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Political Contributions and Public Procurement: Evidence from Lithuania*

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Abstract

This paper studies whether firms trade political contributions for public procurement contracts. Combining data on Lithuanian government tenders, corporate donors and firm characteristics, I examine how a ban on corporate contributions affects the awarding of procurement contracts to companies that donated in the past. Consistent with political favoritism, donors' probability of winning falls by five percentage points as compared to that of non-donor firms after the ban. Evidence on bidding and victory margins suggests that corporate donors may receive auction-relevant information affecting procurement outcomes in their favor.

Keywords: political contributions, public procurement, contributing firms, rent-seeking.
JEL classification: D72, H57.

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1 Introduction

Can political donations buy influence? Should businesses be allowed to support politicians financially? The campaign finance law has been highly debated in the United States for several decades and is a salient issue in many other countries, including Brazil, which recently passed a law to ban corporate donations, the UK, the Netherlands and Japan. Supporters of private donations believe that they increase political information, foster civic involvement and ensure that a diversity of views is heard. They also argue that private financing of politics is more desirable than public financing, which may result in lower political competition and give an advantage for incumbent parties. In contrast, critics claim that private donations lead to corruption and political favors to donors.

Key to this debate is whether public policy can be insulated from the strings potentially attached to political contributions. In particular, government procurement is an important policy outcome: with its 10% to 25% of GDP worldwide (World Bank, 2017), it accounts for a substantial part of the global economy. This paper studies Lithuania, which is a small relatively well-functioning democracy in Eastern Europe. Lithuania ranks similar to Spain (and far ahead of, e.g., Italy and Greece) in terms of perceived corruption (Transparency International, 2014). Procedures for public procurement are strictly monitored.[1] Regulation of political donations is more stringent than in many other European countries (e.g., Sweden). If political contributions influence policy in this environment, then similar effects are likely to exist in a large set of countries.

In 2012, Lithuania enacted a law that banned corporate donations to political parties and campaigns. This paper analyzes whether this reform affected contributing firms' chances of winning and their bidding behavior in public tenders. I investigate a novel data set of 250,000 procurement contracts with 600,000 bids from more than 8,000 unique firms in 2008-2013, combined with data from the Central Election Commission on corporate donors in 2007-2013, including the firm name, the recipient and the amount.

Results strongly indicate that corporate money buys preferential treatment in procurement auctions. Figure 1 shows the probability of winning[2] for corporate donors and other

[1] Nevertheless, controversial role of political donations is salient in procurement market. To quote the Director of the Lithuanian Public Procurement Office, Diana Vilyte: *"Business' connections to politicians exist. I know it, and you know it."* (*Conversation with Diana Vilyte: Corruption Will Be Fought Also in the Top*, February 11, 2015, Vakaru ekspresas.)

[2] To account for heterogeneity in the procurement data, I net out year, 4-digit Common Procurement

tender participants before and after the ban on corporate donations came into force on January 1, 2012. In the 40 months before the reform contributing firms have a steady and unexplained higher chance of winning in procurement tenders. Most important, there is no evidence of pre-trends, as the probability of winning a contract for contributing and non-contributing firms moves in parallel before 2012. Consistent with political favoritism, the gap between the two groups vanishes after the reform. In a difference-in-difference regression framework, I estimate that the chances of winning for corporate donors decrease by five percentage points as compared to non-donor firms after the reform.

[Figure 1 here]

The findings are robust to altering the regression specification. In the preferred specification, firm fixed effects control for time-invariant firm-level heterogeneity, and industry-specific non-parametric time trends ensure that economic cycles in different industries do not confound the results. They are also robust to trimming the sample to improve the overlap between the covariates' distributions of contributing firms and other firms (Crump et al., 2009; Imbens and Wooldridge, 2009).

I then investigate the possible mechanisms through which procurement bureaucrats can favor donor firms. The typical procurement procedure is a first-price sealed-bid auction which is open to an unrestricted number of participants and in which the bids are simultaneously made public. This procedure is strictly monitored by the Public Procurement Office, which severely limits the options of the bureaucrat.[3] In such context, two channels of influence seem most plausible. The first is that bureaucrats affect the *contract design*, i.e. stipulate tender calls so that only a contributing firm can satisfy the necessary requirements (Kang and Miller, 2017). The other is that they leak information, e.g., on competing bids (Andreyanov et al., 2017), to contributing firms (*information channel*). These two channels have very different empirical implications. The *contract design channel* affects participation in procurement auctions. However, I find that the reform had little effect on the number of sole-bid tenders won by contributing firms and, more generally, on the level of competition. More directly,

Vocabulary code, contracting authority type and procurement procedure type fixed effects, and indicators for goods, services and works. The graphical analysis is qualitatively unchanged when the raw *Winner* indicator variable is used (Figure A.3.1 in the Appendix).

[3]Public officials have high incentives to comply with the procurement regulation. The Lithuanian Public Procurement Office actively monitors tenders and bureaucrats are directly responsible for infringements in administering tenders.

the *contract design channel* operates through manipulation of tender calls which specify requisites for procurement purchases. Using text analysis tools, I examine tender descriptions and find no effect of the reform on complexity of tenders won by contributing firms. All in all, the *contract design channel* seems unlikely to be the relevant mechanism. To study the *information channel*, I explore the idea that contributing firms receive auction-relevant information – e.g., on the number of participants, the identities or price bids of competitors – which may affect procurement outcomes in their favor. Such "insider" information regarding a procurement tender plausibly grants an advantage to informed firms, which they can exploit in their bidding strategies.[4] The *information channel* thus only changes the outcome of multiple-bid tenders, in which firms' bids effectively determine the winner. I find that the reduction of the probability of winning is driven by tenders with several participants. This is consistent with the *information channel* playing the main role in Lithuanian political favoritism.

I further examine the *information channel* in a simple first-price sealed-bid auction model with private and independent values, in which one bidder is informed about the bid by the opponent (the most extreme form of favor). The model setup closely resembles the actual implementation of Lithuanian procurement procedures and provides theoretical predictions regarding the bidding behavior of firms. The empirical results are consistent with these insights. First, I find that contributing firms lower their bids after the reform. This suggests that corporate donors were charging higher markups thanks to political favoritism. Second, their victory margin – the percentage difference between their bid and the second lowest bid – before the ban was more often narrow (as compared to non-donor winners) than after the ban. All in all, this evidence is consistent with leaked information being the main channel whereby political money translates into favors in procurement. It allows corporate donors to adjust their bids in order to secure contracts and increase the markup for the contracts they win.

I present a range of additional findings. Large donations give more advantage in public procurement. The effects are largest for top and middle levels of public administration, perhaps because close connections between politicians and bureaucrats are mostly prevalent

[4]Arguably, information on bids submitted by other tender participants is the most "profitable" type of favor in first-price tenders. Yet, this does not exclude the possibility that bureaucrats leak other types of information which would grant an advantage to informed firms – in the reality it is not possible to directly observe which specific information is revealed.

there. I also analyze in more detail contracts in health care, which is the largest procurement sector. In this sector, donations to the party that holds the Chair of the Committee of Health Affairs significantly explain which firm wins procurement tenders.

An important conclusion of this paper is that the additional procurement costs induced by corporate donations are large, despite the strict regulation and monitoring of procurement procedures. Although *a priori* the effects of leaked information may seem small in magnitude, around 14% of GDP in Lithuania is spent for public procurement purchases. Moreover, previously contributing firms win 29% of all contracts and are estimated to lower their prices by 24% after the ban on corporate contributions. Back of the envelope calculations yields that costs-increases in procurement caused by corporate donations are almost one percent of GDP.[5] In addition, the fall in the probability of winning after the ban suggests that five percent of the contracts were misallocated because of corporate donations, thereby causing inefficiencies. These large economic effects have strong policy implications, suggesting that public funding of political parties can be a good investment.[6]

One may be concerned that previously donating firms substitute official donations with unofficial kickback payments. However, this hypothesis is not confirmed by the evidence in the paper. In general, also on aggregate level corruption perceptions in Lithuania have been gradually decreasing since 2000s. Moreover, the Global Corruption Barometer survey shows that the percentage of people who report having paid bribes goes down from 34% in 2010 to 26% in 2012, and the percentage of people who think that parties are very corrupt goes down from 83% to 78% over the same period. This suggests that levels of political corruption do not hike after the reform.

Pre-existing evidence on the effect of political contributions on policy is weak. Findings from the United States show that contributions do not systematically affect legislative behavior (Ansolabehere et al., 2003). Moreover, being mostly made by individuals and in small amounts, political donations are often seen as a form of political participation. On the other hand, giving money may work as an investment in political favors for a subset of donors,

[5]Cheap products or goods can be of a lower quality, however. To mitigate this concern I analyze prices paid for public purchases in two standardized quality categories of purchases – pharmaceuticals and medical equipment. The results (available upon request) show that the price growth decelerates following the ban on corporate donations also for these goods. To the extent that changes in quality of standardized products are unlikely, this evidence helps mitigating quality-related concerns.

[6]The results presented in this paper featured Lithuanian media – *Veidas* magazine and *Business News* (*"Verslo Zinios"*) daily newspaper – to cover the debate on the transparency of Lithuanian political finance.

such as corporations (e.g., Gordon et al., 2007; Hansen et al., 2005). Yet, being mostly based on correlations, these studies suffer from the potential presence of confounding factors, such as firm-politician links. This paper instead exploits a reform which imposed a complete ban on corporate donations to study how it alters policy benefits to (previously) contributing firms.

Evidence also shows that political contributions or lobbying expenditures are positively related to firms' stock market performance (e.g., Jayachandran, 2006; Ferguson and Voth, 2008; Cooper et al., 2010)[7] or effective tax rates (Richter et al., 2009). Different from this literature, I focus on public procurement sector. Preferential allocation of contracts to contributing firms may be one of the most important tools, under control of politicians, to directly affect firm outcomes. Not only do government purchases constitute an important source of revenues for firms, but they may also affect their growth dynamics (Ferraz et al., 2015). Two recent papers (Boas et al., 2014 and Arvate et al., 2016) study a related question of how close electoral victories in Brazil affect allocation of government contracts to donating firms. Similar to this paper, their findings are consistent with a quid pro quo role of donations for procurement contracts. However, while Boas et al. (2014) and Arvate et al. (2016) use the within-donor variation to causally identify *effects of electoral victory*, this paper sheds light on *effects of political donations* by exploiting the exogenous reform-induced variation in the presence of corporate donations.

Moreover, this paper is related to a broad literature on firm-politician connections and stock-market valuations (e.g., Fisman, 2001; Faccio, 2006; Faccio et al., 2006; Coulomb and Sangnier, 2014), access to credit (Khwaja and Mian, 2005), or procurement contracts' allocation (Goldman et al., 2013; Straub, 2014; Brogaard et al., 2016; Koren et al., 2015; Mironov and Zhuravskaya, 2016; Schoenherr, 2018). Even though this literature has established that political connections benefit firms, little is known about how these connections are created and whether they are policy-sensitive. The key contribution of this paper is to show that firms use political donations as a means to build political connections and, most important, that these connections can be affected by policy tools, such as banning corporate donations.

Finally, this study complements the limited understanding of mechanisms in political fa-

[7]The existing literature is not conclusive on the topic, however. For instance, Ansolabehere et al. (2004) do not detect any differences in the performance of firms that give "soft money"; Aggarwal et al. (2012) find a negative correlation between donations and firms' returns.

voritism by documenting the prevalence of the *information channel*. This novel idea is in part similar to Ovtchinnikov et al. (2016) who argue that contributing firms are informed about future legislation. The detailed study of mechanisms in my paper suggests that even under relatively strong institutions political favoritism may slip in through rather sophisticated channels of influence.

The remainder of the paper is organized as follows. Section 2 presents the Lithuanian institutional setting. Section 3 describes the data and the empirical strategy. Section 4 shows the main results and section 5 assesses their robustness. Section 6 discusses the mechanisms at work. Section 7 concludes the paper.

2 The institutional framework

Lithuanian political system. Lithuania is an Eastern European country, situated along the southeastern shore of the Baltic Sea. After declaring its independence from the USSR in 1990, the country is currently a democratic semi-presidential republic with a well-functioning market economy. Lithuania has been a full member of NATO and the European Union since 2004.

Lithuania has a directly elected President. Regular parliamentary elections have been held every four years since 1992. The Lithuanian Parliament, *Seimas*, has 141 seats and a mixed electoral system. In each parliamentary election since the independence, on average, 15 political parties have presented candidate lists and at least six parties have obtained seats. The core of this multi-party system can be classified into two categories. The center-left parties are the Social Democratic Party of Lithuania (LSDP) and the Labour Party (DP). The center-right parties are the Homeland Union - Lithuanian Christian Democrats (TS-LKD) and liberals (the Liberal and Center Union (LiCS) and the Liberal Movement (LRLS)).[8] Shifts in political power are common: left-wing and right-wing coalitions alternated since the 2000s.[9]

Political finance reform. In Lithuania, the financing of political parties and political campaigns has been regulated by the national legislation since 1996.[10] The size of individ-

[8] Order and Justice (TT) is a center-right party which, however, joined a left-wing opposition coalition in 2008 and a left-wing majority coalition in 2012. This illustrates a rather weak left-right ideological dimension in Lithuanian politics.

[9] See Figure A.3.2 in the Appendix.

[10] Financing of political parties and financing of political campaigns differ in that the latter happens during

ual donations and campaign expenditures is capped. Public disclosure of political finance accounts is mandatory for all political parties. Compliance with the law is monitored by the Central Electoral Commission (henceforth - CEC), which supervises elections and implements independent audits.

This paper studies the most recent substantial reform of political finance in Lithuania. It was introduced by Law No.XI-1777 which was passed on December 6, 2011 and came into force on January 1, 2012. The law imposed the following changes:

i) Donations by all legal entities to political parties and campaigns were banned.

ii) The maximum size of an individual donation was reduced from 44,000LTL to 22,000LTL (from 12,700EUR to 6,400EUR) and donations were only allowed during the electoral campaign period.

iii) Party financing from the state budget was introduced.[11]

The reform resulted in a major shift in the sources of political finance from corporate donations to public funding. Table 1 describes the funding structure for six largest political parties in 2011 and in 2012. Prior to the reform, on average 43% of the total party finance was raised from private donations, coming almost exclusively from firms. After the reform, the state funding became the largest source of funding, accounting for 66% of the total.

[Table 1 here]

Figure 2 plots corporate and individual donations received by political parties during the period 2008-2013. Regardless a cyclical pattern of donations peaking in the end of each fiscal year, an unprecedented spike in corporate contributions in December 2011 highlights an evident "donation rush" immediately after the law was passed in the Parliament on December 6, 2011. In particular, 158 out of 162 donations received in December were made after this date. They account for a significant fraction of the total corporate support to parties in 2011.[12] Thereafter, political parties registered no corporate donations.[13] Furthermore,

the pre-election years and is explicitly budgeted for political campaign expenditures.

[11]To refer to the reform enacted by the Law No.XI-1777 as a whole, I use the words "the ban on corporate donations", "the law" and "the reform" interchangeably.

[12]This seemingly wasteful donors' reaction to the ban could be explained by firms' inability to correctly predict politicians' behavior. In fact, there is no evidence that the ban affected the probability of winning for firms which donated in December 2011 for the first time. In other words, their attempt to acquire a donor-premium before the ban comes into force appears – at the very least, empirically – to be a failure. In addition, I note that any confounding effect due to the spike in donations in December 2011 would bias my estimates towards the zero.

[13]Political parties' financial reports are audited by the CEC to guarantee full compliance with the political

there is no evidence that individual donations replaced corporate ones: the yearly amount of private party donations declined throughout the entire 2008-2013 period and the yearly amount of private donations in the 2008 and 2012 parliamentary campaigns was very similar. Finally, Figure 2 illustrates that the ban on corporate donations did not coincide with changes in political power, as regular parliamentary elections took place in October 2008 and 2012.[14]

[Figure 2 here]

Public procurement in Lithuania. Public procurement spending in Lithuania amounts to approximately 14% of GDP (Public Procurement Office, 2014).[15] The Lithuanian Public Procurement Office co-ordinates public procurement activities and supervises their compliance with the Law on Public Procurement and other regulations. It also audits procurement procedures. The majority of tenders are carried out by individual contracting authorities: on average, only nine percent of the procurement value are purchased through a centralized system. Administrative staff in charge of organizing the tender bears administrative responsibility for potential violations of the law. Infringements are punished by monetary fines and/or firing.

A procurement procedure starts with a contracting authority forming a Public Procurement Commission (henceforth – Commission) which is in charge of organizing the tender. The Commission prepares and publishes a contract notice with information about the procurement object, the chosen evaluation criterion, the qualification requirements for suppliers and the deadline for submission of tenders.

The most typical procurement is a first-price sealed-bid auction which is open to an unrestricted number of bidders and in which the bids are simultaneously made public. In theory, the law allows for restricted procedures in which only selected suppliers are invited to participate or procedures which involve negotiations between the contracting authority and

finance laws. After the reform, parties were obliged to return any corporate donation to the donor and to transfer any anonymous donation to the state budget. This made virtually impossible for firms to officially finance political activity.

[14] I gather additional contextual evidence to verify that there were no other institutional changes that happened around the same time as the ban and that could confound the results. Most relevant, the list of laws passed in the six-month window around the ban includes no anti-corruption laws targeted to public procurement. Moreover, corruption prevention activity by the Public Procurement Office is unlikely to explain the drop in the winning probability of contributing firms: Figure A.3.3 in the Appendix shows that the number of procurement procedures inspected and the percentage of them canceled are rather stable over the period 2005-2013 (if anything, they exhibit a mild declining pattern).

[15] In the European Union, the public purchase of goods and services is estimated to account for 16% of GDP (the European Commission).

individual suppliers before the submission of final tender documents.[16] In practice, however, they are rare: in my data 90% of all bids are submitted to open procedures. Similarly, the contracting authority may choose to award the tender to the most economically advantageous tender or the lowest price tender, but the vast majority of tenders in Lithuania are awarded using the latter one.[17]

3 Data and empirical design

3.1 Data

The analysis relies on three main datasets: i) the registry of procurement procedures from the Public Procurement Office; ii) information on corporate donors from the Central Electoral Commission; iii) data on firms' financial accounts from the Orbis database.

Procurement data. I obtain data from the public procurement registry for the period 2008-2013.[18] As the Centralized Public Procurement Information System (CPP IS)[19] was launched in September 2008, data collected earlier is not entirely consistent with that from the CPP IS. Hence, I exclude this period of the data from the analysis.[20] The sample covers 50,000 procurement procedures with 250,000 procurement contracts in 129 3-digit Common Procurement Vocabulary (henceforth - CPV) codes,[21] with bids from more than 8,000 firms. It represents a substantial share of the overall procurement volume in Lithuania over the

[16]The Law on Public Procurement No.I-1491 prescribes that the contracting authority may choose among the following procedure types: open procedure, restricted procedure, negotiated procedure and competitive dialogue. Open and restricted procedures are the main types and can be used in all cases. The negotiated procedures are organized for more complex services or goods. A detailed description of different procedures and their use is provided in the Law No.I-1491.

[17]According to official statistics for the period 2008-2013, only 7% of all Lithuanian tenders are awarded using the most economically advantageous tendering criterion.

[18]The data for a fraction of procurement contracts awarded in 2014 was also made available by the Public Procurement Office. However, it is not a representative sample of contracts awarded in 2014, and it is not used in the main analysis. The findings are robust to the inclusion of the 2014 data.

[19]The CPP IS made it easier for contracting authorities to publish tender calls online. The percentage of auctions published online reached 99% in 2008 (Public Procurement Office, Annual Report 2008). Moreover, the CPP IS could be used to publish official reports about implemented procurement procedures.

[20]None of the findings are driven by dropping observations in this period. Unless explicitly stated, there are no substantial differences in magnitudes or significance of the key estimated coefficients.

[21]The coverage of the CPV codes is based on the criterion that at least one campaign corporate donor in 2008 participated in a tender within a given 3-digit CPV. To define this set, I scrape the public procurement database and search for the 2008 campaign corporate donors among tender participants. I extract the full CPV code for tenders in which these firms have participated and strip the first three digits of CPV codes. I then obtain information on all tenders within the set of resulting CPV codes upon a formal application to the Public Procurement Office.

period. Figure 3 shows that, on average, it corresponds to 66% of the total procurement value and 80% of the total number of procurement procedures. The data contains information on the identity and type of the contracting authority, the procurement procedure type, the CPV code, the type of object procured, the date of award, the supplier identity and the bid price, the winning supplier and the procurement procedure value.[22]

[Figure 3 here]

The top category in terms of procurement sectors is medical equipment, pharmaceutical products and personal care products. Other important categories are repair and maintenance services, food and beverages and construction works.[23]

The structure of the tender-participant level data is illustrated by the procurement procedure No.76266 by Klaipeda Children's Hospital which contains a number of specific lots (Figure 4). The tender is carried out under a simplified open procedure and according to the lowest price criterion. Individual firms' bids are ranked in an ascending order and the supplier with the lowest price wins a contract for a specific lot.

[Figure 4 here]

Table 2 shows the descriptive statistics of the main procurement variables. The final sample consists of 596,068 firm-by-tender observations. The probability of winning for an average tender participant is 43%, reflecting considerable presence of auctions with a sole bidder and rather low numerosity of suppliers in multiple-bid tenders. Most tenders are open procurement procedures and roughly three quarters of all tenders are carried out by middle-level public administration units, which are directly subordinate to the central administration. Finally, 79% of all tenders are organized to procure goods, 16% to procure services and 5% to procure works.

[Table 2 here]

[22] This information is aggregated by procurement procedure. Given that there is no data on quantities, the monetary value at the contract level is not known. Although these data limitations does not allow for fully fledged analysis, I provide suggestive evidence on the contract value in Section 4.

[23] A list of the 10 most frequent CPV 2-digit codes and their descriptions is shown in the Appendix, Table A.3.1.

Data on corporate donors. Information on political donors in Lithuania is publicly available on the CEC website. I collect data on the universe of corporate donors, i.e., all legal entities that contribute to political parties or political campaigns during the period 2007-2011. The data contains the following information for more than 1,500 firms: the legal name of a firm, the amount of the contribution and the recipient's identity (party or candidate name). The median party donation is 10,000LTL (2,960EUR) and 25% of the corporate donors donate several times, thereby suggesting the existence of repeated interactions between firms and politicians. Moreover, corporate political ideology is not very pronounced: over the period of interest, 17% of all firms support different parties, with some firms donating to both right-wing and left-wing politicians.

Firm-level data. I obtain information on firm characteristics from the Orbis database. Due to its broad coverage of Lithuanian firms, I match over 90% of the firms in public procurement data. In particular, I collect information on size, sector, number of employees, number of subsidiaries and shareholders, corporate group size, revenue, net income, total, fixed and current assets and capital.[24]

A comprehensive overview of the coverage of and matches between different types of data is shown in Figure 5.[25] Out of 1,500 corporate donors, roughly one third participates in procurement tenders after having donated. These firms submit around 27% of all bids. A vast majority of them have also won at least one contract during 2008-2013.

[Figure 5 here]

3.2 Empirical strategy

I examine the data on procurement contracts awarded during the period 2008-2013. I use a difference-in-differences estimation and distinguish between contributing firms (*treatment group*) and other firms (*control group*). In tender-participant level regressions, I compare the change in procurement outcomes for contributing and non-contributing firms before and after the ban on corporate donations. In the main analysis, I focus on the probability of winning

[24]While the coverage is nearly perfect for time-constant firm characteristics, it is substantially lower for time-varying indicators, such as net income or capital. This is likely due to the fact that yearly filing of company information is not mandatory for firms.

[25]The information on procurement and corporate donors is merged by the exact match of firms' legal name. Firm characteristics extracted from the Orbis database are merged by the national firm identification number.

in order to test the hypothesis that political contributions grant preferential treatment in the awarding of procurement contracts. If political contributions facilitate the collaboration between firms and politicians, (previous) corporate donors should experience a decrease in their probability of winning as compared to other firms in the period after the reform.

Specifically, I estimate the following panel regression:

$$Winner_{ict} = \alpha + \beta_1 Contribute_i + \beta_2 Ban_t + \beta_3 Contribute_i \times Ban_t + X_{ct}^p \delta + X_{it}^f \gamma + \varepsilon_{ict}, \tag{1}$$

where $Winner_{ict}$ is an indicator variable taking the value of 1 if a tender participant i wins a contract c in a year t. $Contribute_i$ is an indicator variable taking the value of 1 if a tender participant has donated to a political party or a political campaign.[26] Ban_t is an indicator variable taking the value of 1 for contracts signed after the ban on corporate donations came into force, i.e. January 1, 2012. The variable $Contribute$ makes it possible to control for the unobserved time-invariant characteristics that may differ across the two groups of firms, whereas Ban captures the average post-reform trend common to both groups, including the impact of other provisions of the 2011 ban. $Contribute_i \times Ban_t$ is the interaction between the two indicator variables and β_3 measures the effect of interest. X_{ct}^p is a vector of *procurement controls*, which includes year indicators μ_t, CPV 4-digit code indicators μ_s, indicators for public procurement procedure types, for goods, services and works procured and for contracting authority types. X_{it}^f is a vector of *firm controls*, which includes firm size category and firm NACE main industry dummies, and firm age. ε_{ict} is the error term.

The causal interpretation of the coefficient of interest β_3 rests on the assumption that in the absence of reform, the probability of winning would have evolved similarly in the group of contributing and non-contributing firms. In Section 4, I investigate the validity of this assumption by studying the development of the dependent variable in the pre-reform period for the two groups of firms. Moreover, I limit the remaining concerns regarding diverging trends for contributing and non-contributing firms by stringent regression specifications. I include industry-specific non-parametric time trends $\pi_s \times \mu_t$ in equation (1). This ensures that potentially different time trends for firms in certain industries do not drive my results. I also

[26] The treatment (contributing) and control (non-contributing) groups are distinct. Moreover, I consider political contributions as a proactive means of creating political connections and therefore assign to the control group these few firms which only participated in procurement auctions prior to making a political donation (and never participated afterwards).

augment equation (1) with firm fixed effects μ_i in order to control for firm-level time-invariant observed and unobserved heterogeneity. Identification in such specifications comes from within-firm variation over time. Finally, in Section 5, I use the trimming procedure (Crump et al., 2009; Imbens and Wooldridge, 2009) to ensure that differences in the observables for the two groups do not confound the results.

4 Empirical analysis

Do political contributions grant favorable treatment in the awarding of procurement contracts? Time changes in the probability of winning for contributing and other tender participants were presented in Figure 1, which shows the residuals of the regression of the *Winner* indicator variable on *procurement controls* (as defined in section 3.2) for the two groups of firms. Contributing firms face a constantly higher probability of winning than non-contributing firms during 2008-2011. Consistent with the identifying assumption, the two groups parallel each other fairly well during this period. In line with the expected effects of the reform, there is a clear change in the trend of corporate donors' performance *at the time of the reform*: their winning chances start decreasing already in the the first months of 2012. The drop is marked: contributing and other firms face similar chances of victory towards the end of the period.

I quantify changes in the awarding of procurement contracts to corporate donors before and after the ban on corporate donations in a regression analysis. Columns 1 to 5 in Table 3 show the estimation results when I gradually add controls to the specification in equation (1). Standard errors clustered at the firm level are shown in parenthesis.[27]

[Table 3 here]

The specification in column 1 includes *procurement controls* (year and CPV 4-digit code indicators, indicators for procurement procedure types, for contracting authority types and for goods, services and works procured).[28] The coefficient on the *Contribute* indicator variable shows that corporate donors are approximately nine percentage points more likely to

[27]Since the contribution status varies at the firm level, this is the preferred level for clustering standard errors. The results are robust to a coarser clustering at the CPV 4-digit code level or the NACE 2-digit industry level and to the two-way clustering at firm and procurement procedure level.

[28]The coefficient on the *Ban* indicator is not included in the reported output, because its interpretation it not meaningful in specifications with year fixed effects.

win a contract in the period before the reform. The coefficient on the interaction term *Contribute* × *Ban* shows that the probability of winning for contributing firms decreases by four percentage points after the ban on corporate donations, as compared to other tender participants. Column 2 adds *firm controls* (size, industry and age). Firm-level characteristics account for roughly one fourth of "the victory premium" of corporate donors, as the coefficient on the interaction term *Contribute* falls to 0.065. The effect of the reform increases in absolute magnitude and is more precisely estimated (a point estimate of -0.044, a sandard error of 0.017). Column 3 adds industry-specific non-parametric time trends. These ensure that economic cycles in different industries do not confound the results. Columns 4 and 5 include firm fixed effects without and with industry-specific time trends, respectively. The coefficient on the interaction term *Contribute* × *Ban* remains stable with an even lower standard error. In the preferred specification in column 5, the estimated reduction in contributing firms' chances of winning is 4.8 percentage points, with a standard error of 0.015.[29]

The results imply that the "victory premium", possessed by corporate donors in the pre-reform period and unexplained by firm-level variables, decreases substantially after political contributions have been banned. The reform caused a five percentage point drop in the probability of winning a procurement contract for firms that used to support politicians financially.[30]

Although the main analysis of this paper is developed around the probability of winning, the intensive margin may also be affected. Yet, the data only contains procurement value at a more aggregate procurement procedure level, and not at the contract-level. Therefore, I rely on a simple assumption to determine the value of a single contract. I assume that the contract value is distributed uniformly across contracts within a given procedure and calculate the single contract value as the total procedure value divided by the number of

[29]This most stringent regression specification is the preferred one and is used to report the results in subsequent sections, unless otherwise specified.

[30]One may wonder whether lower chances of winning for contributing firms are driven by changes in the numerosity or the composition of the procurement contracts. I plot the number of contracts over time, in total and for five most frequent categories separately in Figure A.3.4 in the Appendix. While there is a substantial month-to-month variation, the data shows no abrupt changes in the volumes of procurement contracts at the time of the reform, both for the total and separately for the largest procurement categories. Moreover, the effect does not seem to be driven by changes in contributing firms' bidding frequency, as illustrated in Table A.3.2 in the Appendix.

contracts in that procedure.[31] First, I study the effect of the ban on the contract value of winning firms in Panel A of Table A.3.3 (with regression specifications analogous to Table 3) in Appendix. The results indicate a negative effect of the reform on the intensive margin, although the point estimates lose significance in some more stringent regression specifications. I then examine the cumulative effect of the two margins in Panel B of Table A.3.3. Negative and statistically significant point estimates show that the reform had an adverse negative overall effect on the procurement performance of contributing firms. Interestingly, it appears to be stronger on the extensive margin, i.e., probability of winning a contract. In closing, I would like to note that the results on the contract values should be given a conservative interpretation, since they rely on data imputation and ignore the fact that the quantities purchased are not observed by the researcher.

Next, I formally test the identifying assumption by implementing placebo regressions (column 6, Table 3). I define an indicator variable *Placebo* taking the value of 1 for contracts awarded after a placebo reform on January 1, 2010[32] and include the interaction term $Contribute \times Placebo$ in my preferred specification of equation (1). The coefficient on $Contribute \times Ban$ remains stable (point estimate of -0.056, a standard error of 0.022), whereas the coefficient on $Contribute \times Placebo$ is positive, small and not significant (point estimate of 0.021, a standard error of 0.029). This evidence suggests that diverging trends for the two groups of firms in the pre-reform period do not drive the results.

Given that effects of the ban appear gradually and that parliamentary elections take place in October 2012, I discuss potential concerns related to the timing of these events. For example, if connections established with the government in the previous mandate become useless or even detrimental after the change in power, one might wrongly attribute the effect of the elections to the effect of the reform. Even though the data around earlier elections' dates are not available to directly examine this hypothesis,[33] several facts are at odds with this possibility. First, party turnover in the Lithuanian multi-party political system is of

[31] The results are broadly confirmed when the procurement contract value is inputed using an alternative assumption that the winning bid directly maps to the contract value (i.e., the winning bid is used as a measure of the value of the contract). The full set of results are available upon request.

[32] The results are robust to alternative definitions in which the *Placebo* indicator takes the value of 1 for contracts awarded after January 1, 2009 and January 1, 2011.

[33] To be precise, elections in October 2008 are included in the sample. Figure 1 highlights that there is no drop in the probability of winning for contributing firms following this event. Even though this suggestive evidence should be taken with a grain of salt, given a narrow time window around the 2008 elections, it goes against the concern on the confounding effects of elections.

limited scope, because the same core parties usually gain a significant number of seats in each election (see Section 2). Hence, the absence of sharp changes in the identities of *insider* vs. *outsider* political parties may alleviate the above concern. Second, under this alternative scenario, donors to parties in the majority coalition in the 2008 government should experience a stronger effect of the ban, whereas it should be mitigated (or null) for donors to parties in the opposition. However, the heterogeneity analysis reveals that both donors to the majority and to the opposition parties experience a reduction in the probability of winning.[34] This pattern is difficult to reconcile with the scenario built on electoral turnover effects. Third, the timing of the effects is in contrast with elections being the main driver of the results. Figure 1 shows that the slope of the probability of winning for corporate donors changes markedly right after the ban: their performance in procurement starts declining, in contrast with a positive trend during the previous years. Most important, this evident turn in the time trend manifests immediately after the reform, and not after the elections (when there is virtually no change in the slope for contributing firms). Backed by this graphical evidence, I decompose the overall effect of the reform into *before-election* and *after-election* effect. The point estimates on the two coefficients are both negative and significant: in the preferred most stringent specification, the estimate of the *before-election* effect of the reform is 2.8 percentage points (with a standard error of 0.013), while that of the *after-election* effect is 5.9 percentage points (with a standard error of 0.023). These results imply that the reform effects are proportional to time: the *after-election* effect observed roughly in two years after the reform is roughly double the size of the *before-election* effect observed in the first year. In line with the constant slope for contributing firms after the reform in Figure 1, these results suggest that the entire estimated effect of the reform is unlikely to stem merely from elections, because the reform starts having an effect – both in quantitative and qualitative terms – immediately after it is enacted. All in all, the competing explanation based on electoral results does not receive empirical support to contrast that the ban is plausibly the main cause behind the deterioration in donors' procurement performance.

[34]The results are available upon request.

5 Robustness checks

Contributing firms are different from other tender participants. On average, they offer lower price bids and are more likely to win a contract. At the firm level, while the majority of contributing firms belong to the medium-sized company category, other firms are mostly small companies (Panel A, Table 4). The former are also three years older and more frequently belong to a (larger) corporate group.[35]

[Table 4 here]

One potential concern is that the estimated reduction in the probability of winning for contributing firms is driven by the difference in firm characteristics. To address this, I show that the average treatment effect remains stable in the sample of firms with similar covariates. For this purpose, I adopt the trimming method proposed in Crump et al. (2009). In a cross-section of firms, I regress the contribution status (0 or 1) on the firm-level observable characteristics and compute their predicted scores ($\hat{p}$) of being in a contributing or not contributing group.[36] Then, I discard observations on the two extremes of the propensity score $\hat{p}$ distribution.[37]

There is a considerable improvement in the overlap of firm covariates in the trimmed sample of firms (Panel B, Table 4). Firm size categories and corporate group size are balanced; the age difference goes down to less than one year; the number of subsidiaries and shareholders is much better matched. Finally, the difference in financial indicators in the trimmed sample shrinks by at least 50% for each of the variables considered.

I replicate the regression analysis with my preferred specification in order to study the effects of the reform in the trimmed sample in column 1 of Table 5.[38] Moreover, as the density of the predicted propensity $\hat{p}$ is very low above 0.6 (Figure A.1.1 in the Appendix), I also

[35] Moreover, 17% of the corporate donors have at least one subsidiary as compared to 5% of the other firms. Financial indicators show that contributing firms have more employees and larger revenues and make higher profits.

[36] The estimation results are shown in Section A.1.

[37] I use the proposed heuristic rule and trim all firms with the estimated propensity score $\hat{p}$ outside the range $[0.1; 0.9]$. I also calculate the optimal rule for trimming by the algorithm proposed in Crump et al. (2009). This interval is wider, which implies that more firms are kept in the sample. However, the covariates' balance achieved by this rule is less satisfactory. The results are robust to using this alternative choice of the trimming interval.

[38] Figure A.3.5 in the Appendix supports the parallel trends assumption in the trimmed sample.

discard observations in this interval with few control group firms in column 2. The estimated effect of the reform is robust in the sample of firms with similar observable characteristics.

[Table 5 here]

I further address concerns related to the heterogeneity between contributing firms and other firms in regression specifications. I augment the preferred regression specification with the predicted propensity of being a corporate donor, $\hat{p}$, interacted with year-fixed effects in Table 5 columns 3 and 4 and with the *Ban* indicator in columns 5 and 6. This controls for a temporal change in the dependent variable that is due to the observable differences between contributing and other firms. Finally, I control for the predicted propensity score non-parametrically, by interacting 10 percentage point bins in $\hat{p}$ with the *Ban* indicator in columns 7 and 8.[39] Moreover, I only consider firms with the $\hat{p}$ in the interval $[0.1; 0.9]$ in columns 4, 6 and 8. The results are substantively unchanged throughout.[40] Hence, the findings are not driven by time trends correlated with the observables in which contributing and not contributing firms differ.

Moreover, I check the robustness of the results to alternative choices to model cross-sectional and time variation. I modify the preferred specification and substitute *procurement controls* with procurement procedure fixed effects[41] in order to partial out procurement procedure level heterogeneity in the dependent variable. Next, I replicate the regressions when replacing CPV 4-digit code fixed effects with more coarse CPV 3-digit code fixed effects. Finally, I substitute year fixed effects with month fixed effects in order to have a finer specification for time variation. The results are robust to these alternative specifications and are available upon request.

6 Mechanisms

A bureaucrat's options to influence procurement outcomes are severely limited by institutional constraints. As mentioned previously, the most common procurement is a first-price

[39] Within these bins, large and very large firm categories and nearly all NACE sectors are balanced. Moreover, the difference in firm financial variables shrinks even further. The results are available upon request.

[40] The point estimates are smaller in absolute magnitude in some specifications, but not by more than one half of a standard deviation. They remain significant at 5% in all columns.

[41] Typically, one procurement procedure contains several lots and a separate contract tendered for each of them.

sealed-bid auction which is open to an unrestricted number of bidders and in which the bids are simultaneously made public. Procurement procedures are strictly monitored by the Public Procurement Office and public employees bear direct responsibility for misconduct and infringements related to procurement procedures which they carry out. Because non-contributing firms observe their own bids, these cannot be manipulated (if they were, firms would report the altered bids to the Public Procurement Office for investigation).

Given these constraints, two channels of influence seem plausible. The first is that the bureaucrats affect the contract design, i.e., stipulate tender calls so that only a contributing firm can satisfy the necessary requirements (Kang and Miller, 2017). The other is that they leak "profitable" information, e.g., on competing bids (Andreyanov et al., 2018), to contributing firms. These two mechanisms have different empirical implications, which I study in Sections 6.1 to 6.4. I also analyze firm-level outcomes in Section 6.5, because both channels imply that the expected benefits of participating in auctions may change for contributing and non-contributing firms. Finally, in Section 6.6 I present heterogeneity analysis to illustrate the functioning of contribution-based political favoritism in procurement.

6.1 Contract design channel

The *contract design channel* primarily affects the participation in public procurement tenders. In the extreme case, the competition is so limited that donor firms win in sole-bid tenders, in which these firms are the only to bid. If this is the active channel, then contributing firms should win less sole-bid tenders after the ban on corporate donations. Column 1 in Panel A of Table 6 shows the results from a regression in which the dependent variable is defined as an indicator for firms that participate (and win) in a sole-bid tender. A small and non-significant coefficient indicates that the ban had little effect on contributing firms' victories in tenders with a sole bidder.[42] Yet, even in multi-bid auctions, the *contract design* may be used to limit participation if it reduces the number of participants to give advantage to contributing firms. First, I test whether presumably restricted entry into procurement market, on aggregate, recovers after the political finance reform. The plots of the share of sole-bid tenders and the average number of bidders in tenders during the period 2008-2013

[42]In addition, the coefficient on the *Contribute* indicator variable, estimated in a more parsimonious regression specifications without firm fixed effects, is very small in magnitude and not significant (available upon request). This suggests that contributing firms were not awarded more sole-bid tenders even before the ban and further supports the idea that victories in sole-bid tenders are unlikely to drive the main result.

(Figure 6), on the contrary, show a slight decrease in the level of competition after the ban. Second, in regression analysis I study contributing and other firms' participation in tenders by their competitiveness level, proxied by the number of competing bidders. Column 2 in Panel A of Table 6 shows the results from Poisson regressions with the dependent variable being *#bidders* defined as the number of bidders in a tender.[43] A negative, small and non-significant coefficient gives no support for the hypothesis that the level of competition is limited specifically in tenders in which contributing firms participate. Overall, the reduction in the probability of winning for corporate donors does not seem to be explained by changes in the nature of competition in procurement after the ban.

[Figure 6 and Table 6 here]

The *contract design* channel operates through how tender calls are written and what requisites they specify for procurement purchases. Therefore, to directly test the presence of such manipulation, I complement the original dataset with the information on the content of calls for procurement purchases. From the website of the Lithuanian Public Procurement Office, I automatically access publicly available calls for tender,[44] download them and convert to text. I then extract the content in the field "Short purchase description", which describes what is to be purchased. To analyze the resulting sample of nearly 30,000 tender calls, I rely on text analysis tools to construct different proxies of tender description complexity. First, I measure the length of the tender description by its word-count. To avoid incorporating noise from a frequent use of connecting words and pronouns, I exclude letter sequences which are shorter than three. Second, I proxy the presence of the thresholds – which can be operational in restricting participation – by the count of the digit sequences (excluding dates and list numbering). Third, I use the relative occurrence of thresholds with respect to the total length of the tender description.

[43] I also implement OLS regressions with the outcome being indicator variables for tenders with one/two/three/four or more bidders. The results (available upon request) illustrate that a small increase in participation in duel tenders is offset by a reduction in tenders with four or more bidders.

[44] They are available for more than 10% of all tenders in my sample. Tenders with and without tender call publication differ along several dimension, yet these level differences are rather small in magnitude (see Table A.3.4 in the Appendix). Interestingly, they seem to be partially explained by differences in regulation governing the publication of tender calls. For example, tenders calls are more often available among procedures implemented by central administration and among open procedures, for which publicity requirements are stricter.

I test whether the complexity of tenders won by contributing firms goes down after the reform when compared to the change in tenders won by non-contributing firms. I estimate regressions, similar to those in equation (1), on contract-level data:

$$\begin{aligned} CallComplexity_{ct} = \alpha + \beta_1 ContributingWinner_c + \beta_2 Ban_t + \\ + \beta_3 ContributingWinner_c \times Ban_t + X_{ct}^p \delta + X_{it}^f \gamma + \varepsilon_{ict}, \end{aligned} \tag{2}$$

where $CallComplexity_{ct}$ is a measure of tender call complexity, $ContributingWinner_c$ is as an indicator variable for contracts which were awarded to contributing firms, and the remaining variables are defined as in equation (1). In more stringent regression specifications, analogous to the analysis regarding the main dependent variable, I include industry-specific non-parametric time trends $\pi_s \times \mu_t$ and firm fixed effects ν_i.

I use different complexity measures as dependent variables in regression analysis (Panel B, Table 6).[45] The point estimates are small and statistically indistinguishable from zero, giving no support to the idea that contributing firms were favored by allowing them to win in particularly complex tenders prior to the reform. Although it is possible that, in general, the *contract design* is used to alter procurement outcomes, this phenomenon does not seem to be sensitive to the ban of corporate donations. Overall, since changes in sole-bid victories, in the level of competition or the tender complexity do not explain the loss of procurement advantage of contributing firms, the *contract design channel* is unlikely to be a plausible mechanism.

6.2 Information channel

I next turn to analyzing the *information channel*. The idea that the leakage of auction-relevant information is used to alter procurement outcomes has featured both in the public debate and in journalist and criminal investigations.[46] They cover various types of informa-

[45] Only the point estimates from the most stringent regression specification are reported. The full set of the results is available upon request.

[46] For example, the leakage of information to the interested parties is considered among the common schemes to alter procurement outcomes in the conclusions of the discussion group "Corruption Prevention in Public Procurement". This idea also appeared in the following media coverage: *"LiCS donors won more than 2.7 billion LTL in public procurement contracts over last 3 years"*, Sarunas Cerniauskas, www.delfi.lt, November 24, 2011; *"Director of the Public Procurement Office Zydrunas Plytnikas: The state has become a political business"*, July 21, 2014, www.respublika.lt; *"Who trades the million-worth information about public procurement?"*, Tomas Dapkus, September 18, 2012, www.alfa.lt. Moreover, in 2012 the Lithuanian Criminal Police Bureau initiated a pre-trial investigation regarding the breach of security conduct in the CPP IS regarding the leakage of confidential information to the interested parties. Other material cited in this paragraph was accessed online via

tion, ranging from *soft*, e.g., on the identities or characteristics of other bidding firms, to *hard*, e.g., on competing bids. I examine the "Report on Corruption in Public Procurement" conducted by the Special Investigation Service (further - SIS) which includes information on criminal investigations in the public procurement sector. The leakage of different types of information – on identities of other potential bidders, their bids, estimated costs of the purchase or other auction characteristics – appears as the second most prevalent reason for initiating a court trial. The following quote from a public interview of a SIS officer illustrates a critical case: "*It turns out that [for bidding firms] it is not always useful, and may even be dangerous, to submit bids in advance of the deadline. The Bureau encountered instances in which sealed envelopes with bid documents were opened, and the information relevant for bidding was passed to firms so that they can adjust their bids.*"[47]

Building on this contextual evidence, I refer to the *information channel* as a leakage of any auction-relevant information to affect procurement outcomes in favor of contributing firms. To be specific, even if information on price bids represents the most "profitable" favor for a tender participant, the *information channel* comprises also other information, such as the number of participants or the identities of competitors. Such "insider" information regarding a procurement tender plausibly grants an advantage to informed firms, which they can exploit in their bidding strategies. Therefore, the *information channel* changes the outcome of multiple-bid tenders, as only in such tenders does the price bid determine the winner (in sole-bid tenders, in contrast, any information would be irrelevant as a firm can win merely by being the sole participant, regardless its bid). If this is the main channel, then the probability of winning in multiple-bid tenders should fall for contributing firms after the ban on corporate donations. In fact, the effect on the probability of winning in the sample of tenders with multiple bids is virtually the same as in the main sample: column 3, Panel A, Table 6 shows that in the most stringent regression specification, the point estimate is -0.047, with a standard error of 0.019. The effect of the ban does, in fact, come from competitive tenders with several participants, suggesting that the *information channel* may be the active one. This mechanism affects both bidding behavior of firms and allocation of tenders, which

the following links: http://www.stt.lt/lt/naujienos/?cat=1&nid=1239; http://www.statybunaujienos.lt/naujiena/Specialiuju-tyrimu-tarnyba-ivardino-korupcijos-viesuosiuose-pirkimuose-schemas/6324; www.statybunaujienos.lt/naujiena/Diskusija-Viesieji-pirkimai-ir-korupcijos-prevencija/6310.

[47] In the same vein, Andreyanov et al. (2018) propose an empirical test to detect corrupt practices which build on the idea that "favored" firms would ideally be the last to bid in an auction. Unfortunately, I cannot apply this empirical exercise to the Lithuanian case because the bids are not time-stamped in my dataset.

I discuss in a simple standard model.

6.3 Theoretical bidding behavior

A typical procurement procedure in Lithuania closely resembles the following theoretical setup. A buyer needs to procure 1 unit of a good. There are I firms which can supply the good. The cost of producing the good for firm i is c_i, which is privately known by i, and $(c_1, c_2, ..., c_I)$ are independently distributed according to $F(c_1)$. Simultaneously, each firm i sets a price p_i, and the procurer buys from the firm with the lowest price.[48]

To obtain the predictions for the empirical analysis, I consider the scenario in which contributing firms are informed about price bids by other tender participants before the ban on corporate donations and no firm is informed after the ban.[49] The model delivers:

Prediction 0. Contributing firms' probability of winning decreases after the ban on corporate donations.

Prediction 1. Contributing firms reduce their price bids after the ban on corporate donations.

Prediction 2. Before the ban on corporate donations, contributing firms' victory margins (defined as the percentage difference between their bid and the second lowest bid) are narrower than compared to victories of non-contributing firms. Contributing firms' victory margins increase after the ban.[50]

The model predicts that when contributing firms are informed about competing bids, they win more contracts and bid higher prices in order to get a contract at maximum revenue. Moreover, contributing firms submit bids which are closer to their competitors thanks to this information. This results into reallocation of surplus from the buyer to the informed firm as the latter can charge higher prices even for contracts under the efficient allocation (being the lowest cost firm). If the ban on corporate donations eliminates the *information channel*, contributing firms' probability of winning a contract should decrease after the ban. This theoretical prediction is consistent with a five percentage point drop in chances of winning for contributing firms, documented in Section 4. Moreover, as contributing firms are no

[48] If $k > 1$ firms charge the same lowest price, the buyer purchases from one of those firms randomly, each selling with probability $1/k$.

[49] As argued earlier, this is the most extreme form of favor which donor firms could receive from procurement bureaucrats, and I focus on this critical case in order to build my theoretical framework.

[50] Further assumptions and analytic derivations are presented in Section A.2 in the Appendix.

longer able to adjust their bids to get closer to their opponent's bid after the ban, they should lower their prices and win at wider margins than before.

6.4 Empirical bidding behavior

To test Prediction 1 empirically, I study changes in corporate donors' bidding behavior in response to the reform. Table 7 analyzes prices that are bid before and after the ban on corporate donations. The regression specifications in columns 1-5 are analogous to those shown in Table 3. The insignificant coefficient on the variable *Contribute* suggests that, before 2012, bids submitted by contributing and other tender participants do not show clear-cut differences. After the ban on corporate donations, prices offered by contributing firms systematically decrease compared to other firms' bidding. The coefficient on the interaction term $Contribute \times Ban$ indicates that after 2012 corporate donors submit bids which are 24% lower (Table 7, column 5). Former corporate donors bid more aggressively due to the reform: they are constrained to offer lower prices when competing for the allocation of public funds after the reform.

[Table 7 here]

The evidence on the bidding behavior of formerly donating firms suggests that several alternative channels are unlikely to be at work. In theory, it is possible that political favoritism works through the imperfect enforcement of tender contracts (Guasch and Straub, 2009), whereby contributing firms rely on the lax enforcement of, e.g., quality requirements, to outbid other competitors. This mechanism would predict that after the ban donor firms can no longer sustain low bidding, because they are now obliged to deliver according to the contract provisions. In reality, the evidence on bidding points to the opposite direction, suggesting that this channel is not very plausible in the Lithuanian political favoritism. Another possibility is that mean reversion in corporate donors' performance drives the reallocation of procurement contracts. If firms contribute because of a positive shock in their performance (e.g., low cost c_i), the reduction in the probability of winning could result from the fact that, in a few years, these firms return to their average costs and hence are less competitive in tendering. While this is a possible scenario, it is not consistent with contributing firms' bidding behavior: higher costs would predict higher rather than lower bids.[51] Other explanations

[51]Moreover, one may consider collusion as an alternative mechanism. However, the observed effects could only be explained by a rather intricate coordination scheme, in which a politician acts as the only admissible

related to possible changes in the procurement market competition are addressed (and ruled out) in Section 6.5.

The *information channel* also implies that contributing firms undercut their competitors by a small amount in order to secure contracts (Prediction 2). I hence examine victory margins in multiple-bid tenders won by contributing and other firms.[52] Figure 7 shows kernel density plots of the relative victory margin – the logarithm of the difference between the second lowest bid and the winning bid, normalized by the winning bid – for the two groups of winners and distinguishes between contracts awarded before and after the ban on corporate donations. In line with Prediction 2, corporate donors more frequently win by narrow margins as compared to other firms before the ban. Victory margins for the two groups are substantially more similar after the reform.

[Figure 7 here]

Although the theory predicts that informed donors win at negligible margins, in practice extremely close victories may increase the risk of undesirable monitoring.[53] To examine these distributional effects of the ban, I estimate the following unconditional quantile regressions (Firpo et al., 2009) on contract-level data:

$$\begin{aligned} Margin_{ct}^{QUANTILE_X} = \alpha + \beta_1 ContributingWinner_c + \beta_2 Ban_t + \\ + \beta_3 ContributingWinner_c \times Ban_t + X_{ct}\gamma + \varepsilon_{ct}, \end{aligned} \tag{3}$$

where $Margin_{it}$ is defined as the logarithm of the difference between the second lowest and the first lowest bid (normalized by the first lowest bid) in a contract c in a year t; $ContributingWinner_c$ – as an indicator variable for contracts which were awarded to contributing firms; Ban_t – as an indicator variable for contracts signed after January 1, 2012 and X_{ct} – as a vector of controls that includes indicators for year, CPV 2-digit code, procurement procedure type, contracting authority type and for goods, services and works procured. Standard errors are computed by bootstrap with 200 replications.

intermediary among firms to establish the scheme and colluding firms are no longer able to continue under the existing scheme once a politician steps out.

[52] To better match the set-up of the model, I exclude tenders in which more than one contributing firm participates.

[53] I model the bid deviation to be nearly zero, but in practice extremely low victory margins may look suspicious. To quote the President of INFOBALT, Vytautas Vitkauskas, "*In an auction of 5 million LTL worth, the winner outbids the runner-up by 8 thousand LTL. Let's be (...) fair: miracles don't happen.*" (Tomas Dapkus, *Where is confidential information on public procurement illegally traded?*, September 25, 2012, www.alfa.lt).

Figures 8(a) and 8(b) plot the coefficients β_1 and $\beta_1 + \beta_3$, estimated at each decile. These coefficient measure the difference in the victory margins between contracts won by contributing and non-contributing firms before (Figure 8(a)) and after the ban (Figure 8(b)). Each figure also plots the corresponding OLS coefficients. On average, prior to the ban the race with a donor winner proves closer than the race with a non-donor winner (a point estimate of -0.232, with a robust standard error of 0.014).[54] Although there is no marked difference between victory margins at the lowest deciles, this gap amplifies in the third to the sixth deciles and then remains constant. The data indeed suggests that very narrow margins are avoided and political favoritism mainly operates via intermediate ones. After the ban, the difference in victory margins between tenders with donor and non-donor winners is much smaller, both on average (a point estimate of -0.051, with a robust standard error of 0.021) and at different deciles (see Figure 8(a)). This evidence suggests that the bidding advantage of contributing firms is, at large, eliminated.

[Figure 8 here]

This evidence shows strong empirical support for the *information channel* whereby political money translates into favors in procurement. It allows corporate donors to adjust their bids in order to secure contracts. After the reform, however, they need to engage in competitive bidding.

6.5 Firm performance

Is participation in political-business networks profitable for firms? Is their lost advantage in the procurement market reflected in firm dynamics? To answer these questions, I compare outcomes of contributing and non-contributing firms before and after the ban on corporate donations. I focus on three variables which are available for most firms: number of employees, revenue and revenue per employee.[55] The results in Table 8 show that formerly contributing firms reduce their employment relative to control firms following the ban on corporate donations.[56] Moreover, their revenue shrinks, but there is no evidence of statistically significant

[54] The full set of the results is available upon request.

[55] The sample coverage of time-varying financial indicators in the Orbis database is incomplete. Due to potential sample selection, the results in this section should be interpreted with caution.

[56] Standard errors are clustered at firm level.

changes in revenue per employee.[57] This worse firms' performance suggests that losses in procurement market are not compensated by gains in other domains (e.g., disbursement of EU funds). To the contrary, back of the envelope calculations indicate that the revenue reduction from lost connections exceeds that from the procurement market (similar to Ferraz et al., 2015).[58] This indirectly suggests that favoritism in procurement represents only one of the channels through which contributing firms exploit their investment in political favors' market.

[Table 8 here]

I then study whether the ban on corporate donations affects firms' presence in procurement market. If corporate donors' participation in procurement is mainly driven by the size of the expected political rents, contributing firms may no longer participate in public tenders after the ban on corporate donations. However, the data does not support this explanation. Figure 9 shows that the share of tenders in which a contributing firm participates does not change substantially after the political finance reform. Moreover, I make sure that any potential selection into the procurement firms' sample does not affect my findings. I focus on the sample of firms that have participated in procurement tenders in each year during 2008-2013 and repeat the main set of regressions. The result remains virtually unchanged, with the point estimate of -0.047 (a standard error of 0.019). All in all, movements in or out of procurement market do not drive the patterns in the data. While contributing firms are affected negatively by the ban on corporate donations, the reform in political finance does not seem to trigger substantial changes in their procurement market participation.

[Figure 9 here]

[57] I also find that while firms appear to scale down on their labour force to maintain labour productivity unchanged, their capital stock does not unjust at a comparable pace, implying somewhat lower returns to capital. However, since the latter variables are available for a substantially smaller portion of the full sample, these analysis are not reported in the main text of the paper.

[58] The calculations take into consideration two main effects of the ban of corporate donations. First, I compute the revenue loss due to lower chances of winning a contract and second – the revenue loss due to lower prices offered for contracts which contributing firms won. These calculations bear the assumption that the value and the composition of procurement contracts and the firm decision to enter the procurement market remain constant.

6.6 Which donations matter?

Donations to core parties. In this section on heterogeneous effects, I restrict the analysis to the core parties, which held seats in three most recent legislatures (see Section 2), as donations to them constitute the majority of all donations. Column 1 of Table 9 shows that the coefficient of interest remains stable in this specification and illustrates that the effects are mainly driven by donations to these core parties.

[Table 9 here]

Party and campaign donations. The majority of political donors support general activity of parties. In particular, out of 550 contributing firms that participate in procurement, only 83 firms are exclusively campaign donors. Given a potentially different nature of the two types of donations – e.g., electoral motive may be more salient for campaign donations – I check that the results are not sensitive to the definition of *Contribute* that only comprises firms' contributions to political parties.[59] In column 2 of Table 9 the estimated reduction in the probability of winning (a point estimate of -0.047, a standard error of 0.015) is unchanged when I exclude firms that only support political campaigns.[60]

Large donations. To study whether politicians reward more generous donors, I use the information on the size of donations. For every contributing firm, I construct a cumulative amount of party and campaign donations paid during the period 2007-2011. Among contributing firms in the procurement sample, the median cumulative donation value is 42,500LTL($\approx$ 13,000EUR).[61] I define an indicator variable *Big Contributions* (*Small Contributions*) taking the value of 1 if a tender participant has donated an above-median (below-median) cumulative value to a political party or a political campaign over the period of interest. Column 3 in Table 9 shows that the reduction in the probability of winning is

[59] In the main part of the analysis, I use the most natural definition of a contributing firm *Contribute* and consider as such all firms that have donated to a political party or a political campaign and have participated in a procurement auction afterwards.

[60] In addition, the reduction in the probability of winning for firms which are exclusively campaign donors is larger in absolute magnitude. Yet, I cannot reject the equality of the two coefficients. Moreover, I find no differential returns to political connections for firms that have donated to several parties, suggesting that politically non-loyal firms go unpunished in Lithuanian political favoritism (the results are available upon request). Altogether, this indicates that there may be political rents attached to campaign donations as well.

[61] In the cross-section of 550 contributing and procuring firms, the median cumulative amount donated is 15,000LTL($\approx$ 4,500EUR). The difference is due to the fact that bigger donors participate in procurement more often.

almost three times larger for firms with generous donations: the point estimate implies a reduction of 6.8 percentage points for donors with above-median cumulative donations, whereas it is 2.6 percentage points for donors with smaller contributions. I also consider the logarithm of the cumulative value of donations as a continuous measure in column 4. Similarly, the point estimate on the interaction term with the *Ban* indicator is negative and significant, in line with a more pronounced effect for firms which have donated larger amounts to politicians. This shows that returns to corporate political support respond to the monetary value of contributions.

Levels of public administration. On the one hand, strong links between politicians and bureaucrats are likely to facilitate favoring of contributing firms in procurement auctions. Therefore, donation-based connections to national politicians may yield higher returns in tenders administered by top-level bureaucrats: they are closer to national politics and the politician-bureaucrat influence chain is shorter. On the other hand, tenders carried out at the national level are subject to a stronger scrutiny by the public, which may limit the prevalence of political favoritism. To examine this relationship, I interact the main variable of interest $Contribute \times Ban$ with indicators for tender contracts administered at the central ($Center$) and at the local level or by public utility companies ($Local/PUC$). The prevalence of political favoritism at intermediate levels of public administration (which is the omitted category) is shown directly by the coefficient on $Contribute \times Ban$.[62] Column 5 of Table 9 shows that the overall reduction in the probability of winning comes from tenders organized at central level institutions and at institutions under their direct control: the effect is virtually the same in administration at central and intermediate levels of public administration. In contrast, the reform does not affect the awarding of tenders administered at the local level. The positive relationship between the level of public administration and political favoritism appears to flatten out at the top level, in which rent seeking is likely to face a stronger public scrutiny. Political favoritism instead remains strong in tenders administered at intermediate levels, in which the link between politicians and bureaucrats is close and the exposure to public attention is more limited.

[62]The Law of Public Procurement categorizes all contracting authorities that purchase through the public procurement system as follows: i) central public administration bodies (e.g., ministries, central government agencies, national defense, etc.); ii) middle level units that are directly controlled by state authorities (e.g., hospitals, prisons, educational institutions, etc.); iii) local units (e.g., municipalities and their administration bodies); iv) public utility companies.

Donations to powerful politicians. There are different ways by which elected legislators may affect bureaucrats' decisions. On the one hand, bureaucrats' careers may hinge on politicians' influence, who use administrative appointments to control the awarding of procurement contracts (e.g, Boas et al, 2009; Lehne et al, 2018). On the other hand, the favor exchange may take form of tangible benefits – e.g., cash (Mironov and Zhuravskaya, 2015) – shared between bureaucrats and politicians. To shed light on the relative importance of these channels, I reconstruct influence lines and study whether connections to political parties with relevant positions are more lucrative in the health care sector.[63] I collect information on parties which were in charge of political leadership assignments to the Ministry of Health and the Committee on Health Affairs in the Parliament before 2012. I distinguish between three types of connections: i) connections to parties which appointed the Minister of Health (*Minister of Health*); ii) connections to parties which mandated the Chair/Vice-chair of the Committee on Health Affairs (*Chair of Committee on Health Affairs*); and iii) connections to other parties (*No power position*). I then estimate the reduction in the probability of winning for firms with the three types of connections. Column 6 in Table 9 shows that firms with donations to parties choosing the Chair (Vice-chair) of the Committee on Health Affairs suffer from the most pronounced reduction in the probability of winning. The effect is smaller for connections to parties with a major stake at the Ministry of Health and is negligible for firms which have donated to parties with no power positions in the health care sector.[64] Yet, while control of decision making positions seems to matter, this cannot be interpreted as an unambiguous conclusion that the influence channel is solely accountable for the favoritism in public procurement. After all, over 40% of total donations are destined to parties in the opposition at the moment of donation and there is no conclusive evidence to gather that being in the majority of the legislature delivers larger benefits to contributing firms (see Section 4).

[63] Unfortunately, as no data on bureaucratic appointments and administrative careers exist in the Lithuanian context, it is not possible to direct test these channels.

[64] In addition, I estimate equation (1) with the interaction between an indicator variable *Big contributions to Health Committee* taking the value of 1 for tender participants which have donated an above median cumulative amount to one of the parties with assignments to Chair/Vice Chair of the Committee on Health Affairs and the *Ban* indicator. A large and negative coefficient suggests that the strong effect of connections to the leadership of the Committee on Health affairs is driven by firms which directed substantial amounts to these parties. The results are available upon request.

7 Concluding remarks

Money in politics receives a great deal of attention from both scholars and policy-makers. Even though donations made by individuals are usually seen as a form of political expression, political giving by firms – as legal entities possessing no ideological preferences – is more debatable. This study sheds light on how such political donations shape government procurement, and suggests that corporate money can indeed buy political influence and secure preferential treatment in the allocation of public resources.

I find that the disruption of contribution-based connections between firms and politicians results in worse procurement outcomes for these businesses. Firms favored under a less stringent regulation experience a significant loss in their victory advantage in public tenders when corporate donations are banned. Following the reform, they are also forced into more aggressive bidding. Overall, the ban on corporate donations proves to be an effective means to discontinue political favoritism in the awarding of public procurement contracts.

Campaign finance literature has long wrestled with the question of why not all firms make political contributions. The results presented in this paper are consistent with the entry into donating activity being limited, e.g., because of personal connections or organization culture (Hart, 2001), unsuccessful preference aggregation within the firm (Bonica, 2016) or information needed to build the relationship. Also in a context with limited entry, understanding the effects of the political finance reform is important because of distortions in procurement contract allocation in favor of donor firms.

How general is the understanding of the role of political money drawn from the Lithuanian context? According to the Transparency International Corruption Perceptions' Index (CPI), Lithuania ranked 39 on a global scale in 2014. Figure 10(a) shows that among countries with developed political rights (Freedom House, 2014), it is positioned around the middle of the ranking. Furthermore, concerns regarding the transparency of political donations and procurement procedures are common. In fact, Figures 10(b) and 10(c) show that numerous countries publish political finance accounts and monitor procurement procedures.

[Figure 10 here]

A simple theory predicts that political favoritism may induce "politician-friendly" firms to cater to the public sector and incur higher costs for public purchases. To assess the effect

of the ban on public finances, I provide back of the envelope calculations. I estimate that contributing firms, on average, lower their price bids by 24%. Moreover, they win 29% of the tender contracts in the post-reform period.[65] Since procurement purchases are 14% of GDP, this amounts to large savings of almost 1% of GDP. Although these simple calculations should be taken with a grain of salt, they imply a substantial cost reduction in the public sector: eliminating political favoritism saves around 180 million EUR per year for Lithuanian tax payers compared to 5-6 million EUR per year spent to finance political parties. Cost-benefit calculation based on these numbers suggests that the public financing of political parties is indeed a profitable investment for public sector.

The legislative stance regarding the transparency of corporate donations differs across countries. Some countries have restricted or banned these contributions; in other countries they are allowed and sometimes not even regulated. For example, in the United States corporations may donate to politicians via *super PACs*, whereas roughly half of the European countries have enacted legislation to ban corporate donations to political parties or candidates (EuroPAM, 2016). The Lithuanian case shows that banning corporate donations may result in reallocation of tenders and important gains in public finance. From the policy perspective, it is important to note that the ban on corporate donations was accompanied by other policy elements targeted to maximize the effectiveness of the reform. First, public financing was introduced to safeguard that a sharp fall in resources available to political parties does not induce illicit behaviors. Second, stricter transparency requirements for private contributions curtailed a potential substitution of corporate donations with private ones. The evidence documenting the effects of such reform could, therefore, draw attention of regulators of public procurement and political finance, not least because of substantial money spent on public sector purchases.

[65]The reduction in costs for the public sector only comes from tenders in which the contributing firm wins and instead of matching the opponent's bid p_1 now bids its competitive price p_2. The price in tenders reallocated from informed firms to uninformed firms does not change: the bidding strategy for firm 1 is the same and firm 2 bids p_1 in the informed case. Hence, the buyer pays the same price in tenders that were previously captured by contributing firms and pays a lower price and pays a lower price in tenders that are awarded to previously contributing firms after the ban.

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Tables and figures

Table 1: Political party funding structure

Party	Total funds	Corporate donations	Individual donations	Membership fees	State funding	Loans	Other
			Year 2011				
DP	2,445,288	34.69	0.67	4.80	26.44	32.98	0.42
LiCS	1,447,662	63.20	0.00	5.56	31.23	0.00	0.00
LRLS	3,618,558	65.34	0.95	2.25	14.87	16.58	0.01
LSDP	2,564,573	36.08	1.24	25.10	35.80	0.00	1.77
TSLKD	4,449,497	26.09	0.23	2.25	36.73	34.67	0.02
TT	2,229,718	32.76	0.00	20.07	29.01	18.16	3.39
Average	2,792,549	43.03	0.52	10.01	29.01	17.07	0.37
			Year 2012				
DP	2,483,797	0.00	0.00	5.67	86.16	0.39	7.78
LiCS	3,464,316	0.00	2.53	1.77	90.15	0.00	5.56
LRLS	2,259,987	0.00	0.00	4.57	62.03	22.12	11.27
LSDP	43,692	0.00	0.00	22.07	0.00	55.29	22.63
TSLKD	5,871,066	0.00	0.00	2.98	87.58	0.00	9.44
TT	3,663,025	0.00	0.00	6.74	71.31	18.56	3.39
Average	2,964,314	0.00	0.42	7.30	66.20	16.06	10.01

Notes. Own calculations based on the Central Electoral Commission data. Total funds are reported in LTL; other columns present their breakdown by item in percentages.

Table 2: Descriptive statistics

	Total	Not contributing	Contributing	Difference
Main dependent variables:				
Probability of winning	0.43	0.41	0.47	-0.063***
	(0.49)	(0.49)	(0.50)	(0.001)
Log price bid	7.55	7.75	7.00	0.749***
	(3.24)	(3.18)	(3.33)	(0.010)
# bidders	3.49	3.56	3.29	0.270***
	(2.37)	(2.46)	(2.09)	(0.006)
Procurement procedure:				
Open	0.91	0.89	0.93	-0.039***
	(0.29)	(0.31)	(0.25)	(0.001)
Negotiation	0.05	0.05	0.03	0.015***
	(0.21)	(0.22)	(0.18)	(0.001)
Other	0.05	0.06	0.03	0.024***
	(0.22)	(0.23)	(0.18)	(0.001)
Public administration unit:				
Central	0.07	0.08	0.04	0.037***
	(0.25)	(0.27)	(0.19)	(0.001)
Middle	0.76	0.73	0.84	-0.119***
	(0.43)	(0.45)	(0.36)	(0.001)
Local/territorial	0.08	0.09	0.06	0.038***
	(0.28)	(0.29)	(0.23)	(0.001)
Public utility company	0.09	0.10	0.06	0.044***
	(0.29)	(0.30)	(0.24)	(0.001)
Procurement object:				
Goods	0.79	0.77	0.82	-0.042***
	(0.41)	(0.42)	(0.39)	(0.001)
Services	0.17	0.19	0.11	0.080***
	(0.37)	(0.39)	(0.31)	(0.001)
Works	0.05	0.04	0.08	-0.037***
	(0.22)	(0.19)	(0.27)	(0.001)
Observations	596,068	434,606	161,462	596,068

Notes. The sample includes tenders awarded in the period 2008-2013.

Table 3: Main results

Dependent variable:	Winner					
	(1)	(2)	(3)	(4)	(5)	(6)
Contribute	0.094*	0.065**	0.066**			
	(0.048)	(0.028)	(0.028)			
Contribute × Ban	−0.041*	−0.044***	−0.051***	−0.042***	−0.048***	−0.056**
	(0.021)	(0.017)	(0.017)	(0.014)	(0.015)	(0.022)
Contribute × Placebo						0.021
						(0.029)
Procurement controls	X	X	X	X	X	X
Firm controls		X	X			
Industry FE × Year FE			X		X	X
Firm FE				X	X	X
R^2	0.08	0.09	0.09	0.16	0.15	0.15
N	596,039	575,835	575,835	593,477	575,527	575,527

Notes. The table reports the difference-in-differences coefficients from OLS regressions. The dependent variable is *Winner* defined as an indicator variable for firms which win a contract. *Contribute* is an indicator variable for firms which have donated to a political party or to a political campaign. *Ban* is an indicator variable for contracts signed after January 1, 2012. *Placebo* is an indicator variable for contracts awarded after a placebo reform on January 1, 2010. Procurement controls are year, CPV 4-digit code, contracting organization type and procurement procedure type indicators and indicators for goods, services and works procured. Firm controls are size categories, NACE main industry fixed effects and firm age. Standard errors clustered at the firm level are shown in parenthesis. *** - significant at 1 percent, ** - significant at 5 percent, * - significant at 10 percent.

Table 4: Firm characteristics: contributing and non-contributing firms

	Panel A: Full sample						Panel B: Trimmed sample					
	Contribute	N	Other	N	Difference	p-val	Contribute	N	Other	N	Difference	p-val
Firm size:												
Very large	0.03	522	0.01	7,374	0.02***	0.00	0.04	303	0.03	1,137	0.01	0.39
Large	0.17	522	0.06	7,374	0.11***	0.00	0.27	303	0.23	1,137	0.04	0.12
Medium-sized	0.56	522	0.36	7,374	0.20***	0.00	0.63	303	0.66	1,137	−0.03	0.27
Small	0.23	522	0.57	7,374	−0.34***	0.00	0.06	303	0.08	1,137	−0.02	0.24
Age	13.44	517	10.57	7,336	2.88***	0.00	15.27	303	14.36	1,137	0.91***	0.00
Corporate group:												
None	0.56	521	0.77	7,366	−0.22***	0.00	0.44	303	0.48	1,137	−0.04	0.26
Two	0.28	521	0.15	7,366	0.13***	0.00	0.35	303	0.34	1,137	0.01	0.77
Three or more	0.16	521	0.08	7,366	0.08***	0.00	0.21	303	0.18	1,137	0.03	0.28
# subsidiares:												
None	0.82	522	0.95	7,374	−0.12***	0.00	0.76	303	0.80	1,137	−0.04	0.13
Single	0.08	522	0.04	7,374	0.04***	0.00	0.09	303	0.11	1,137	−0.02	0.28
Two or more	0.10	522	0.02	7,374	0.08***	0.00	0.15	303	0.08	1,137	0.06***	0.00
# shareholders:												
None	0.37	522	0.69	7,374	−0.32***	0.00	0.17	303	0.24	1,137	−0.07**	0.01
Single	0.23	522	0.16	7,374	0.07***	0.00	0.26	303	0.26	1,137	−0.00	0.94
Two or more	0.41	522	0.15	7,374	0.26***	0.00	0.57	303	0.50	1,137	0.07**	0.03
Financials:												
Log # employees	3.66	517	2.50	7,289	1.16***	0.00	4.35	303	3.81	1,137	0.55***	0.00
Log Turnover	14.19	484	12.49	5,995	1.71***	0.00	14.86	297	14.22	1,088	0.63***	0.00
Log Net Income	11.73	386	10.92	2,731	0.81***	0.00	11.93	276	11.63	876	0.30**	0.02
Log SHLDR funds	13.19	423	12.10	3,307	1.10***	0.00	13.60	291	13.17	1,009	0.43***	0.00
Log Total assets	14.07	430	12.89	3,532	1.18***	0.00	14.41	293	13.89	1,033	0.52***	0.00
Log Fixed assets	12.67	425	10.92	3,496	1.75***	0.00	13.18	289	12.42	1,018	0.76***	0.00
Log Current assets	13.53	426	12.43	3,479	1.09***	0.00	13.90	289	13.34	1,026	0.55***	0.00
Observations	7,896						1,440					

Table 5: Robustness checks

Dependent variable:	Winner							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Contribute × Ban	−0.044**	−0.044**	−0.039**	−0.042**	−0.039**	−0.042**	−0.046***	−0.047***
	(0.018)	(0.018)	(0.017)	(0.018)	(0.017)	(0.018)	(0.016)	(0.017)
$\hat{p}$ × Year FE			X	X				
$\hat{p}$ × Ban					X	X		
$\hat{p}$ bins × Ban							X	X
Trimmed sample	X	X		X		X		X
Full controls	X	X	X	X	X	X	X	X
R^2	0.13	0.13	0.15	0.13	0.15	0.13	0.15	0.13
N	362,026	358,611	569,487	362,026	569,487	362,026	569,487	362,026
# clusters	1,289	1,271	5,610	1,289	5,610	1,289	5,610	1,289

Notes. The table reports the difference-in-differences coefficients from OLS regressions. The dependent variable is *Winner* defined as an indicator variable for firms which win a contract. *Contribute* is an indicator variable for firms which have donated to a political party or to a political campaign. *Ban* is an indicator variable for contracts signed after January 1, 2012. $\hat{p}$ is the predicted propensity of being a contributing firm. $\hat{p}$ *bins* are 10 percentage point bins of the predicted propensity $\hat{p}$. Full controls correspond to the specification in column 5 of Table 3. Standard errors clustered at the firm level are shown in parenthesis. *** - significant at 1 percent, ** - significant at 5 percent, * - significant at 10 percent.

Table 6: Contract design channel

	Panel A: Participation		
Dependent variable:	Sole-bid victory	# bidders	Win in multi-bid
	(1)	(2)	(3)
Contribute × Ban	−0.007	−0.008	−0.047***
	(0.013)	(0.015)	(0.019)
Full controls	X	X	X
Poisson regression		X	
R^2	0.28		0.08
N	575,527	575,559	476,108
	Panel B: Tender design		
Dependent variable:	# words	# thresholds	Complexity
	(1)	(2)	(3)
Contributing winner × Ban	−0.880	0.101	0.000
	(1.675)	(0.205)	(0.008)
Full controls	X	X	X
R^2	0.64	0.39	0.20
N	27,728	27,728	27,726

Notes. The table reports the difference-in-differences coefficients. Panel A on participation in procurement tenders covers the entire sample of bidding firms. Panel B on tender design includes firms winning contracts with tender call description available. *Contribute* is an indicator variable for firms which have donated to a political party or to a political campaign. *Contributing winner* is an indicator for winning firms which have donated to a political party or to a political campaign. The dependent variable in Panel A, column 1 is defined as an indicator variable for firms which participate (and win a contract) in a sole-bid tender; in column 2 is *# bidders* defined as the number of bidders in a tender; in column 3 as an indicator for winning firms (and the sample includes only multiple-bid tenders). The dependent variable in Panel B, column 1(column 2) is *# words* (*# thresholds*) defined as the number of meaningfull words (numbers) in the tender description and in column 3 is *Complexity* defined as the frequency of thresholds relative to the total length of the tender description. *Ban* is an indicator variable for contracts signed after January 1, 2012. Full controls correspond to the specification in column 5 of Table 3. Standard errors clustered at the firm level are shown in parenthesis. *** - significant at 1 percent, ** - significant at 5 percent, * - significant at 10 percent.

Table 7: Bidding

Dependent variable:	Price bid				
	(1)	(2)	(3)	(4)	(5)
Contribute	−0.039	0.001	0.004		
	(0.102)	(0.126)	(0.127)		
Contribute × Ban	−0.275*	−0.263*	−0.279*	−0.242	−0.240
	(0.154)	(0.152)	(0.165)	(0.173)	(0.177)
Procurement controls	X	X	X	X	X
Firm controls		X	X		
Industry FE × Year FE			X		X
Firm FE				X	X
R^2	0.42	0.42	0.42	0.48	0.48
N	570,710	557,071	557,071	568,204	556,714

Notes. The table reports the difference-in-differences coefficients from OLS regressions. The dependent variable is *Price Bid* defined as a logarithm of the price offer made by firms. The sample only includes tenders which were awarded to the lowest price bidder. *Contribute* is an indicator variable for firms which have donated to a political party or to a political campaign. *Ban* is an indicator variable for contracts signed after January 1, 2012. Procurement controls are year, CPV 4-digit code, contracting organization type and procurement procedure type indicators and indicators for goods, services and works procured. Firm controls are size categories, NACE main industry fixed effects and firm age. Standard errors clustered at the firm level are shown in parenthesis. *** - significant at 1 percent, ** - significant at 5 percent, * - significant at 10 percent.

Table 8: Firm performance

Dependent variable:	# employees	Revenue	Revenue/employee
	(1)	(2)	(3)
Contribute × Ban	-0.118^{***}	-0.104^{**}	0.017
	(0.034)	(0.042)	(0.033)
Year FE	X	X	X
Year FE × Firm controls	X	X	X
R^2	0.69	0.67	0.36
N	19,855	19,083	19,038

Notes. The table reports the difference-in-differences coefficients from firm-level OLS regressions. The dependent variable in columns 1 is the logarithm of the number of employees, in column 2 - the logarithm of the gross revenue and in column 3 - the logarithm of the revenue per employee. *Contribute* is an indicator variable for firms which have donated to a political party or to a political campaign. *Ban* is an indicator variable for contracts signed after January 1, 2012. Firm controls are size categories, NACE main industry fixed effects and firm age. Standard errors clustered at the firm level are shown in parenthesis. *** - significant at 1 percent, ** - significant at 5 percent, * - significant at 10 percent.

Table 9: Heterogeneous donations

Dependent variable:	Winner					
	(1)	(2)	(3)	(4)	(5)	(6)
Contributions to core × Ban	−0.049***					
	(0.015)					
Party contributions × Ban		−0.047***				
		(0.015)				
Big contributions × Ban			−0.068***			
			(0.011)			
Small contributions × Ban			−0.026*			
			(0.014)			
Contribution amount × Ban				−0.004***		
				(0.001)		
Contribute × Ban					−0.054***	
					(0.018)	
Contribute × Ban × Central					0.001	
					(0.087)	
Contribute × Ban × Local/PUC					0.057**	
					(0.024)	
Minister of Health × Ban						−0.009
						(0.011)
Chair of CoHA × Ban						−0.080***
						(0.011)
No power position × Ban						−0.001
						(0.012)
Full controls	X	X	X	X	X	X
Health care sector						X
R^2	0.15	0.15	0.15	0.15	0.15	0.13
N	575,527	575,527	575,527	575,527	575,527	346,475

Notes. The table reports the difference-in-differences coefficients from OLS regressions. The dependent variable is *Winner* defined as an indicator variable for firms which win a contract. The sample in columns 6 includes only tenders in health care institutions. *Contributions to core* is an indicator variable for firms which have donated to core parties. *Party contributions* is an indicator variable for firms which have donated to political parties. *Big contributions/Small contributions* is an indicator variable for firms which have donated the amount above/below the median value. *Contribution amount* is the logarithm of the cumulative amount of contributions made by a firm. *Minister of Health* is an indicator for firms which have donated to one of the parties that appointed the Minister of Health. *Chair of CoHA* is an indicator variable for firms which have donated to one of the parties which appointed the chair/vice-chair of the Committee on Health Affairs. *No power position* is an indicator variable for firms which have donated to one of the parties with no power positions in health care. Standard errors clustered at the firm level are shown in parenthesis. *** - significant at 1 percent, ** - significant at 5 percent, * - significant at 10 percent.

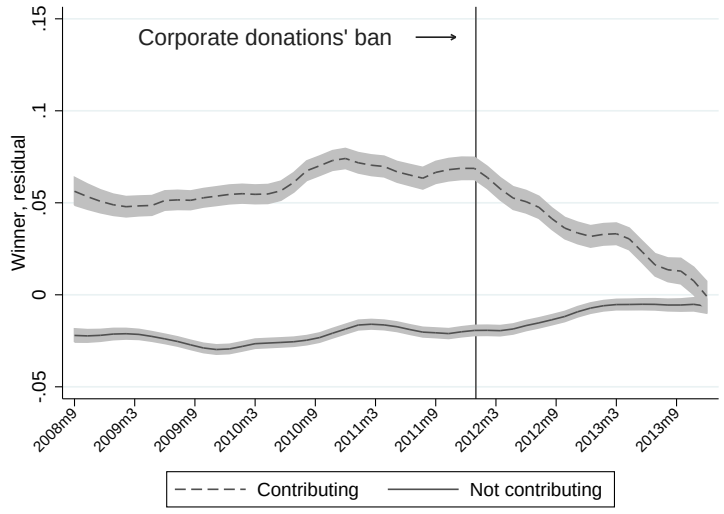


Figure 1: Probability of winning, residual

Notes. Locally smoothed means of the residual from the regression of the *Winner* indicator variable on procurement controls.

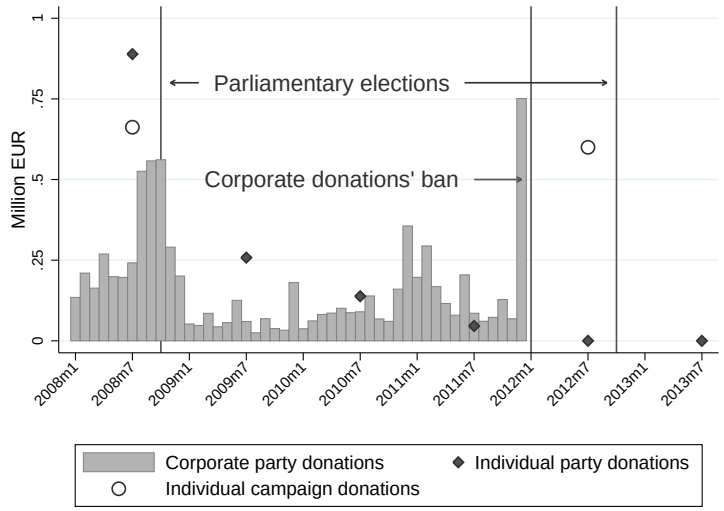


Figure 2: Corporate donations to parties

Notes. Data from the Central Electoral Commission of Lithuania. Monthly amount of corporate party donations and yearly amount of individual party and campaign donations are shown.

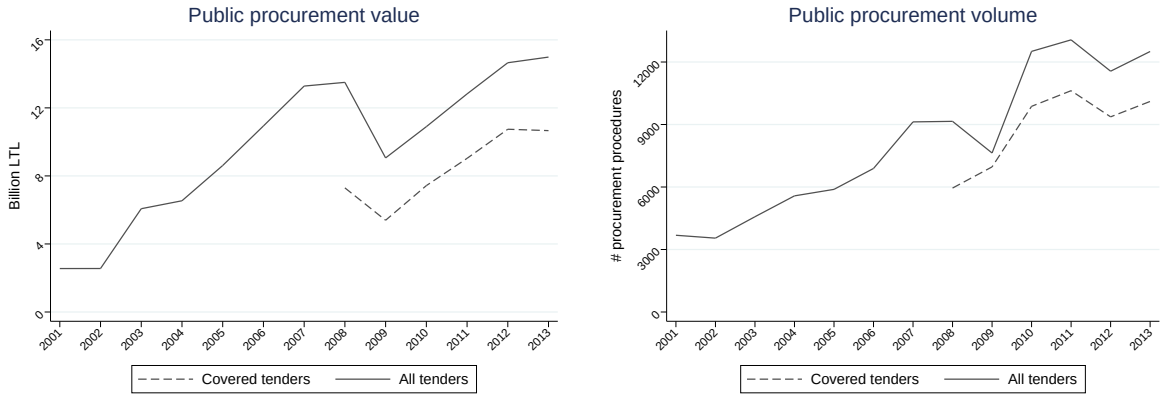


Figure 3: Data coverage

Notes. Data from the Public Procurement Office of Lithuania.

Purchase object part 1. Miconazolum mouth gel 20mg/g 40g N1 (33600000-6)		
Rank	Bidder	Price bid
1	UAB "MEDIKONA"	1413,00 LTL
2	UAB "ARMILA"	1422,75 LTL
3	UAB "Limedika"	1442,20 LTL
Purchase object part 2. Aliuminii hydroxidum/magnii hydroxidum susp (100g with 4g/1,38g) (33600000-6)		
Rank	Bidder	Price bid
1	UAB "MEDIKONA"	5,61 LTL
2	UAB "ARMILA"	6,71 LTL
	UAB "Limedika"	5,61 LTL
	Rejection reason: a different pharmaceutical product was offerred.	
Purchase object part 3. Aliuminii hydroxidum/magnii hydroxidum susp (15ml with 0,5235/0,5985g) (33600000-6)		
Rank	Bidder	Price bid
1	UAB "Limedika"	14,17 LTL
Purchase object part 4. Ranitidine tablets 150mg (33600000-6)		
Rank	Bidder	Price bid
1	UAB "MEDIKONA"	383,33 LTL
2	UAB "ARMILA"	392,04 LTL
3	UAB "Limedika"	452,81 LTL
4	UAB "ENTAFARMA"	718,09 LTL

Figure 4: Sample procurement procedure

Notes. Procurement procedure for pharmaceutical products No.76266, carried out by Klaipeda Children's Hospital in 2009.

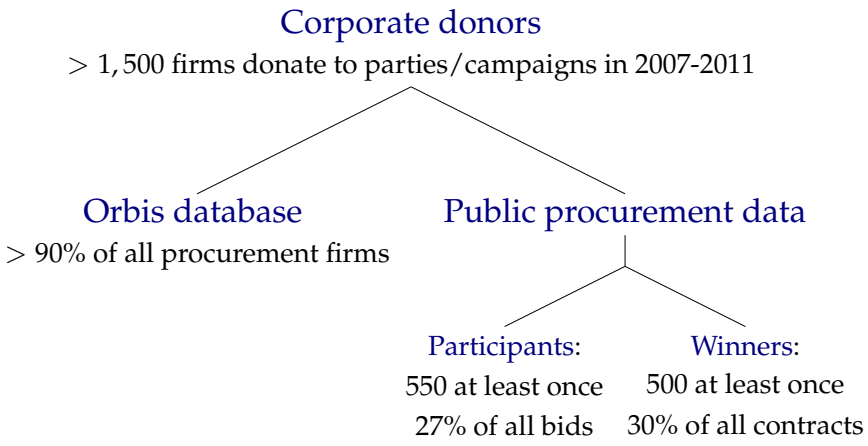
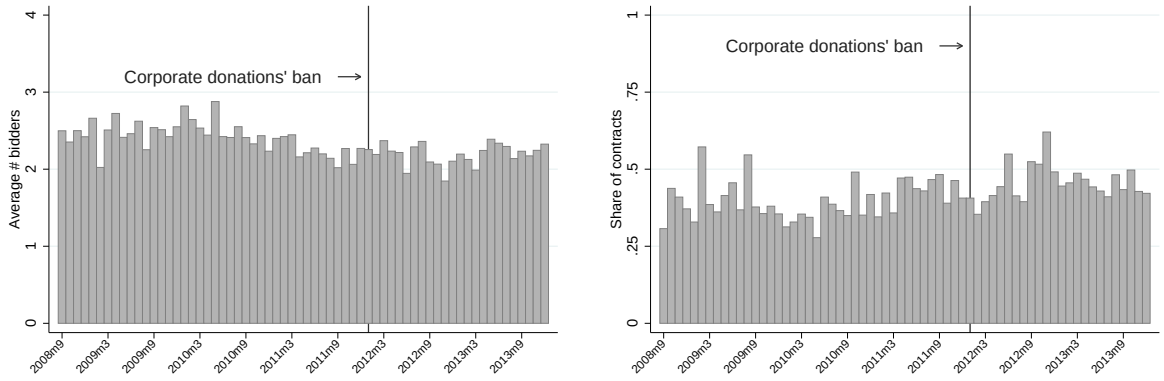


Figure 5: Data sources

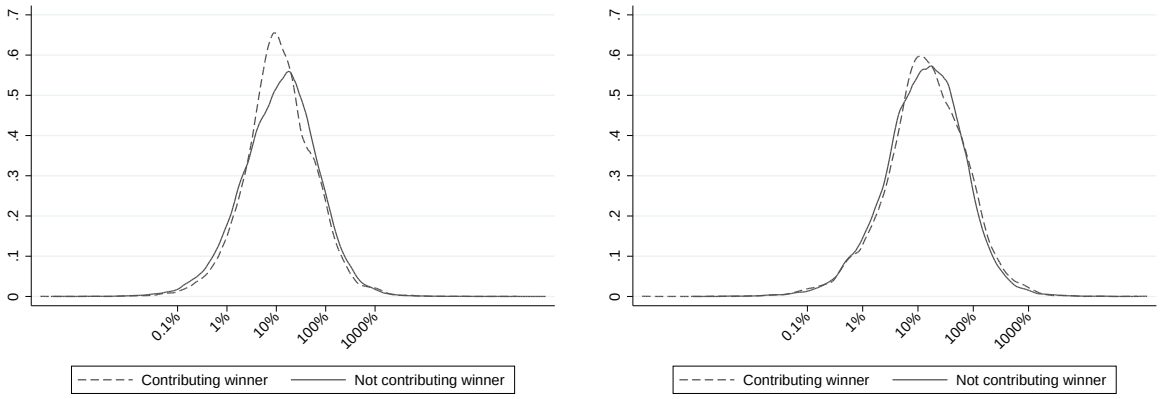


(a) Number of bidders

(b) Sole-bid tenders

Figure 6: Participation in procurement

Notes. Figure (a) shows the average monthly number of bidders in tenders and Figure (b) – the monthly share of sole-bid tenders.

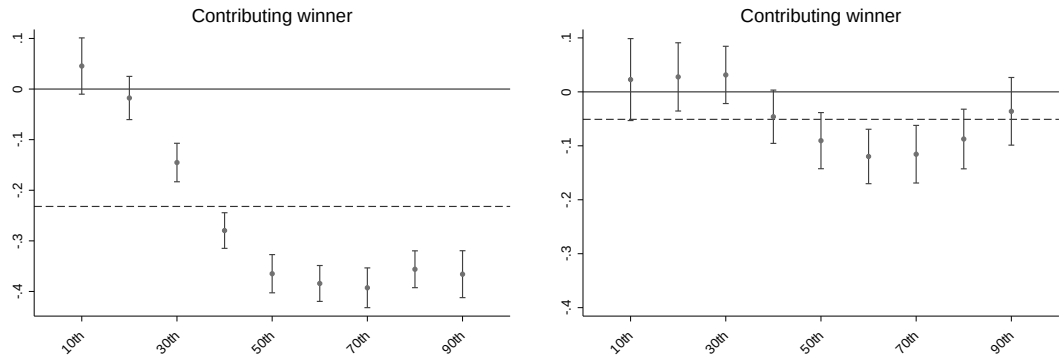


(a) Before

(b) After

Figure 7: % victory margin, log

Notes. The dependent variable is the victory margin defined as the decimal logarithm of the difference between the second lowest bid and the winning bid, normalized by the winning bid. Figure (a) and Figure (b) show kernel density plots of the victory margin in contracts awarded to contributing and non-contributing firms, respectively, before and after the ban on corporate donations. The sample excludes tenders with more than one contributing firm among bidders.



(a) Before (b) After

Figure 8: % victory margin, log

Notes. The dependent variable is the victory margin defined as the decimal logarithm of the difference between the second lowest bid and the winning bid, normalized by the winning bid. Figures (a) and (b) plot, respectively, the coefficients β_1 and $\beta_1 + \beta_3$ from unconditional quantile regressions in equation (3) for each decile. They show the difference in the victory margin in contracts awarded to contributing and non-contributing firms, respectively, before and after the ban on corporate donations. The dashed line plots the average effect from an analogous specification estimated by the OLS. The sample excludes tenders with more than one contributing firm among bidders.

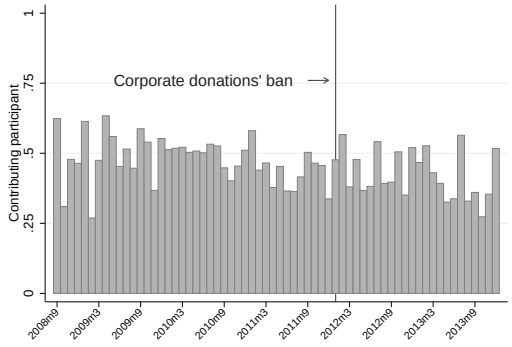
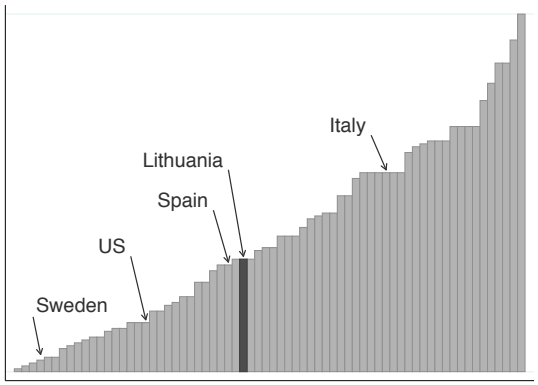
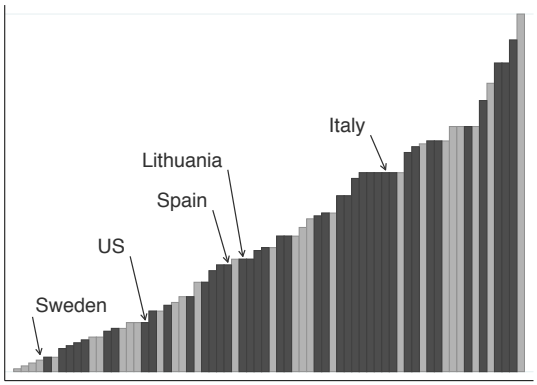


Figure 9: Tenders with a contributing firm

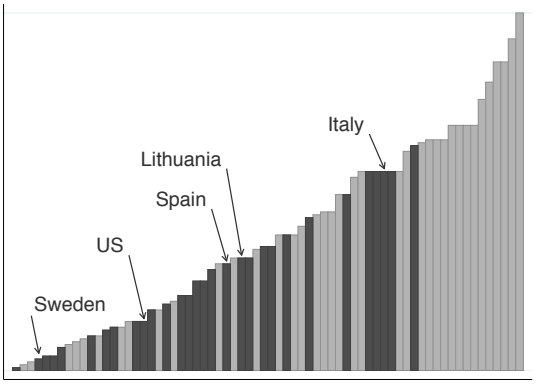
Notes. Figure shows the monthly share of tenders in which at least one contributing firm participates.



(a) Corruption Perceptions' Index



(b) Public information on donors



(c) Procurement supervision body

Figure 10: Institutional context

Notes. Figure (a) shows Corruption Perceptions Index in 2014 for 68 countries with free political rights (score of 1 or 2, Freedom House). Among them, Figure (b) indicates in black countries in which information on political donors is publicly available and Figure (c) – countries in which procurement procedures are monitored by a supervision body. Countries with missing information are not highlighted.

Appendix

For Online Publication

A.1 Predicting the contribution status

I estimate the propensity to be a contributing firm using a logistic regression:

$$log\left(\frac{p_i}{1-p_i}\right) = \alpha + X_i\gamma + \varepsilon_i \tag{4}$$

where p_i is the probability that a firm contributes and X_i is a vector of controls that includes measures for i) time constant firm characteristics (size, NACE industry, corporate group structure and the number of subsidiaries and of shareholders), ii) firm age (the year of incorporation and the firm's age, computed as the difference between the first year in the procurement dataset and the year of incorporation), iii) broadly available firm financial indicators (the logarithm of turnover and of number of employees) and iv) other firm financial indicators (the logarithm of capital, of fixed assets and of current assets).[66] Columns 1-4 in Table A.1.1 show the regression results with the different specifications i)-iv).[67]

Firm time-invariant characteristics are important in predicting contributing firm status. For example, firm size is positively associated with being a contributing firm. However, there is no considerable increase in the predictive power of the model when financial indicators are added. In fact, augmenting equation (3) with variables that are not much correlated with the probability of being a contributing firm (e.g., capital, fixed assets and current assets) results in a marked reduction of the sample size and also lowers the pseudo-R^2 of the model (Table A.1.1, column 4). Hence, I base the trimming procedure on the specification in column 2, which is estimated for most firms in the sample and has the highest pseudo-R^2.[68] Given a heavy left tail of the propensity score distribution (Figure A.1.1), trimming results in discarding 6,456 firms out of 7,896. They are mostly control group firms that are distant from the contributing firms in their covariates' distribution and do not frequently participate in tenders. The sample obtained after trimming consists of almost 360,000 observations.

[66] For time-varying characteristics in the latter two specifications, I take their value in 2005 (or in the year of incorporation for firms founded after 2005).

[67] Specifications in columns 3 and 4 include a considerably smaller number of observations due to the fact that extensive coverage of firm-level variables is not available for all firms in Orbis database.

[68] Virtually the same pseudo-R^2 is achieved in the specification in column 3. As the latter can only be estimated for a considerably smaller fraction of firms, the model in column 2 is preferred. The results are robust to using this specification for trimming.

Table A.1.1: Predict contribution status

Dependent variable:	Contribute			
	(1)	(2)	(3)	(4)
Very large company	1.835***	1.439***	0.372	−0.019
	(0.365)	(0.396)	(0.436)	(0.471)
Large company	1.463***	1.192***	0.635***	0.394
	(0.186)	(0.190)	(0.222)	(0.249)
Medium-sized company	0.906***	0.781***	0.577***	0.407**
	(0.127)	(0.130)	(0.144)	(0.176)
Log # of employees			0.090	0.008
			(0.064)	(0.084)
Log Turnover			0.195***	0.192**
			(0.045)	(0.080)
Industry FE	X	X	X	X
Age controls		X	X	X
Other firm controls				X
Pseudo-R^2	0.15	0.17	0.17	0.15
N	7,834	7,823	6,448	3,393

Notes. Firm-level logistic regression results are shown. The dependent variable in all columns is an indicator *Contribute* for firms that have donated to a political party or to a political campaign. Controls in column 1 include time-invariant firm characteristics (size and industry). Column 2 adds the year of incorporation and the firm's age at the entry in procurement. Column 3 adds the logarithm of turnover and of the number of employees. Column 4 also includes the logarithms of capital, of fixed assets and of current assets. In the interest of space, only coefficients of selected variables are shown. Robust standard errors in parenthesis. *** - significant at 1 percent, ** - significant at 5 percent, * - significant at 10 percent.

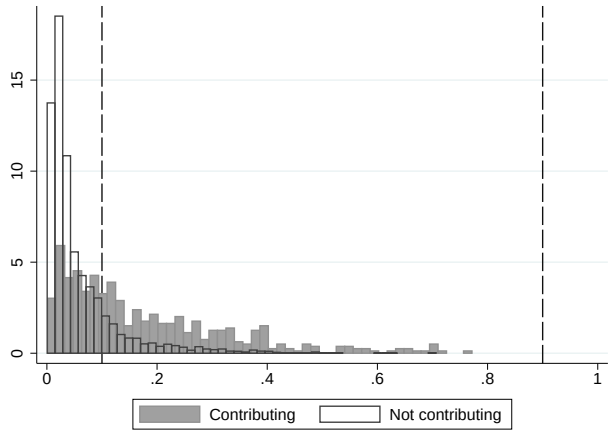


Figure A.1.1: Being a contributing firm

Notes. Figure shows the density of the predicted propensity to contribute $\hat{p}$ for the two groups of firms. Dashed lines indicate the trimming interval $[0.1, 0.9]$.

A.2 Analytical predictions

First-price sealed-bid auction

For the illustration purposes, I assume that the cost of producing the good for firm i is c_i is privately known by i, and $(c_1, c_2, ..., c_I)$ are independently and uniformly distributed on [0,1]. The payoff for firm i is:

$$\Pi_i = \begin{cases} p_i - c_i, & \text{if } i \text{ wins} \\ 0 & \text{otherwise.} \end{cases}$$

In the symmetric Bayes-Nash equilibrium of this game, firms set the following bids and the firm with the lowest cost wins the auction:

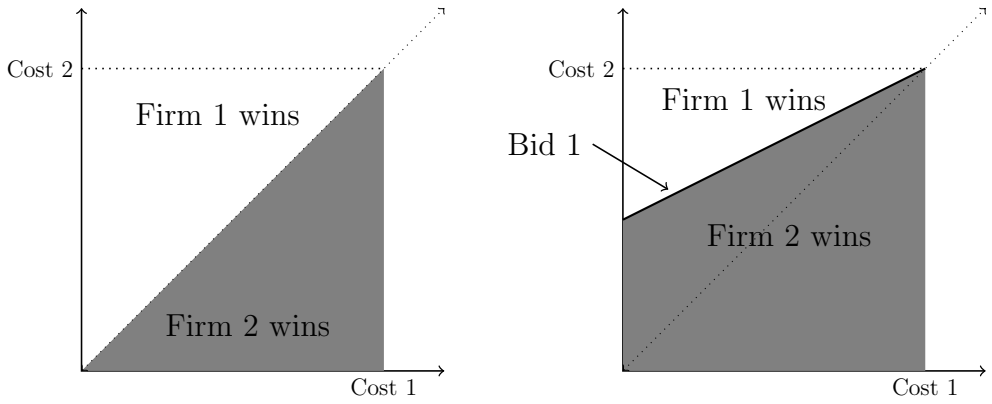
$$p(c_i) = \frac{1}{I} + \frac{I-1}{I} c_i, \quad \text{with } I{=}2: \quad p(c_i) = \frac{1}{2}(1 + c_i).$$

I consider the case where one firm is informed about the bid by its competitor. Suppose that the informed firm is $i = 2$ and the uninformed firm $i = 1$ knows that its competitor is informed. In the Perfect Bayesian Equilibrium of this sequential game, firm 2 bids:

$$p_2 = \begin{cases} p_1, & \text{if } c_2 < p_1, \\ p_1 + \Delta, & \text{if } c_2 \geq p_1 \text{ and } \Delta > 0. \end{cases}$$

The bidding strategy for the informed firm implies that it can outbid its competitor whenever its cost c_2 is below the price bid by its opponent p_1.[69] The result is an inefficient allocation of contracts as the informed firm now also wins a fraction of contracts in which it is not the lowest cost bidder (see Figure A.2.1).

[69] Intuitively, firm 2 should always bid above its cost: $\Delta > c_2 - p_1$.



(a) Standard (b) Insider information

Figure A.2.1: Reallocation of tenders

Notes. Figure (a) illustrates the allocation of tenders in the standard first-price sealed-bid auction model, whereas Figure (b) shows the reallocation of a fraction of tenders to the firm with information on the opponent's bid.

Given the bidding behavior of firm 2, firm 1 maximizes its expected profit:

$$(p_1 - c_1)\Pr(p_1 < c_2) \implies \text{FOC:} \quad p_1 = \frac{1}{2}(1 + c_1)$$

The bidding strategy for the uninformed firm 1 is the same as in the auction with no informed bidder. Although the probability of winning the contract $\Pr(p_1 < c_2)$ is smaller than in the case when no firm is informed, the elasticity with respect to p_1 is the same (firm 1 cannot affect its probability of winning in the range of prices for which firm 2 can profitably win).

The expected cost:

$$\begin{aligned} & E(\min(c_1, c_2)) \\ = & \int_0^1 \int_0^{c_1} c_2 dc_2 dc_1 + \int_0^1 \int_{c_1}^1 c_1 dc_2 dc_1 \\ = & \int_0^1 \frac{1}{2}\left[c_2^2\right]_0^{c_1} dc_1 + \int_0^1 c_1 \left[c_2\right]_{c_1}^1 dc_1 = \frac{1}{3} \quad (S1) \end{aligned}$$

The expected price:

$$E(p(c_i)) = \frac{1}{2} + \frac{1}{2}E(\min(c_1, c_2)) = \frac{2}{3} \quad (S2)$$

The expected profit, conditional on c_i is:

$$(p_i - c_i)\Pr(p_i < p_j) = \frac{1}{2}(1 - c_i)(1 - c_i) = \frac{1}{2}(1 - c_i)^2 \quad (S3)$$

First-price sealed-bid auction, with insider information

The expected cost:

$$\begin{aligned} &= \int_0^1 \int_0^{\frac{1}{2}(1+c_1)} c_2 dc_2 dc_1 + \int_0^1 \int_{\frac{1}{2}(1+c_1)}^1 c_1 dc_2 dc_1 \\ &= \int_0^1 \frac{1}{2} \left[c_2^2\right]_0^{\frac{1}{2}(1+c_1)} dc_1 + \int_0^1 c_1 \left[c_2\right]_{\frac{1}{2}(1+c_1)}^1 dc_1 \\ &= \int_0^1 \frac{1}{2} \left(\frac{1}{2}(1+c)\right)^2 dc_1 + \int_0^1 c \left(1 - \frac{1}{2}(1+c)\right) dc_1 = \frac{3}{8} \quad (I1) \end{aligned}$$

The expected price:

$$E\left(\min\left(p_1, p_2\right)\right) = E\left(p_1\right) = \int_0^1 \frac{1}{2}\left(1+c_1\right) dc_1 = \frac{3}{4} \quad (I2)$$

The expected profit for firm 1, conditional on c_1:

$$\left(p_1 - c_1\right) \Pr\left(\frac{1}{2}\left(1+c_1\right) < c_2\right) = \frac{1}{2}\left(1-c_1\right)\frac{1}{2}\left(1-c_i\right) = \frac{1}{4}\left(1-c_i\right)^2 \quad (I3a)$$

The expected profit for firm 2, conditional on c_2:

$$\left(p_1 - c_2\right) \Pr\left(\frac{1}{2}\left(1+c_1\right) > c_2\right) = \begin{cases} \left(1-c_2\right)\left(1+c_1-2c_2\right) & \text{if } c_2 \geq \frac{1}{2} \\ \frac{1}{2} + \frac{1}{2}c_1 - c_2 & \text{if } c_2 < \frac{1}{2} \end{cases} \quad (I3b)$$

Predictions 1, 2, 3 and 4

Prediction 1: The comparison of the firm 2 bidding differs for different combinations of the relationship between the costs of the two firms and the strategy for firm 2.

- $c_1 > c_2$. Firm 2 is more efficient than firm 1 and it can always outbid firm 1. Then its bid with information p_2^i is always higher than its bid p_2^{ni} in the case with no information due to its lower cost:

$$p_2^i = \frac{1+c_1}{2} > p_2^{ni} = \frac{1+c_2}{2}$$

- $c_1 < c_2$. Firm 2 is less efficient than firm 1. It can, however, win as long as $c_2 < p_1$. Then its bid p_2^i is lower than its bid with no information p_2^{ni} due to its higher cost:

$$p_2^i = \frac{1+c_1}{2} < p_2^{ni} = \frac{1+c_2}{2}$$

Now consider the case when it is not profitable for firm 2 to win ($c_2 \geq p_1$). For Δ large enough price p_1^i bid is larger than its bid p_2^{ni} in the case with no information:

$$p_2^i = \frac{1+c_1}{2} + \Delta > p_2^{ni} = \frac{1+c_2}{2} \quad \text{if} \quad \Delta > \frac{c_2 - c_1}{2}$$

Under the assumption about the cost distributions, the average price bid by the informed firm is higher than its bid with no information.[70]

Prediction 2: To see this, define the victory margin M as the relative difference between the second lowest bid (runner-up) and the first lowest bid (winner).

$$M = \frac{p_{2nd} - p_{1st}}{p_{1st}}$$

Moreover, note that the informed firm in order to secure the victory has an incentive to bid very close to the uninformed firm. However, when the informed firm would rather lose the contract, Δ is set arbitrarily large to make sure that the firm does not get a contract which is not profitable:

$$M_{F2wins} = \frac{p_1 - p_2}{p_2} = \frac{p_1 - p_1}{p_1} = \frac{0}{p_1} \approx 0$$

$$M_{F1wins} = \frac{p_2 - p_1}{p_1} = \frac{p_1 + \Delta - p_1}{p_1} = \frac{\Delta}{p_1} > 0$$

In the case with no information, the margin of victory if firm 2 wins is given by the difference in costs:

$$M_{F2wins} = \frac{c_1 - c_2}{c_2} > 0$$

In addition, the comparison of costs and prices in the two cases provides the following predictions:

Prediction 3. More efficient (i.e. lower cost) firms sell to the buyer after the ban.

Follows from *S1* and *I1*.

Prediction 4. Procurement goods are purchased at lower prices after the ban.

Follows from S2 and I2.

[70] I use a simulation that mimics costs drawn from the U$[0, 1]$ distribution to compare patterns in winning and bidding, on average, in the standar case and in the case with one informed firm. Numeric calculations of the overall change in bidding show that bids by informed firms are, on average, higher than their bids with no information.

A.3 Additional results

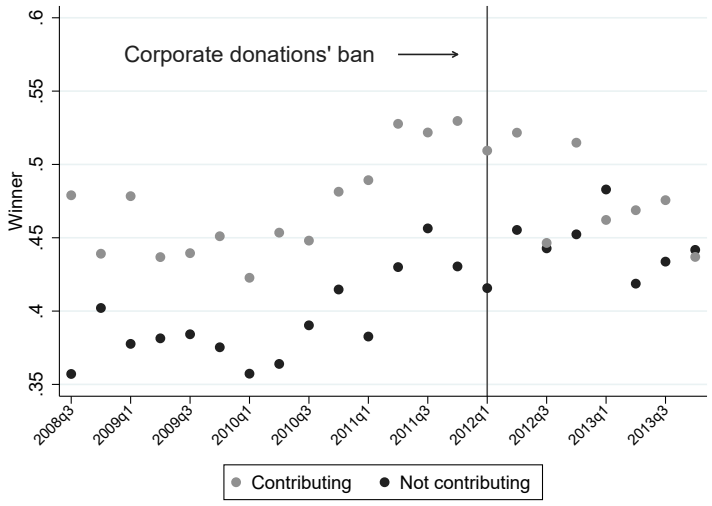


Figure A.3.1: Probability of winning

Notes. Figure shows the scatter plot of the variable *Winner* defined as an indicator for firms which win a contract.

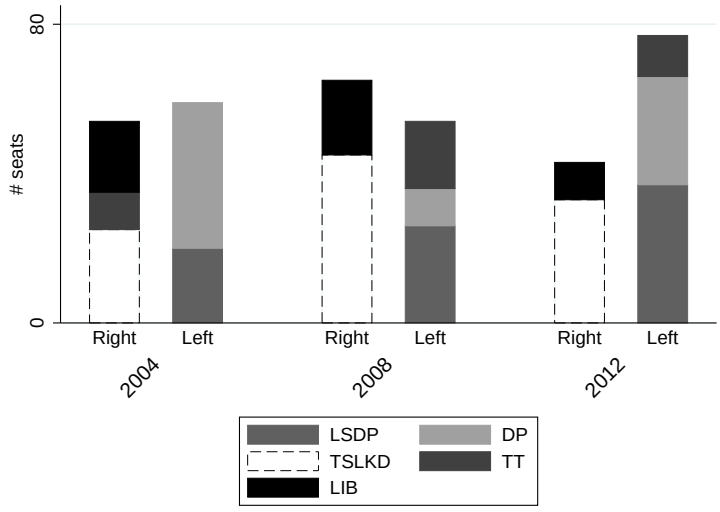


Figure A.3.2: Main parties in the Parliament

Notes. Left-wing coalition is formed by LSDP and DP. Right-wing coalition is formed by TS-LKD and liberals (LiCS and LRLS). TT is the center-right party, which joined left-wing coalitions in 2008 and in 2012.

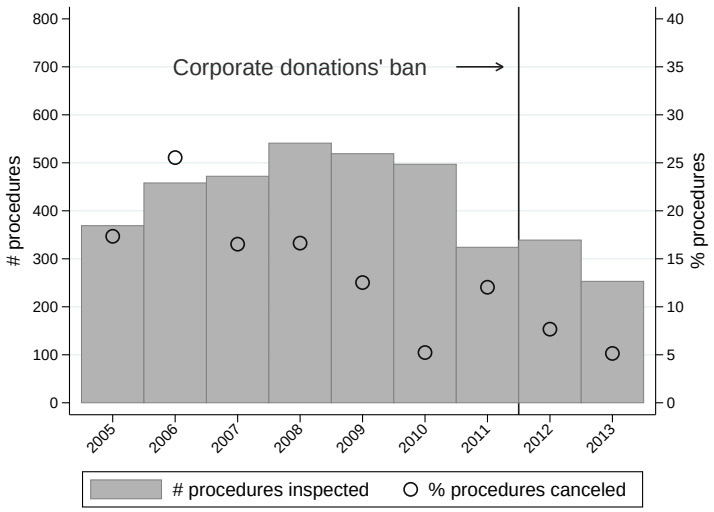
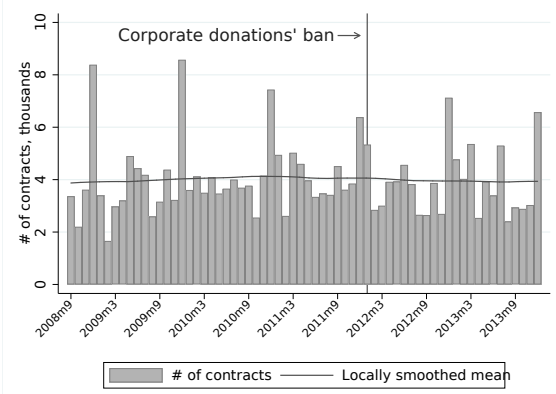
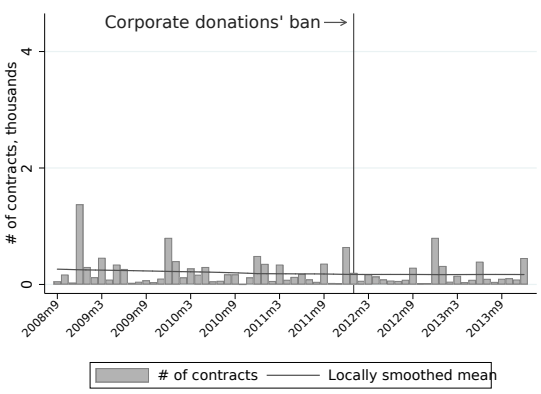


Figure A.3.3: Inspections by the Public Procurement Office

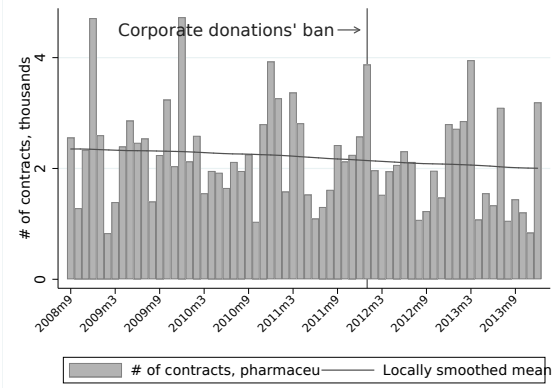
Source: Author's calculations based on the data in the Public Procurement Office annual reports.



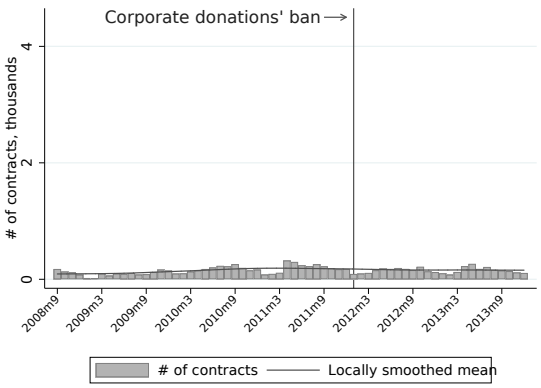
(a) Total



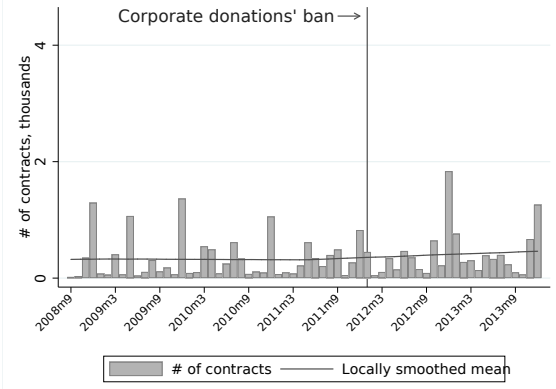
(b) Food and beverages



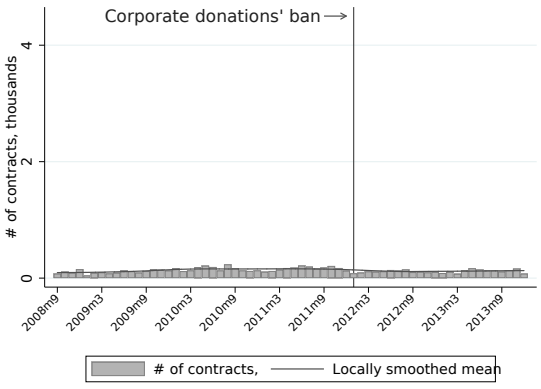
(c) Medical equipment



(d) Construction works



(e) Repair and maintenance services



(f) Architecture and engineering services

Figure A.3.4: Procurement contract volume

Notes. Figure shows the total number of contracts with locally smoothed mean in each spending category.

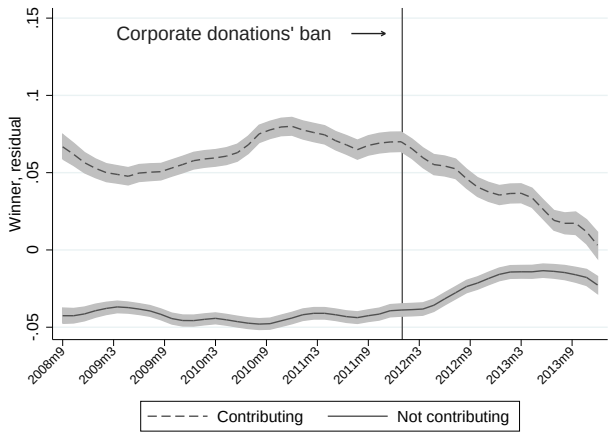


Figure A.3.5: Probability of winning, trimmed sample

Notes. Figure shows locally smoothed means of the residual from the regression of the *Winner* indicator on procurement controls in the trimmed sample.

Table A.3.1: Procurement sectors

CPV	Description	Frequency
33	Medical equipments, pharmaceuticals and personal care products	140,093
50	Repair and maintenance services	22,838
15	Food, beverages, tobacco and related products	12,820
45	Construction work	9,757
71	Architectural, construction, engineering and inspection services	8,461
34	Transport equipment and auxiliary products to transportation	6,880
80	Education and training services	5,786
44	Construction structures and materials	5,027
22	Printed matter and related products	4,822
30	Office and computing machinery, equipment and supplies	4,060

Notes. CPV 2-digit code descriptions for 10 most frequent codes. The frequencies are shown for contract level data. The top categories remain similar when the data is cut at the procurement procedure level.

Table A.3.2: Participation in procurement

Dependent variable:	Number of bids for a procurement tenders		
Model:	OLS	Poisson	Negative binomial
	(1)	(2)	(3)
Contribute × Ban	−0.015	−0.049	0.023
	(0.025)	(0.098)	(0.053)
Procurement controls	X	X	X
Firm controls	X	X	X
Industry FE × Year FE	X	X	X
N	61,614	61,614	61,614

Notes. The table reports the difference-in-differences coefficients on firm-month level data. Regression models are indicated in column headers. The dependent variable is defined as the number of bids for a procurement contract made in a month (in logarithms in column 1). *Contribute* is an indicator variable for firms which have donated to a political party or to a political campaign. *Ban* is an indicator variable for contracts signed after January 1, 2012. Procurement controls are year, CPV 4-digit code, contracting organization type and procurement procedure type indicators and indicators for goods, services and works procured. Firm controls are size categories, NACE main industry fixed effects and firm age. Standard errors clustered at firm level in parenthesis. *** - significant at 1 percent, ** - significant at 5 percent, * - significant at 10 percent.

Table A.3.3: Contract value

Dependent variable:	Panel A: Intensive margin				
	(1)	(2)	(3)	(4)	(5)
Contribute	0.665***	0.366**	0.366**		
	(0.215)	(0.159)	(0.158)		
Contribute × Ban	−0.238**	−0.265**	−0.274**	−0.088	−0.116*
	(0.107)	(0.115)	(0.117)	(0.068)	(0.063)
R^2	0.50	0.51	0.51	0.61	0.61
N	255,546	244,941	244,940	253,411	243,803
Dependent variable:	Panel B: Overall effect				
	(1)	(2)	(3)	(4)	(5)
Contribute	0.808**	0.534***	0.543***		
	(0.336)	(0.191)	(0.191)		
Contribute × Ban	−0.325**	−0.370***	−0.399***	−0.282***	−0.320***
	(0.137)	(0.125)	(0.123)	(0.099)	(0.101)
Procurement controls	X	X	X	X	X
Firm controls		X	X		
Industry FE × Year FE			X		X
Firm FE				X	X
R^2	0.13	0.13	0.14	0.23	0.22
N	596,039	575,835	575,835	593,477	575,527

Notes. The table reports the difference-in-differences coefficients from OLS regressions. The dependent variable is *Log Contract value* defined as the logarithm of the contract value, calculated as the total procedure value divided by the number of contracts in that procedure. The sample in Panel A only includes winning firms, while the sample in panel B includes all firms. *Contribute* is an indicator variable for firms which have donated to a political party or to a political campaign. *Ban* is an indicator variable for contracts signed after January 1, 2012. Procurement controls are year, CPV 4-digit code, contracting organization type and procurement procedure type indicators and indicators for goods, services and works procured. Firm controls are size categories, NACE main industry fixed effects and firm age. Standard errors clustered at firm level are shown in parenthesis. *** - significant at 1 percent, ** - significant at 5 percent, * - significant at 10 percent.

Table A.3.4: Descriptive statistics: contracts calls' sample

	No description	With description	Difference
Main dependent variables:			
Log price bid	7.25	8.60	-1.36^{***}
	(3.16)	(3.19)	(-68.13)
# bidders	2.35	2.22	0.13^{***}
	(1.64)	(1.67)	(12.69)
Procurement procedure:			
Open	0.85	0.97	-0.12^{***}
	(0.35)	(0.17)	(-93.14)
Negotiation	0.06	0.00	0.06^{***}
	(0.24)	(0.02)	(119.19)
Other	0.08	0.03	0.05^{***}
	(0.28)	(0.17)	(46.14)
Public administration unit:			
Central	0.07	0.14	-0.06^{***}
	(0.26)	(0.34)	(-31.11)
Middle	0.76	0.80	-0.04^{***}
	(0.43)	(0.40)	(-16.59)
Local/territorial	0.07	0.07	0.00^{*}
	(0.25)	(0.25)	(2.50)
Public utility company	0.10	0.00	0.10^{***}
	(0.30)	(0.03)	(153.09)
Procurement object:			
Goods	0.75	0.85	-0.10^{***}
	(0.43)	(0.35)	(-45.07)
Services	0.21	0.14	0.06^{***}
	(0.40)	(0.35)	(28.78)
Works	0.04	0.00	0.04^{***}
	(0.20)	(0.07)	(66.03)
Observations	226,473	29,134	255,607

Notes. The table reports means with standard deviations in parenthesis of procurement variables for tender contracts with/without procurement object description available (*With description*/*No description*) in column 1/column 2, respectively. Column 3 reports the difference between the two groups with the t-statistic in parenthesis.