0.4790***	-0.4416***
	(0.0321)	(0.0403)	(0.0347)	(0.0431)
Log FPM Transfer · Same Muni =1	0.0543	-0.5312*	0.0907	-0.5771*
	(0.0555)	(0.3017)	(0.0558)	(0.2999)
Observations	2,648,831	2,648,831	2,648,831	2,648,831
R2	0.91625	0.93534	0.91834	0.93647
Bandwidth	Optimal	Optimal	Optimal	Optimal
SameMuni-Cutoff-Year FE	Yes	Yes	Yes	Yes
Item-Cutoff-Year FE	Yes	Yes	Yes	Yes
Winner-Cutoff-Year FE		Yes		Yes
MesoRegion-Cutoff-Year FE			Yes	Yes

This table reports the heterogeneous effects of Federal transfers on procurement prices for suppliers from the same municipality versus those from different municipalities using a Regression Discontinuity (RD) analysis. The dependent variable is the natural logarithm of price. Log FPM transfer is the natural logarithm of the Federal transfers, instrumented by the predicted transfer according to pre-defined rules based on population cutoffs. "Same Muni = 1" indicates suppliers from the same municipality. All specifications include item-threshold-year and threshold-same municipality-year fixed effects with additional fixed effects: firms that win the public contract (columns II and IV), and meso-region (columns III and IV). We use a first-order polynomial (linear) fit around the threshold. The table shows the effective sample size, determined using the optimal bandwidth selection method from Calonico et al. (2014). The sample size varies depending on the dependent variable. Standard errors are clustered at the item-municipality-threshold level. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Table A.12: Federal Transfer Effects on Prices: New Suppliers

	log(price)			
	I	II	III	IV
Log FPM transfer	-0.4119***	-0.3545***	-0.3610***	-0.3414***
	(0.0295)	(0.0431)	(0.0330)	(0.0469)
Log FPM Transfer · New Supplier =1	0.1866**	-0.1858	-0.0892	-0.1995
	(0.0898)	(0.1864)	(0.0924)	(0.1868)
Observations	2,212,720	2,212,720	2,212,720	2,212,720
R2	0.91770	0.93610	0.91958	0.93703
Bandwidth	Optimal	Optimal	Optimal	Optimal
NewSupplier-Cutoff-Year FE	Yes	Yes	Yes	Yes
Item-Cutoff-Year FE	Yes	Yes	Yes	Yes
Winner-Cutoff-Year FE		Yes		Yes
MesoRegion-Cutoff-Year FE			Yes	Yes

This table reports the heterogeneous effects of Federal transfers on procurement prices for new versus existing suppliers using a Regression Discontinuity (RD) analysis. The dependent variable is the natural logarithm of price. Log FPM transfer is the natural logarithm of the Federal transfers, instrumented by the predicted transfer according to pre-defined rules based on population cutoffs. "New Supplier" is an indicator for suppliers who are new to the municipality in a given year. All specifications include item-threshold-year and threshold-new supplier-year fixed effects with additional fixed effects: firms that win the public contract (columns II and IV), and meso-region (columns III and IV). We use a first-order polynomial (linear) fit around the threshold. The table shows the effective sample size, determined using the optimal bandwidth selection method from Calonico et al. (2014). The sample size varies depending on the dependent variable. Standard errors are clustered at the item-municipality-threshold level. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Table A.13: Federal Transfer Effects on Purchasing Price and Quantity: Single-Bidder Auctions

	log(price)		log(quantity)	
	I	II	III	IV
Log FPM transfer	-0.0015	-0.2767	-0.1578	-0.5324
	(0.2923)	(0.3733)	(0.4964)	(0.6506)
Observations	507,622	507,622	474,321	474,321
R2	0.96470	0.96479	0.94709	0.94726
Bandwidth	Optimal	Optimal	Optimal	Optimal
Item-Cutoff-Year FE	Yes	Yes	Yes	Yes
Winner-Cutoff-Year FE	Yes	Yes	Yes	Yes
MesoRegion-Cutoff-Year FE		Yes		Yes

This table reports the effects of Federal transfers on purchasing price and quantity for auctions with only one bidder, using a Regression Discontinuity (RD) analysis. The dependent variable is the natural logarithm of price (columns I and II) and quantity (columns III and IV) . Log FPM transfer is the natural logarithm of the Federal transfers, instrumented by the predicted transfer according to pre-defined rules based on population cutoffs. All specifications include item-threshold-year and firms that win the public contract fixed effects (columns I and III) with additional meso-region (columns II and IV) fixed effects. We use a first-order polynomial (linear) fit around the threshold. The table shows the effective sample size, determined using the optimal bandwidth selection method from Calonico et al. (2014). The sample size varies depending on the dependent variable. Standard errors are clustered at the item-municipality-threshold level. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.

Table A.14: Product Description

Category	Product	Description
Population Benefit Product	Education Learning	School supplies, educational equipment, and teaching materials used for student education
	Healthcare & Medical	Medicines, hospital supplies, and medical equipment for patient care
	Food & Nutrition	Food items including school meals, fruits, vegetables, and dairy products for public consumption
	Water & Sanitation	Water treatment chemicals, cleaning supplies, and waste management services
	Social & Assistance	Basic necessities like food baskets, hygiene kits, and support materials for vulnerable populations
	Public Infrastructure	Construction materials and road maintenance supplies for public works
	Public Safety & Security	Security services and equipment for protecting public spaces
	Environmental & Waste Services	Waste collection, recycling, and public cleaning services
	Recreation & Culture	Sporting equipment, playground items, and recreational materials for public use
	Public Health Services	Medical equipment, medicines, and laboratory supplies specifically for public health initiatives
Government Consumption Product	Administrative Materials	Office supplies, furniture, and standard administrative equipment
	It & Technology	Computers, software, and IT services for government operations
	Operational Support Services	Consulting, legal, accounting, and specialized administrative services
	Facilities Management	Cleaning services and maintenance for government buildings
	Government Operations Logistics	Government vehicles, heavy equipment, and official travel expenses
	Security Operations	Security services specifically for government facilities
	Administrative Equipment	Office furniture and technology equipment for administrative purposes

The table shows two broad product categories: Population Benefit Products and Government Consumption Products, along with their detailed products and descriptions.

Table A.15: Pass-through: Competition and Price

Product	log(no.participants)	log(price)	Δno.participants	Δprice	Category
Education Learning	0.7435***	-0.3427***	3.0573	-1.4325	Population Benefit Product
Healthcare & Medical	1.0825***	-0.5056***	6.5553	-3.2330	Population Benefit Product
Food & Nutrition	0.4182***	-0.5209***	1.5951	-1.9922	Population Benefit Product
Water & Sanitation	0.5007**	-0.4963***	2.0048	-2.0182	Population Benefit Product
Social Assistance	0.6966***	-0.3112**	3.1640	-1.4306	Population Benefit Product
Public Infrastructure	0.7967***	-0.4014***	3.0417	-1.5482	Population Benefit Product
Public Safety & Security	0.1194	-0.2324	0.4720	-0.9350	Population Benefit Product
Environmental & Waste Services	1.0546***	-0.4514*	4.3479	-1.8957	Population Benefit Product
Recreation & Culture	0.4223	-0.7274***	1.4574	-2.5849	Population Benefit Product
Public Health Services	1.0733***	-0.4405***	6.3985	-2.7508	Population Benefit Product
Administrative Materials	0.6828***	-0.2422**	3.1110	-1.1072	Government Consumption Product
IT & Technology	0.1849	-0.2418	0.7258	-0.9396	Government Consumption Product
Operational Support Services	0.9050**	-0.9272**	3.6025	-3.6761	Government Consumption Product
Facilities Management	0.4309	-0.9155*	1.9370	-4.0038	Government Consumption Product
Government Operations Logistics	0.4844	-1.2292***	1.7419	-4.3298	Government Consumption Product
Security Operations	0.1194	-0.2324	0.4720	-0.9350	Government Consumption Product
Administrative Equipment	0.4233*	-0.2285*	1.7798	-0.9645	Government Consumption Product

The table reports estimated changes in competition and prices across products, using our preferred specifications in Table 2 columns III. We also report absolute changes by multiplying the estimated changes by the mean values of no.participants and prices in each product, in columns Δ no. participants and Δ prices.

Table A.16: Federal Transfer Effect on Procurement Participants: First Stage

	log(FPM transfer)			
	I	II	III	IV
Log FPM transfer by law	0.8736***	0.8992***	0.8674***	0.8965***
	(0.0030)	(0.0029)	(0.0029)	(0.0030)
Observations	1,803,716	1,803,716	1,803,716	1,803,716
R2	0.99696	0.99945	0.99808	0.99956
Bandwidth	Optimal	Optimal	Optimal	Optimal
Item-Cutoff-Year FE	Yes	Yes	Yes	Yes
Winner-Cutoff-Year FE		Yes		Yes
MesoRegion-Cutoff-Year FE			Yes	Yes

This table reports the first stage results of the main Regression Discontinuity specification in equation 2, where we regress the natural logarithm of law-implied FPM transfer on the natural logarithm of the actual transfer. All specifications include item-threshold-year fixed effects with additional fixed effects: firms that win the public contract (columns II and IV), and meso-region (columns III and IV). We use a first-order polynomial (linear) fit around the threshold. The table shows the effective sample size, determined using the optimal bandwidth selection method from Calonico et al. (2014). The sample size varies depending on the dependent variable. Standard errors are clustered at the item-municipality-threshold level. ***, **, * denote significance at the 1%, 5%, and 10% level, respectively.