Government Transparency Institute

Elizabeth Dávid-Barrett[1], Mihály Fazekas[2]

Anti-corruption interventions in development aid: Is corruption reduced or merely displaced?

Working Paper series: GTI-WP/2018:02

September 2018, Budapest, Hungary

[1] University of Sussex
[2] Central European University

Abstract

Most anti-corruption interventions are small-scale and targeted. Hence, there is a risk that they simply displace corruption rather than reducing it as corrupt actors adapt to the new conditions. Direct attempts at improving corruption controls in one area might elicit two evasive tactics: corrupt actors could shift focus to areas with weaker controls or could more aggressively exploit the loopholes that remain. Observing such displacement effects requires an overview of a whole system and detailed data points within it, hence we focus on the procurement process which is highly regulated and structured yet also prone to corrupt manipulations. We analyse a dataset of World Bank-funded development aid tenders over two decades in >100 developing countries. With data points from multiple stages of the procurement process and key outcomes, we observe the heterogeneous effects of a 2003 anticorruption reform aimed at increasing oversight and opening up competition. Our tight matching estimations suggest that the reform is effective in a direct sense: it decreases corruption risks due to low competition (the share of single bidding falls from 22% to18%). But evasive tactics largely cancel out these positive direct effects: buyers switch to non-treated non-competitive procedure types (whose share increases from 7% to 10%) and exploit them more intensively. Overall, foreign companies lose out: their market share drops by 2 percentage points.

1. Introduction

Anti-corruption reforms typically take a piecemeal approach, seeking incremental improvements, while 'Big Bang' systemic interventions remain rare. As such, interventions focus on reducing corruption in targeted areas and seek to ensure that their impact is sustainable. However, the recognition has gained traction more recently (Fisman & Golden, 2017) that an additional key challenge is to ensure that corruption is reduced rather than merely displaced, or at least the unintended negative consequences of corruption displacement do not outweigh the intended positive consequences of corruption reduction. When fighting high-level, organised forms of corruption in particular, there is a pronounced risk that improving controls in one area will simply prompt actors to shift their corrupt activity to other areas where controls are weaker, or to exploit remaining loopholes more aggressively.

In order to gather systematic evidence about the extent and nature of corruption displacement, we focus on government procurement tenders and contracts funded by the World Bank. Observing corruption displacement effects requires an overview of a whole system and detailed data points within it, hence we consider the procurement process as ideal: it is tightly regulated to minute detail and highly structured, yet also prone to corruption. We analyse a unique large-scale dataset of World Bank-funded development aid tenders and contracts over two decades in >100 developing countries. With data points from multiple stages of the procurement process as well as a range of outcomes, we observe the heterogeneous effects of a 2003 anticorruption reform which aims to open up competition. Hence, our main research question is

> Do donor reforms aiming to open up competition lower corruptions risks or merely displace them?

While displacement can take place in many ways, we explore this research question in the narrower domain of public procurement where close substitute evasive strategies are to be found. For example, tighter control of corruption in the advertisement of tenders (where short advertisement periods might be a way of favouring cronies) could displace corruption to the evaluation of bids (where cronies are favoured through biased evaluation). Focusing on a single area of government spending also keeps the broader regulatory framework and set of actors constant, making our analysis tractable. In addition, if corruption is more tightly controlled in some procurement processes, it is likely that corrupt actors will first seek alternative corruption strategies within the same area rather than incurring the transaction costs (e.g. informational costs, resistance from other corrupt groups controlling their turf) involved in learning to corrupt an alternative government function. In order to track as wide as possible a range of evasive strategies, we develop corruption risk indicators for three stages of the procurement process: bidding, contract award, and contract signature.[3]

Employing a tightly coupled matching estimator, we find that the World Bank procurement reform is effective in a direct sense: it decreases corruption risks due to low competition: the share of tenders with a single bidder decreases from 22.4% to 18.7%, the average number of bidders increases from 4.5 to 5.0; and the share of repeat winners falls from 71.8% to 65.4%. However, we also find evidence of evasive tactics which largely cancel out these positive direct effects. First, buyers switch to non-treated non-competitive procedure types, whose prevalence increases from 7.3% to 9.6%. They also exploit these types more intensively: the outcomes of non-competitive procedure types deteriorate, e.g., the share of single bidding

[3] The final contract implementation phase is not covered by our indicators as data is only available on project level rather than contract level which makes our identification strategy ineffectual.

increases from 67% to 81%. Overall, foreign companies lose out as their market share drops by 2 percentage points, suggesting that the net effect of the reform may be close to zero.

These findings not only highlight the theoretical and empirical importance of tracking likely displacement effects in order to achieve success in anti-corruption reform, but also point out that distinct combinations of reform efforts may increase impact. In particular, we propose that any procurement reform aiming to expand advertisement and publicity of tenders should be coupled with stronger regulation and monitoring of non-competitive, non-advertised tenders.

2. A review of the literature

Law and regulation concerning public procurement is based on economic theory assumptions that **greater competition** for tenders leads to better value for money (Ware et al. 2007; Celentani & Ganuza 2002) and that the best way to increase competition is to reduce transaction costs (Williamson 1981; Estache & Iimi 2008). Thus, some key aims of procurement reform are to ensure that processes are truly open by reducing the transaction costs associated with learning about tenders and bidding. There is considerable evidence to support this approach (Ohashi 2009; Kenny & Crisman 2016; Estache & Iimi 2008). For example, Knack et al (2017), using evidence from firm surveys in 88 developing countries, find that firms are more likely to submit bids if they perceive procurement systems to be transparent, particularly in the case of smaller firms. Moreover, firms report paying fewer and smaller bribes in countries with more transparent procurement systems, more effective complaint mechanisms and better external auditing arrangements (Knack et al. 2017). Kenny & Crisman (2016) show that better advertising of contract tenders increases the number of bidders, while Coviello & Mariniello (2014), in their study of national tenders in Italy, find that the number of bidders increased by 9.3% as a result of advertising in official bulletins rather than advertising only on the buyers' own local notice boards.

E-procurement, which standardises various aspects of the process, also reduces transaction costs for bidders - for example, by allowing them to submit documentation electronically. The introduction of e-procurement has been found to reduce prices (Auriol 2006; Singer et al. 2009) and, in both India and Indonesia, has been shown to increase the probability that the winning bidder comes from outside the region where the contract takes place – another indicator of widening access (Lewis-Faupel et al. 2016). In these cases, while the intervention did not lead to reduced prices, it changed the nature of supply, bringing in higher-quality suppliers, such that there were reduced rents and increased efficiency of public spending. In Slovakia, the introduction of e-procurement together with requirements to publish tenders on a central procurement repository website achieved an increase in the average number of bids per contract, from 2.3 bids per tender in 2009 to 3.6 bids per tender in 2011 (Šípoš et al. 2015).

In political science, theories of corruption control - which focus on the 'buyer' side - suggest that corruption can be deterred by **reducing the discretionary power** of the officials who administer the process (Becker 1968; Rose-Ackerman & Palifka 2016; Klitgaard 1991). This leads to the design of anti-corruption interventions based on improving the type and frequency of oversight and accountability. Increased oversight can be achieved with relatively simple changes to the rules – for example, by changing governance structures such that use of non-competitive procedure types is subject to more onerous approval processes. In Serbia, following a 2013 amendment which made open tenders the default and required procuring authorities to seek permission for using any form of restricted procedure, the share of tenders conducted through non-competitive procedures dropped from 28% in 2012 to only 5% in 2014 (David-Barrett, Gligorov & Krstic, 2015). The threat of external audit - another form of oversight – is also found to be effective in reducing corruption (Olken 2007; Knack et al. 2017; Zamboni & Litschig 2013; Avis et al. 2016). This benefit is reflected in concrete welfare effects: the performance of intensive audits reduces the prices paid for homogeneous goods (Di Tella & Schargrodsky 2003). Note that some interventions are in line with both logics: e-procurement, for example, both reduces transactions costs and constrains the discretionary power of officials overseeing the process.

While this literature provides evidence that successful anti-corruption interventions can bring important gains in terms of improving access to tenders, reducing corruption, and securing welfare benefits such as reduced prices, relatively few studies assess whether such

interventions have unintentional adverse consequences elsewhere. Such questions are more commonly addressed in the literature on the impact of law enforcement on crime patterns, as well as in scholarship on the evaluation of public policy. These 'displacement effects' - although difficult to measure precisely (Levi & Maguire, 2004; Vijlbrief, 2012) – are commonly observed as a result of **law enforcement** actions against organised crime (Guerette & Bowers 2009; Levi & Maguire 2004; Smith et al. 2003; Welsh & Farrington 2002). Traditionally, criminals under pressure moved to a different geographical location, taking advantage of weaker law enforcement or greater market opportunities (Varese 2012). Vidal et al (2018), in a recent study, find that methamphetamine producers in the United States "keep abreast of legislations and perfect the recipes accordingly" to get around regulations (Vidal & Décary-Hétu 2018). In other cases, criminals utilise new technologies to avoid detection, as with the growth in use of drones to smuggle drugs into prisons (O'Hagan & Hardwick 2017).

The idea that policy interventions may lead to "surprises, paradoxes and unintended effects" is also embraced in scholarship on **public policy** (Margetts et al. 2010: 4). One strand examines how highly centralised systems of policy design are prone to overlook practical or local knowledge, as in Scott's example of 18th-century foresters who changed the patterns of tree-planting to facilitate counting but unwittingly destroyed the ecosystem by doing so (Scott 1999). There are numerous critiques of new public management theory which argue, similarly, that efforts to measure performance often undermine the results they intend to achieve (see, for example, Hood 2002). In this tradition, some scholars argue that economic theories of corruption control are flawed. Philp argues that efforts to specify accountability in democratic systems, for example, often undermine wider concepts of integrity (Philp 2001; Philp 2009), while Heywood finds that attempts to introduce accountability mechanisms in the UK public service risk undermining core values that underpin the public service ethos (Heywood 2010). Osrecki argues that initiatives that demand transparency, accountability, and compliance – common elements of anti-corruption interventions - run the risk of installing an inflexible and ineffective work-to-rule regime that may have the unintended consequence of stifling adaptability (Osrecki 2015).

There is increasing recognition that **anti-corruption** interventions may elicit strategic evasive responses by the targeted actors (Olken & Pande 2012). Fisman & Golden (2017) point to the results of an experiment in Romania, where the use of closed-circuit television in high-school exams and introduction of penalties for cheating reduced the opportunities for collective cheating, but had the unintended consequence that more affluent students paid bribes to facilitate their own cheating, while less affluent students saw their grades drop (Borcan et al. 2017; Fisman & Golden 2017). Recent work on anti-corruption interventions in Uganda's health sector found that the health ministry's approach of drastically increasing oversight may have caused a shift in the nature of informal payments in the sector rather than a true reduction (Peiffer et al. 2018). Fearful health workers ceased requesting informal payments outright, but still expected 'gifts' or other signs of 'appreciation' and relied on them to supplement their incomes.

3.1 Fighting corruption in public procurement

Our research focuses on **public procurement**, an area of administration which accounts for a large share of public spending and that is highly prone to corruption (Ware et al. 2007; Rose-Ackerman & Palifka 2016). Yet, because procedures are highly structured (OECD 2009), the process is also well suited to observing strategic responses to interventions. Public procurement is typically administered in a staged process with interdependent decision points, roughly following a decision tree. At the beginning of the process, a procuring entity (for example, a ministry, government agency, state-owned enterprise or municipality), assesses its needs. It then writes a tender specification based on those needs, decides on a procedure

for engaging with bidders (e.g., open or restricted bidding), and advertises the tender for a certain period. When the deadline arrives, the entity evaluates the bids and selects a winner. It then needs to formally let the contract, which sometimes involves further negotiation, and also retains a duty to oversee contract implementation. These formal stages of the procurement processes are similar all around the world. Indeed, public procurement is a key example of the isomorphic mimicry that has tended to pervade anti-corruption practice (Schnell 2015; Andrews et al. 2012), with many countries adopting very similar laws, but often failing to invest in building capacity or will to implement them.

Corruption in public procurement typically occurs when insiders manipulate different parts of the process - for example, by writing the specification of the tender very narrowly such that only one company would meet the conditions (Bága̋er 2011; Grodeland 2005; Heggstad & Froystad 2011; Goldman et al. 2013), or advertising the tender for a very short period so that only companies with advance knowledge have time to write a bid (Tanzi & Davoodi 1997; Kenny & Musatova 2010). Usually, the manipulations pay lip service to the rules so that officeholders can plausibly claim that the process was open and competitive. The fact that the process is complex yet structured means that, when confronted with changes in procurement rules which increase oversight or constrain their discretionary power, corrupt officeholders often have considerable scope to respond strategically by shifting their manipulations to another phase of the process. Shifting is facilitated by procurement officials frequently controlling several stages of the process. Moreover, and particularly in clientelist systems, politicians are often able to influence whichever stage they wish, through direct influence over bureaucrats or as part of more socially complex patterns of loyalty and reciprocal obligations (Charron et al. 2017; Mavrogordatos 1997; David-Barrett & Fazekas 2016; Goldman et al. 2013).

There is a growing body of evidence on displacement effects resulting from procurement reforms. Olken's case study in Indonesia finds that an increase in auditing of road expenditures leads to a reduction in missing expenditures, but also to an increase in the distribution of contracts to family members of project officials (Olken 2007). Gerardino et al (2017) use a regression discontinuity design to test the impact of audits on choice of procurement procedure, and find that this classic anti-corruption intervention perversely leads to a decrease in the use of auctions and a corresponding increase in the use of direct (non-competitive) contracts (Gerardino et al. 2017). There is also some evidence that procuring entities seek to evade regulations by bringing procedures outside the applicability of the Public Procurement Law or into less open and competitive procedure types (Podumljak & David-Barrett 2015; Heggstad & Froystad 2011; Kenny & Musatova 2010). This can be done, for example, by slicing up contracts so that they fall below contract value thresholds at which certain controls or transparency would be required (Papanek 2009 ch. 6; Piga 2011); invoking special rules of exception such as national security or extreme urgency (Soreide 2002; OECD 2007; Schultz & Soreide 2008); or underestimating expected contract value, where expected contract value is the basis for requiring competitive procedure types.

We use a November 2003 update to World Bank procurement rules as a case study. This reform intervened along two main dimensions. The main strand of reform sought to increase competition through widening access to procurement tenders, specifically by requiring greater use of electronic advertisement and e-procurement methods. In addition, it also sought to limit officials' discretion and increase oversight, through requiring procurement plans (to which buyers can be better held to account), introducing obligatory prior review mechanisms for cases where all bids are rejected (to check that reasons for rejecting bids were legitimate), and extending oversight to bidders (through audit requirements). Given that the main thrust of the 2003 reform aimed to increase competition as a way of mitigating corruption, and building

on prior research analysing the intervention's impact on competitiveness (Dávid-Barrett et al. 2017), we hypothesise the intended effect to be:

H1: Increased donor oversight and wider access decrease corruption risks associated with lack of competition.

As outlined above, there are two main ways corrupt actors can react to increased corruption controls in their line of business: i) move on to other, less controlled areas or corruption strategies; or ii) exploit the existing loopholes more intensively. In the specific context of World Bank funded procurement tenders and the corresponding dataset, we expect two particular evasive techniques in line with the first type of responses. Corrupt actors may simply switch to procedure types which are less competitive by nature such as sole-sourcing, where the new requirements of online advertising and the use of e-procurement have little impact. If changing procedure type turns out to be too costly - since procedure type choice is tightly regulated – they might alternatively seek to corrupt competitive procedures after the bidding stage, for example by pushing companies into corruption during the contract signature negotiations. Hence, the first unintended consequence is hypothesized to be:

H2: Increased donor oversight and wider access displace corruption risks to less competitive procedure types and the contract signature phase.

When corrupt actors decide to exploit existing loopholes more intensively, they change how they use existing corruption techniques. In our context, the most straightforward corruption technique remaining consistently available throughout the intervention is non-competitive procedure types. These procedure types carry a high corruption risk, i.e., it is easy to exploit them for channelling public funds to cronies. Yet they can be misused in varying ways, producing different outcomes such as single bidding or repeated award to the same company. Hence, we hypothesize:

H3: Increased donor oversight and wider access increases corruption risks in already risky non-competitive procedure types.

While the characteristics of the tendering process and associated corruption risks are expected to shuffle around as a result of the intervention, in line with the three above hypotheses, they are also likely to impact on which companies can benefit from corruption. Corruption in public procurement is predominantly about erecting barriers between insiders or connected firms on the one hand and outsiders or non-connected firms on the other, in order to confer a competitive advantage on the former. However, the intended and unintended impacts of the intervention may move the barrier between these two groups. If the intended positive effects dominate the compound effect, we shall see outsiders gaining relative market share, while if the unintended negative effects are stronger, outsiders are likely to lose ground. Because foreign firms are on average less connected than domestic firms, i.e. they are less likely to have already established links to public authorities before entering the market (for a similar argument contrasting local and non-local firms see Coviello & Gagliarducci 2017), we hypothesize that

H4: Increased donor oversight and wider access expand participation of less connected (foreign) bidders at the expense of more connected (domestic) bidders.

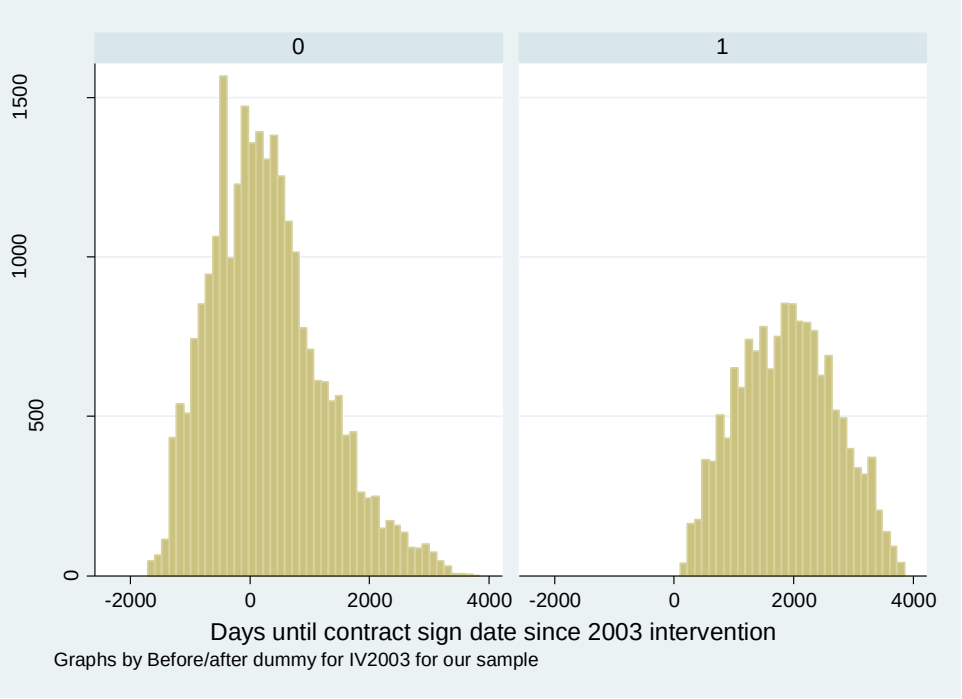
3. Methods, data, and indicators

3.1 Methods

Following David-Barrett et al (2017), we employ a quantitative research design which exploits the distinct break in the application of the new rules to World Bank-financed projects, and the time lag in issuing tenders and awarding contracts in control and treatment projects (projects governed by the old and new rules, respectively). We match contracts according to similarities in country, year, market, buyer organisation, and contract value, such that matched pairs differ only by the regulatory regime governing their projects, allowing us to identify the causal impact of the intervention. In other words, in the years following the 2003 regulatory change, we exploit the fact that the same or very similar countries, buyers, and markets see similar contracts awarded from projects which are either treated or not depending on the project approval date (Figure 1). We suggest that matching, based on average corruption risks prior to the intervention on the country as well as procuring entity levels (i.e. lagged dependent variable), closely approximates the true causal effect. Our control variables are superior to traditional confounding factors controlled for in the literature such as ethnic fractionalisation or democracy because the level of measurement is closer to the hypothesized impact mechanisms and uses variables more directly relevant for causal identification on the contract level. Detailed goodness of fit statistics for our matching estimation can be found in Appendix D.

Because the date at which the new rules apply is globally imposed by the World Bank, and because designing, negotiating, and approving projects is a lengthy exercise, we expect no gaming around the temporal cut-point (there is no evidence that project approval dates are brought forward artificially to avoid using the new regulatory regime). This is also supported by statistical tests of observed project distributions (see Appendix B).

FIGURE 1. FREQUENCY DISTRIBUTION OF CONTROL (0) AND TREATMENT (1) CONTRACTS ACCORDING TO THE TIME ELAPSED SINCE THE 2003 INTERVENTION, WORLD BANK, GOODS, WORKS AND SERVICES



Comprehensive qualitative coding of the World Bank's procurement guidelines for goods, works and services was completed. The coding frame was theoretically underpinned by the

literature on corruption control, distinguishing between interventions that target behavioural change on the part of buyers or suppliers, and those which seek to constrain opportunities for corruption or build capacity. Coding was completed by conducting in-depth year-on-year comparison of guidelines to ascertain changes. Each element was coded and entered into a spreadsheet, making it possible to track year-on-year changes to the documentation. From this, a narrative account was developed where major changes were highlighted and compared, to identify key themes. Interviews were also carried out with staff from the World Bank procurement team and some country offices to clarify what various interventions aimed to achieve and how they were implemented in practice.

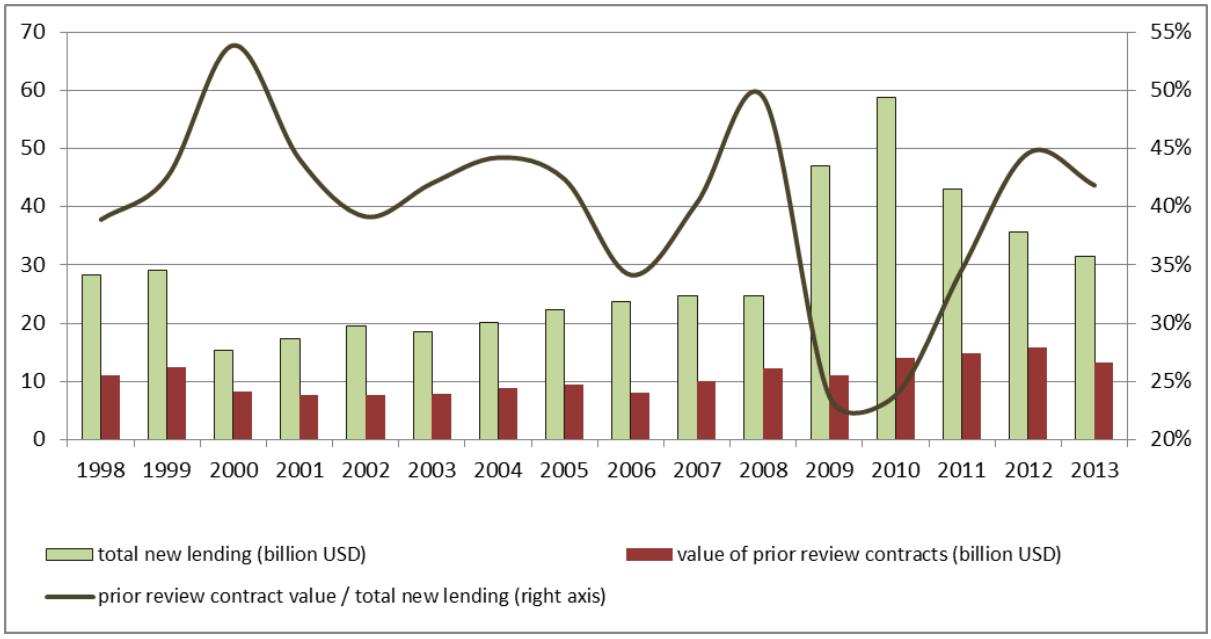
3.2 Data

Our database contains all major contract awards of World Bank-financed projects for the fiscal years 1998-2013.[4] Major contract awards refer to all 'prior-reviewed' contracts, i.e., contracts awarded in tendering processes that were reviewed by the World Bank prior to award and at key stages throughout the project cycle. Only contracts with an estimated value above a certain, context-specific, threshold undergo the prior-review process.[5] The other tendering processes, the so-called post-reviewed tenders, are managed completely by the recipients of World Bank loans with World Bank staff reviewing and auditing projects only after the end of the loan contract.[6] As our dataset only contains such high-risk tenders with greater World Bank controls, our findings are not representative of all aid spending financed by the World Bank, but only the part where risks are higher, and hence this greater degree of control is deemed necessary. For other World Bank-financed procurement tenders, we assume that donor corruption controls are of lesser importance as oversight is much more light touch and risks are lower (at least in principle).

Prior-review contracts represent a significant, albeit fluctuating, share of total lending (see Figure 2). This fluctuation is due to the constantly changing country, sector, and organisational composition of spending and project start and completion dates. While we cannot fully rule out a range of sample biases such as gaming of prior review thresholds for bureaucratic cost avoidance reasons, our interviews and review of procedures (e.g. number and range of people required to approve changes in thresholds) suggest that any gaming is likely to be of minor importance.

[4] A fiscal year begins in July and ends with June the next year, so in fact we observe each major contract award between July 1997 – Jun 2014.
[5] See Appendix 1 of World Bank Procurement Guidelines: http://bit.ly/2wuj2a9.
[6] Thresholds for prior review are set in a complex process and are reviewed regularly (details available here: http://bit.ly/2wa6Qc1). The World Bank first decides to what degree a recipient country can be trusted to manage aid funded procurement on its own through the Country Procurement Assessment Review (CPAR).[6] Based on this assessment a project risk level, or review threshold, is established based on the risks associated with the economic sector, the implementing agency, and the procurement method. The World Bank provides an indicative list of thresholds for each country, but the risk assessment is outlined and the exact thresholds are determined in the procurement plans which are subject to the World Bank's 'no objection' scrutiny at key stages throughout.

FIGURE 2. SHARE OF PRIOR REVIEW CONTRACTS COMPARED TO TOTAL NEW LENDING BY THE WORLD BANK (1998-2013)



Source: Own calculation based on World Bank data

We compiled a dataset from data scraped or downloaded directly from the World Bank's public website to have the most up-to-date data (a full description of data sources is provided in Appendix A). In addition, we also used an internal database of the World Bank which includes a slightly richer set of variables for the major contract awards dataset, allowing us to construct indices of competition such as whether a contract was awarded in a tender which received only one bidder.[7]

We focus on changes introduced by the November 2003 update of the rules for tenders of goods, works and services. The new rules apply to projects where the project concept note is approved after the new rules became effective; the regulations to follow are specified in the financial agreement in each project. For projects approved prior to the introduction of the new rules, contracts continue to be awarded according to the old regulatory regime.[8] This means that tendering processes that occur at the same time may operate under different regulations, depending on whether their project's approval date is before or after the effective date of the new regulation. This is critical to our identification strategy, and hence we have fully investigated possible exceptions.[9]

[7] The full dataset is downloadable at http://www.govtransparency.eu/index.php/2017/05/22/data-publication-world-bank-public-procurement-data-for-fiscal-years-1998-2013/.

[8] Although in theory the borrower may request a switch to the new rules in an already ongoing project and the Bank may agree, the World Bank procurement expert we interviewed told us that, "Most Borrowers and Bank staff would rather not go through a formal restructuring if the only modification is the change of procurement rules" (email correspondence with World Bank procurement specialist, 18 May 2017).

[9] A key concern is whether the new or old regulations are applied when additional financing takes place (i.e. project extension), which occurs in about 25% of projects. Although the new regulations apply by default, most Borrowers request to remain with the old rules and the Bank

In *Table 2*, the number of contracts in the control and treatment groups is summarized on a yearly basis, where the control group consists of projects approved before 1 November 2003 and the treatment group consists of projects approved after. We only consider contracts larger than 25,000 USD to exclude small contracts where competition is less likely to take place.

TABLE 1. NUMBER OF CONTRACTS AWARDED IN THE TREATED AND CONTROL GROUPS, CONTRACTS ABOVE 25,000 USD, GOODS AND WORKS, 2000-2008

	Contract award year									
	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
control	1,307	2,437	3,573	4,082	4,077	3,494	2,219	1,747	1,216	24,152
treated	0	0	0	0	321	1,157	1,641	2,164	2,266	7,549
Total	1,307	2,437	3,573	4,082	4,398	4,651	3,860	3,911	3,482	31,701

3.3 Indicators

All hypotheses take different types of corruption risk as the dependent variable. One of the innovations of this article is the identification of objective proxy indicators of corruption in aid-funded public procurement based on a methodology widely applied to national public procurement datasets (Klasnja 2016; Charron et al. 2017). This work contributes to a growing literature which seeks to develop objective corruption indicators from administrative data around the world (Escresa & Picci 2016; Cordis & Milyo 2016; Escresa & Picci 2015), addressing the widely accepted shortcomings of hitherto used perception-based corruption indices (Foster et al. 2012; Andersson & Heywood 2009).

Public procurement is assumed to be least prone to corruption where the process is open and competitive, and procurement regulations have been developed to set a number of maxims intended to ensure openness. Where the process deviates from these maxims, the deviations may indicate a deliberate manipulation of the process by a corrupt public official (or network of public and private actors) to favour a particular company and gain a private advantage (Fazekas & Kocsis, 2017).

In order to track displacement effects our set of corruption risk indicators must cover a wide range of possible corruption techniques capturing manipulation at different stages of the public procurement process as well as its outcomes. Given data constraints, we develop indicators characterising three stages of the tendering cycle: 1) the bidding phase, when the tender is advertised and companies can pose questions and prepare their bids; 2) the contract award phase, when the bids are evaluated, the award decision made and the winning bidder announced; and 3) the contract signature phase, when the awarded contract is negotiated and the final contract signed by both parties. The indicators used and the typical corruption situation which it proxies are highlighted in *Table 2.*

has approved these requests in all cases (email correspondence with World Bank procurement specialist, 18 May 2017).

TABLE 2. SUMMARY OF CORRUPTION RISK INDICATORS USED AS DEPENDENT VARIABLE

Tendering phase	Indicator name	Indicator definition	Typical corruption scheme
Bidding	Non-competitive procedure type	1=non-open procedure types (e.g. single source) 0=open procedure types (e.g. international competitive bidding)	Awarding contract to connected firm without competition
Contract award	Single bid	1=1 bidder per contract 0=2 or more bidders per contract	Setting tendering terms which only one firm can satisfy
	Bidder number (trimmed)*	Bidder number (50+ bidders set at 50)	Organising a collusive ring of a few firms where the winner is pre-determined in advance.
	Repeat winner	1=supplier won at least 2 contracts in 1998-2014 0=supplier won only 1 contract in 1998-2014	Although there is a façade of competition, the same few well-connected firms keep winning contracts.
	Foreign supplier*	1=supplier is registered in a foreign country 0=supplier is registered in the country of buyer	Domestic firms with good local connections enjoy unfair treatment, e.g., receiving information through informal channels.
Contract signature	Risky signature period	1=Time between award date and contract signature date is shorter than 14 days 0=Time between award date and contract signature date is longer than 14 days	Contract is signed very quickly, without substantive work on the exact contractual terms, laying the ground for incomplete or inadequate delivery without penalty.

Note: *for these outcomes higher values indicate lower risk of corruption

The November 2003 regulatory change is the main independent variable, defined as a 0-1 binary variable taking the value of 0 if the project concept note approval date was before this date (control group) and 1 if it was after (treatment group). As there were other regulatory changes both before and after the 2003 change, we restricted the treatment and control groups to projects approved between January 1999 and September 2006, inclusive.

Descriptive statistics of all variables used in the analysis are in Appendix C.

4. Results

First, we investigate hypothesis 1 (H1) regarding the desired direct effect on corruption risk associated with lack of competition. The empirical evidence provides support for H1, using both the naïve comparison of group averages and the sophisticated matching. The share of single bidder contracts decreases from 22.4% to 18.7% in the matched samples, while the average bidder number goes up from 4.5 to 5.0 (Table 4). Not only does the intensity of competition improve but the pool of bidders widens too: the share of repeat winners - i.e. companies who won a contract more than once, proxying incumbency – falls from 71.8% to 65.4%. Surprisingly, foreign winners' market share slightly decreases too, from 15.8% to 13.7%, which is contrary to H1 and alludes to H5. As corrupt deals are more difficult to conduct when there are many other companies watching and market entrants are challenging connected incumbents (Fazekas & Kocsis 2017; Coviello & Gagliarducci 2017), we consider competition-related corruption risk to decrease.

Second, we test hypothesis 2 (H2) by looking for signs of evasive tactics which use alternative corruption techniques to restricting competition through bad advertisement (recall wider advertisement and easier bid submission represent the main treatment in the 2003 reform). Both simple comparisons and matching estimations lend support to our expectations that evasive responses are systemic: the use of non-competitive or closed procedure types goes up from 7.3% to 9.6% in the matched samples while the frequency of risky signature periods also increases from 25% to 29.4%[10] (Table 4). As none of these potential corruption techniques are directly treated by the 2003 intervention, their increased use suggests that corrupt actors respond to a direct attack on their corruption opportunities by moving on to other corruption tactics that are not affected: they either limit competition prior to advertisement or engage in corruption during the contract signature period.

[10] Recall, too short signature periods suggest that the contract was not properly negotiated leading the way to corrupt contract enforcement and monitoring. The treatment did not make contract signature electronic and the matching balances the two samples by contract value and product type, hence our preferred corruption risk-related explanation is the most plausible.

TABLE 3. SIMPLE, UN-MATCHED COMPARISONS OF TREATMENT AND CONTROL GROUPS, CONTRACTS ABOVE 25,000 USD, GOODS AND WORKS, 2003-08

	single bid	bidder number (trimmed)	closed procedure type	risky signature period	repeat winner	foreign supplier
control	21.7%	4.09	8.9%	25.2%	70.9%	18.0%
treatment	18.2%	4.84	13.3%	28.6%	65.9%	18.0%
diff(treatment - control)	-3.6%*	0.74*	4.5%*	3.3%*	-5.0%*	0.0%
95% c.interval-lower bound	-4.8%	0.60	3.8%	2.3%	-6.0%	-0.9%
95% c.interval-upper bound	-2.3%	0.88	5.2%	4.3%	-4.0%	0.9%
N control	12,610	12,610	15,086	15,086	15,086	15,086
N treatment	5,778	5,778	15,204	15,204	15,204	15,204

* 5% significance level

TABLE 4. MATCHED COMPARISONS OF TREATMENT AND CONTROL GROUPS, CONTRACTS ABOVE 25,000 USD, GOODS AND WORKS, 2003-08

	single bid	bidder number (trimmed)	closed procedure type	risky signature period	repeat winner	foreign supplier
control	22.4%	4.50	7.3%	25.0%	71.8%	15.8%
treatment	18.7%	5.04	9.6%	29.4%	65.4%	13.7%
diff(treatment - control)	-3.8%*	0.54*	2.3%*	4.5%*	-6.4%*	-2.0%*
95% c.interval-lower bound	-6.8%	0.12	1.4%	3.0%	-7.9%	-3.1%
95% c.interval-upper bound	-0.8%	0.95	3.2%	5.9%	-5.0%	-0.9%
N control	1,404	1,404	7,515	7,515	7,515	7,515
N treatment	1,404	1,404	7,515	7,515	7,515	7,515
matching variables						
log contract value	Y	Y	Y	Y	Y	Y
main sector	Y	Y	Y	Y	Y	Y
year dummies	Y	Y	Y	Y	Y	Y
country prior DV avg.	Y	Y	Y	Y	Y	Y
buyer prior DV avg.	Y	Y	Y	Y	Y	Y

* 5% significance level

Third, we investigate hypothesis 3 (H3) which foresees that untreated corruption tactics would be more intensively exploited as a result of the successful anti-corruption intervention. To test this hypothesis, we split the sample according to competitive and non-competitive procedures and perform matching separately on the subsamples (Table 5 and Table 6). Comparing competitive and non-competitive subsamples informs our hypothesis because the competitive procedure types - where wide advertisement and many bidders are expected - are treated by the 2003 intervention, while non-competitive procedure types are by and large unaffected. We have already seen that the frequency of using non-competitive procedures increased, we now turn our attention to the intensity of use for corrupt purposes by tracking the outcomes of non-competitive procedures in terms of bidder number and composition.

The comparison of the two matched sub-samples reveals consistent support to our hypothesis. In competitive procedures, the share of tenders with a single bidder goes down (from 18.5% to 10%) while the bidder number goes up (from 4.6 to 5.5). In non-competitive procedures, single bidding drastically increases (from 67.3% to 81%) and bidder number drops (from 1.7 to 1.4). In addition, the repeat winners' share of contracts decreases from 72.5% to 64.5% in competitive procedures; while the change is insignificant for non-competitive procedures. For foreign winners, there is no significant change in competitive procedures but a marked and significant drop in non-competitive procedures from 29.9% to 20.9%. Taken together, we observe further support for H1 as the most directly treated procedure types perform a lot better on competition-related risks as a result of the treatment. However, non-competitive procedures appear to be more intensively exploited in line with H3, resulting in further clustering of risks.

TABLE 5. MATCHED COMPARISONS OF TREATMENT AND CONTROL GROUPS, COMPETITIVE PROCEDURES ONLY, CONTRACTS ABOVE 25,000 USD, GOODS AND WORKS, 2003-08

	single bid	bidder number (trimmed)	risky signature period	repeat winner	foreign supplier
control	18.5%	4.60	24.1%	72.5%	14.6%
treatment	10.0%	5.52	28.5%	64.5%	13.6%
diff(treatment - control)	-8.5%*	0.92*	4.4%*	-8.0%*	-1.1%
95% c.interval-lower bound	-11.2%	0.46	2.9%	-9.5%	-2.2%
95% c.interval-upper bound	-5.8%	1.39	5.9%	-6.5%	0.1%
N control	1,235	1,237	6,966	6,966	6,966
N treatment	1,235	1,237	6,966	6,966	6,966
matching variables					
log contract value	Y	Y	Y	Y	Y
main sector	Y	Y	Y	Y	Y
year dummies	Y	Y	Y	Y	Y
country prior DV avg.	Y	Y	Y	Y	Y
buyer prior DV avg.	Y	Y	Y	Y	Y

* 5% significance level

TABLE 6. MATCHED COMPARISONS OF TREATMENT AND CONTROL GROUPS, NON-COMPETITIVE PROCEDURES ONLY, CONTRACTS ABOVE 25,000 USD, GOODS AND WORKS, 2003-08

	single bid	bidder number (trimmed)	risky signature period	repeat winner	foreign supplier
control	67.3%	1.70	36.8%	63.2%	29.9%
treatment	81.0%	1.43	41.3%	58.5%	20.9%
diff(treatment - control)	13.7%*	-0.27*	4.6%	-4.7%	-8.9%*
95% c.interval-lower bound	4.4%	-0.51	-1.2%	-10.5%	-14.1%
95% c.interval-upper bound	23.0%	-0.03	10.3%	1.0%	-3.8%
N control	168	167	549	549	549
N treatment	168	167	549	549	549
matching variables					
log contract value	Y	Y	Y	Y	Y
main sector	Y	Y	Y	Y	Y
year dummies	Y	Y	Y	Y	Y
country prior DV avg.	Y	Y	Y	Y	Y
buyer prior DV avg.	Y	Y	Y	Y	Y

* 5% significance level

Fourth, we consider the question of who benefits and who loses as a result of the intentional and unintentional impacts, i.e. H4. The validity of this hypothesis will point at the likely total net effect of the intervention. All matching estimations suggest that the dominance of incumbents falls (from 71.8% to 65.4%, see Table 4), increasing the total pool of successful bidders. However, foreign firms - which are less connected on average – do not benefit from this broadening of access: their total market share slightly decreases (from 15.8% to 13.7%, see Table 4). In competitive procedures, some of which are explicitly designed for facilitating international competition (International Competitive Procedure), no change is observed. These findings contradict H4, suggesting that broader access favours those who were more readily able to exploit connections (i.e. domestic firms) at the expense of those who were more likely to lack connections (i.e. foreign firms).

Taken together, the net benefit of the reform is likely to be zero as the decrease in competition-related corruption risks is offset by increasing risks in the pre- and post- advertisement phases. These effects in opposite directions appear to be of comparable size, although measurement error prevents us from reaching precise conclusions. Nevertheless, the overall decreasing share of foreign firms further supports a conclusion that the net effect may be close to zero.

5. Discussion and conclusions

Using a unique large-scale contracts database covering virtually all developing and transition economies, we investigated the direct corruption effects of a donor anti-corruption reform as well as its displacement effects. Using a tightly coupled matching estimator, we find that the reform – which seeks to broaden access through targeting tender advertisement and submission - is effective in a direct sense: it decreases corruption risks due to low competition, with the share of single bidding decreasing from 22.4% to 18.7% and the average bidder number increasing from 4.5 to 5.0. It also broadens the pool of bidders that win contracts, with the share of repeat winners falling from 71.8% to 65.4%.

However, confirming expectations deriving from the criminology and public policy literature, we also observe strong displacement effects which largely cancel out the direct positive impacts. These evasive strategies follow two main logics: i) substituting corruption techniques in the more tightly controlled with corruption techniques in the less tightly controlled areas; and ii) exploiting remaining weaknesses in the control framework more intensively. Corrupt buyers switch to non-treated non-competitive procedure types, whose prevalence increases from 7% to 10% and risky signature periods also become more common, increasing from 25% to 29.4%. Moreover, the already risky, but non-treated non-competitive procedure types are more intensely exploited, with the share of single bidding increasing from 67.3% to 81% and bidder number dropping from 1.7 to 1.4. While the overall, net welfare effect remains unclear, we see foreign companies lose out (their market share drops by 2 percentage points), while domestic companies – which tend to be better connected – perform better in the market (repeat winning falls). These suggest that the displacement effects may cancel out the observed direct positive benefits.

Our analysis suggests that even a well-designed, thoroughly implemented and seemingly successful anti-corruption intervention may waver as a direct affront on core corrupt deals provokes strong evasive strategies by the corrupt. Some of the corrupt actors directly comply with the new rules, facilitating more open access, and do not seek to respond strategically, in line with theories of corruption control which suggest that increasing the expected risk of detection will deter corruption. However, others rather seek to adapt their behaviour to regulatory conditions, finding new ways to control administrative procedures and maintain their access to private gains. The procurement process is arguably a fairly fluid space in which corrupt actors can operate, offering many alternate ways of manipulating the process to steer a contract to a favoured bidder or solicit kickbacks. The study of displacement effects in this area can help us understand how it is possible that, despite so many countries adopting and implementing good policies and IT tools for supporting open and fair competition for government contracts, this domain continues to be plagued by corruption benefiting corrupt elites.

Our findings lend themselves to policy advice. Crucially, reformers should plan for likely evasive strategies and address them early on . Given that rich and real-time public procurement datasets are increasingly available globally, a staged approach is also possible where displacement effects can be observed and addressed in turn until most loopholes are closed. Our findings also suggest that a minimum effective reform package must be rather comprehensive; targeting only one phase of the procurement cycle is likely to be ineffective.

One crucial limitation of our analysis remains, which future research may address: we lack sufficiently detailed data to assess the impact of the intervention on the contract implementation phase, where at least some of the displacement is likely to occur. In this sense, our study only provides a lower bound estimate of the total direct and indirect effects.

Observing a fuller set of potential strategic responses would require more data on contract implementation.

References

Andersson, S. & Heywood, P.M., 2009. The Politics of Perception: Use and Abuse of Transparency International's Approach to Measuring Corruption. Political Studies, 57, pp.746–767.

Andrews, M., Pritchett, L. & Woolcock, M., 2012. Escaping Capability Traps through Problem-Driven Iterative Adaptation (PDIA), Washington, DC.

Auriol, E., 2006. Corruption in procurement and public purchase. International Journal of Industrial Organization, 24(5), pp.867–885.

Avis, E., Ferraz, C. & Finan, F., 2016. Do government audits reduce corruption? Estimating the impacts of exposing corrupt politicians,

Bágер, G., 2011. Corruption Risks in Public Administration. Methodology and Empirical Experiences. Public Finance Quarterly, 2, pp.44–57.

Becker, G.S., 1968. Crime and punishment: an economic approach. Journal of Political Economy, 76, pp.169–217.

Borcan, O., Lindahl, M. & Mitrut, A., 2017. Fighting corruption in education: What works and who benefits? American Economic Journal: Economic Policy, 9(1), pp.180–209.

Celentani, M. & Ganuza, J.-J., 2002. Corruption and competition in procurement. European Economic Review, 46(7), pp.1273–1303.

Charron, N. et al., 2017. Careers, Connections, and Corruption Risks: Investigating the impact of bureaucratic meritocracy on public procurement processes. Journal of Politics, 79(1), pp.89–103.

Cordis, A.S. & Milyo, J., 2016. Measuring Public Corruption in the United States: Evidence From Administrative Records of Federal Prosecutions. Public Integrity, 18, pp.127–148.

Coviello, D. & Gagliarducci, S., 2017. Tenure in Office and Public Procurement. American Economic Journal: Economic Policy, forthcomin.

Coviello, D. & Mariniello, M., 2014. Publicity requirements in public procurement: Evidence from a regression discontinuity design. Journal of Public Economics, 109, pp.76–100.

Dávid-Barrett, E. et al., 2017. Controlling Corruption in Development Aid: New Evidence from Contract-Level Data, Budapest.

David-Barrett, E. & Fazekas, M., 2016. Corrupt Contracting: Partisan Favouritism in Public Procurement. Hungary and the United Kingdom Compared.,

Escresa, L. & Picci, L., 2015. A New Cross-National Measure of Corruption. World Bank Economic Review.

Escresa, L. & Picci, L., 2016. Trends in Corruptions Around the World. European Journal on Criminal Policy and Research, 22(3), pp.543–564.

Estache, A. & Iimi, A., 2008. Procurement Efficiency for Infrastructure Development and Financial Needs Reassessed. World Bank Policy Research Working Paper …, (July).

Fazekas, M. & Kocsis, G., 2017. Uncovering High-Level Corruption: Cross-National Corruption Proxies Using Government Contracting Data. British Journal of Political Science.

Fisman, R. & Golden, M., 2017. How to fight corruption. Science, 356(6340), p.803 LP-804.

Foster, J.E., Horowitz, A.W. & Méndez, F., 2012. An Axiomatic Approach to the Measurement of Corruption: Theory and Applications. World Bank Economic Review, 26(2), pp.217–235.

Gerardino, M.P., Litschig, S. & Pomeranz, D., 2017. Can Audits Backfire? Evidence from Public Procurement in Chile,

Goldman, E., Rocholl, J. & So, J., 2013. Politically Connected Boards of Directors and The Allocation of Procurement Contracts. Review of Finance, 17(5), pp.1617–1648.

Grodeland, A.B., 2005. Bulgaria, Czech Republic, Romania and Slovenia: The Use Of Contacts and Informal Networks in Public Procurement. In OECD, ed. Fighting Corruption and Promoting Integrity in Public Procurement. Paris: OECD, pp. 59–76.

Guerette, R.T. & Bowers, K.J., 2009. Assessing the extent of crime displacement and diffusion of benefts: A review of situational crime prevention evaluations. Criminology, 47(4), pp.1331–1368.

Heggstad, K.K. & Froystad, M., 2011. The basics of integrity in procurement, Bergen, Norway: U4 Anti-Corruption Resource Centre Chr. Michelsen Institute (CMI).

Heywood, P.M., 2010. Integrity management and the public service ethos in the UK: patchwork quilt or threadbare blanket?,

Hood, C., 2002. The risk game and the blame game. Government and opposition, 37(1), pp.15–37.

Kenny, C. & Crisman, B., 2016. Results Through Transparency: Does Publicity Lead to Better Procurement?, Washington, DC.

Kenny, C. & Musatova, M., 2010. 'Red Flags of Corruption' in World Bank Projects: An Analysis of Infrastructure Contracts, Washington, DC.

Klasnja, M., 2016. Corruption and the Incumbency Disadvantage: Theory and Evidence. Journal of Politics, 77(4), pp.928–942.

Klitgaard, R., 1991. Controlling Corruption, Berkeley, CA: University of California Press.

Knack, S., Biletska, N. & Kacker, K., 2017. Deterring Kickbacks and Encouraging Entry in Public Procurement Markets. Evidence from Firm Surveys in 88 Developing Countries, Washington, DC.

Levi, M. & Maguire, M., 2004. Reducing and preventing organised crime: An evidence-based critique. Crime, Law & Social Change, 41, pp.397–469.

Lewis-Faupel, S. et al., 2016. Can Electronic Procurement Improve Infrastructure Provision? Evidence from Public Works in India and Indonesia. American Economic Journal: Economic Policy, 8(3), pp.258–283.

Margetts, H., 6, P. & Hood, C., 2010. Paradoxes of Modernization: Unintended Consequences of Public Policy Reform, Oxford: Oxford University Press.

Mavrogordatos, G.T., 1997. From Traditional Clientelism to Machine Politics: the Impact of PASOK Populism in Greece. South European Society and Politics, 2(3), pp.1–26.

O'Hagan, A. & Hardwick, R., 2017. Behind bars: the truth about drugs in prisons. Forensic Research & Criminology International Journal, 5(3).

OECD, 2007. Integrity in Public Procurement. Good Practice from A to Z, Paris: OECD.

OECD, 2009. OECD Principles for Integrity in Public Procurement, Paris: OECD.

Ohashi, H., 2009. Effects of transparency in procurement practices on government expenditure: A case study of municipal public works. Review of Industrial Organization, 34(3), pp.267–285.

Olken, B.A., 2007. Monitoring Corruption: Evidence from a Field Experiment in Indonesia. Journal of Political Economy, 115(2), pp.200–249.

Olken, B.A. & Pande, R., 2012. Corruption in Developing Countries, Boston, Massachusetts.

Osrecki, F., 2015. Fighting corruption with transparent organizations: Anti-corruption and functional deviance in organizational behavior. Ephemera: Theory & Politics in Organization, 15(2), pp.337–364.

Papanek, G., 2009. A korrupció és a közbeszerzési korrupció Magyarországon. I. kötet, Budapest.

Peiffer, C., Armytage, R. & Marquette, H., 2018. Uganda's Health Sector as a 'Hidden' Positive Outlier in Bribery Reduction, Birmingham.

Philp, M., 2001. Access, accountability and authority: Corruption and the democratic process. Crime, Law and Social Change, 36(4), pp.357–377.

Philp, M., 2009. Delimiting democratic accountability. Political Studies, 57(1), pp.28–53.

Piga, G., 2011. A fighting chance against corruption in public procurement? In S. Rose-Ackerman & T. Soreide, eds. International Handbook on the Economics of Corruption, Volume Two. Cheltenham, UK: Edward Elgar, pp. 141–181.

Podumljak, M. & David-Barrett, E., 2015. Political Favouritism in Croatian Public Procurement. In A. Mungiu- Pippidi, ed. Government Favouritism in Europe The Anticorruption Report 3. Barbara Budrich Publishers.

Rose-Ackerman, S. & Palifka, B.J., 2016. Corruption and Government: Causes, Consequences, and Reform 2nd ed., Cambridge, UK: Cambridge University Press.

Schnell, S., 2015. Mimicry, Persuasion, or Learning? The Case of Two Transparency and Anti-Corruption Policies in Romania. Public Administration and Development, 35(4), pp.277–287.

Schultz, J. & Soreide, T., 2008. Corruption in emergency procurement. Disasters, 32(4), pp.516–536.

Scott, J.C., 1999. Seeing like a state,

Singer, M. et al., 2009. Does e-procurement save the state money? Journal of Public Procurement, 9(1), pp.58–78.

Šípoš, G., Samuek, S. & Martin, K., 2015. Not in force until published online. What the radical transparency regime of public contracts achieved in Slovakia, Bratislava: Transparency International Slovakia.

Smith, R.G., Wolanin, N. & Worthington, G., 2003. E-crime solutions and crime displacement,

Soreide, T., 2002. Corruption in public procurement. Causes, consequences and cures, Bergen, Norway.

Tanzi, V. & Davoodi, H.R., 1997. Corruption, Public Investment, and Growth, Washington, DC.

Di Tella, R. & Schargrodsky, E., 2003. The Role of Wages and Auditing during a Crackdown on Corruption in the City of Buenos Aires. Journal of Law and Economics, 46(1), pp.269–292.

Varese, F., 2012. How mafias take advantage of globalization: The Russian mafia in Italy. British Journal of Criminology, 52(2), pp.235–253.

Vidal, S. & Décary-Hétu, D., 2018. Shake and Bake: Exploring Drug Producers' Adaptability to Legal Restrictions Through Online Methamphetamine Recipes. Journal of Drug Issues, 48(2), pp.269–284.

Ware, G.T. et al., 2007. Corruption in Public Procurement: A Perennial Challenge. In J. E. Campos & S. Pradhan, eds. The Many Faces of Corruption. Tracking Vulnerabilities at the Sector Level. Washington, DC: World Bank.

Welsh, B.C. & Farrington, D.P., 2002. Crime prevention effects of closed circuit television: a systematic review,

Williamson, O.E., 1981. The Economics of Organizations: The Transaction Cost Approach. American Journal of Sociology, 87(3), pp.548–577.

Zamboni, Y. & Litschig, S., 2016. Audit Risk and Rent Extraction Evidence from a Randomized Evaluation in Brazil, Barcelona.

Appendices

Appendix A. Description of datasets

Major contract awards

https://finances.worldbank.org/Procurement/Major-Contract-Awards/kdui-wcs3

Contains "prior-reviewed" contracts by World Bank, i.e. the contract award commitments that were reviewed by the World Bank before they were awarded. Each contract is being prior-reviewed in case their value is above a certain threshold. Thresholds vary by country and the type of contract (goods, works, services) and are defined in the procurement plans.

World Bank Projects and Operations

http://data.worldbank.org/data-catalog/projects-portfolio

Includes basic information of all World Bank projects, such as the project title, task manager, country, project id, sector, commitment amount and financing. It also provides links to publicly disclosed online documents.

Notices and Contracts (WB website)

http://projects.worldbank.org/procurement/procurementsearch?lang=en&srce=both

Contract notices and contract awards are continuously published here, so the website provides the potential for building a self-updating database.

Internal World Bank Database

Internal database of World Bank that contains a wider range of variables than the publicly available data. Our key variable, single bidding is from this database.

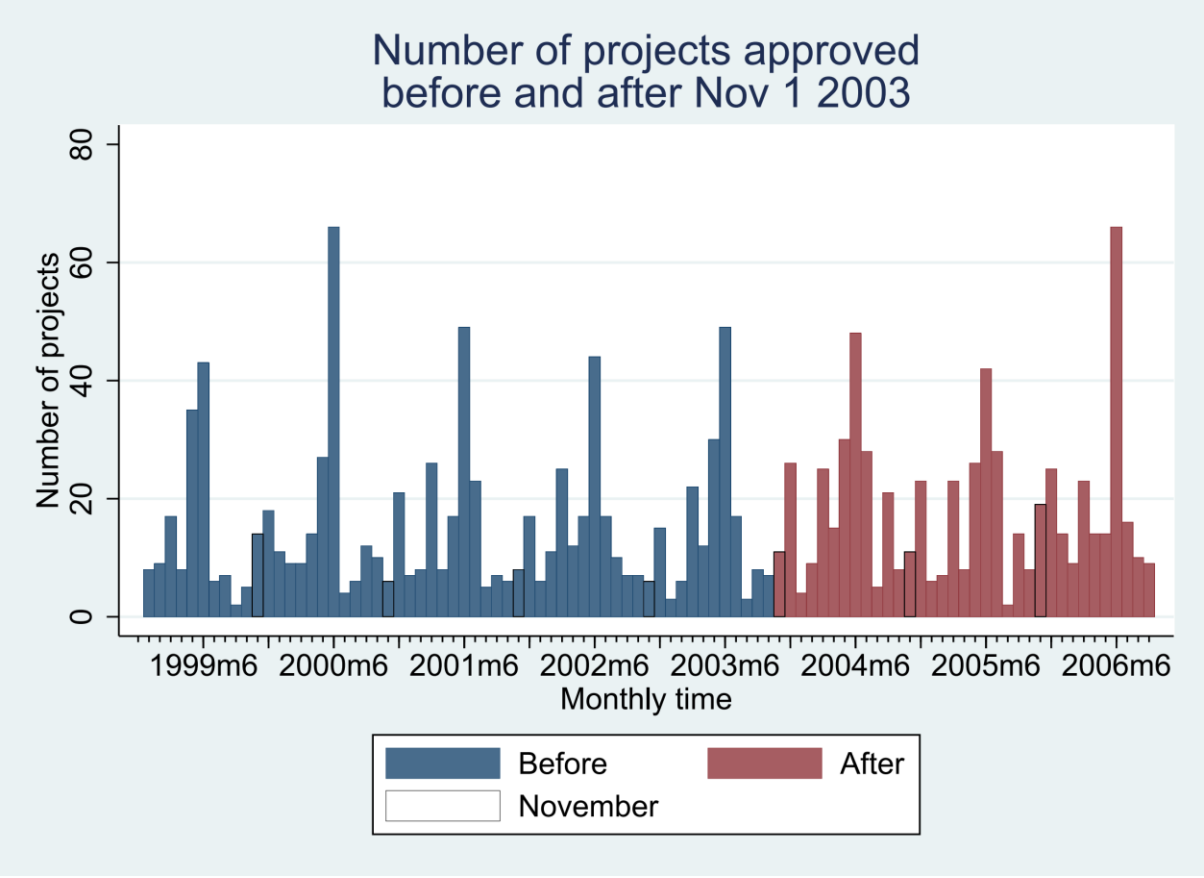
The combined complete datasets can be downloaded at
http://www.govtransparency.eu/index.php/2018/02/13/data-publication-foreign-aid-of-world-bank-europeaid-and-iadb/

Appendix B. Evidence for the absence of manipulation round the threshold

The main question in assessing potential manipulation around the threshold is whether there was gaming in project approvals, i.e. artificially postponing or bringing forward the approval in order to fall under the desired regulations. If actors follow such practices, our identification strategy would not be credible as we could not assume a quasi-random timing of project approvals around the intervention.

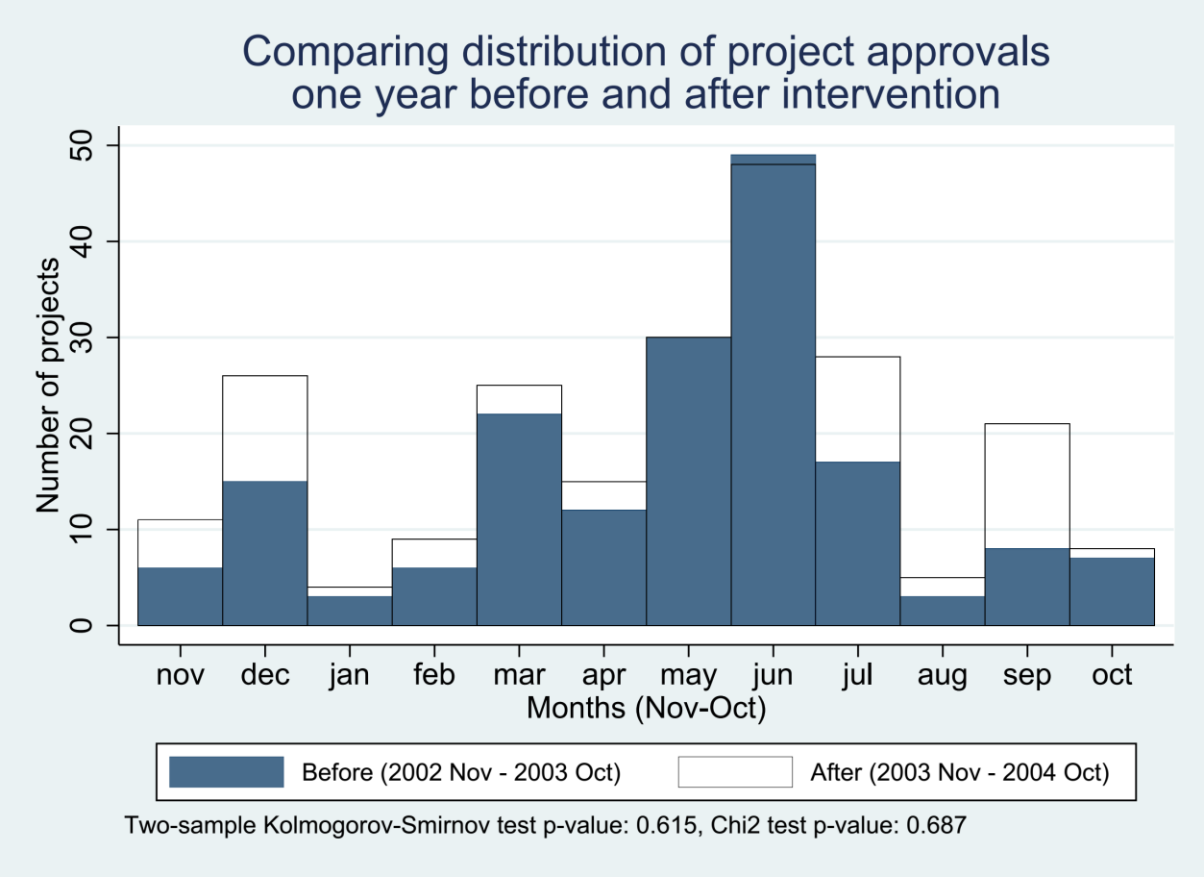
To test whether there was gaming we first plotted the number of projects launched monthly in the years before and after the November 2003 intervention (Figure 3) beginning with the latest and ending with the next intervention in WB regulations. We can see a strong seasonality in this graph with peaks in June each year that is the last month of a fiscal year at World Bank. According to this graph there was no extraordinary pattern around November 2003.

FIGURE 3. SEASONAL DISTRIBUTION OF PROJECT APPROVALS BY MONTHS (JAN 1999 - SEP 2006)



We also made some formal tests to make sure there is no irregular pattern in the timely distribution of project approvals around the intervention. On Figure 4, we show the overlapping histograms of project approval dates monthly for the years preceding and following Nov 2003. The two distributions look very much alike and we did not find any significant differences between them with the two-sample Kolmogorov-Smirnov test and simple chi2 tests, either. We also tested the differences in distributions for broader time periods and for periods with November in the middle and we also did not find any significant differences in these versions.

FIGURE 4. OVERLAPPING HISTOGRAMS OF PROJECT APPROVALS (MONTHLY) FOR THE YEARS PRECEDING AND THE FOLLOWING YEAR OF NOV 1 2003



Appendix C. Descriptive statistics

TABLE 1. SIMPLE STATISTICS ABOUT THE VARIABLES USED IN THE ESTIMATIONS, CONTRACTS ABOVE 25,000 USD, GOODS AND WORKS, 2000-2008

Variable	Obs.	Mean	Std. Dev.	Min	Max
Single bidding	28,818	0.22	0.42	0	1
ANB-level single bidding before intervention	19,362	0.23	0.33	0	1
Country-level single bidding before intervention	31,139	0.25	0.21	0	1
Contract value	31,701	4711109	23100000	38726	2130000000
Log of contract value	31,701	13.73	1.56	10.56	21.48
Party System Institutionalization	30,709	0.01	0.81	-2.36	1.25
State Capacity	30,132	-0.29	0.63	-2.58	1.73
Sectors:					
Agriculture	31,701	0.09	0.28	0	1
Education	31,701	0.13	0.34	0	1
Finance	31,701	0.11	0.31	0	1
Energy & mining	31,701	0.01	0.12	0	1
Finance	31,701	0.17	0.38	0	1
Industry and trade	31,701	0.03	0.16	0	1
Info & communication	31,701	0.01	0.09	0	1
Public admin, Law	31,701	0.16	0.37	0	1
Transportation	31,701	0.17	0.37	0	1
Water, sanitation, flood protection	31,701	0.13	0.33	0	1

TABLE 2. LIST OF COUNTRIES AND THE NUMBER OF CONTRACTS PER COUNTRY IN THE SAMPLE, CONTRACTS ABOVE 25,000 USD, GOODS AND WORKS, 2000-2008

Country name	Freq.	Percent	Cum. Percent
Afghanistan	495	1.57	1.57
Albania	350	1.11	2.69
Algeria	23	0.07	2.76
Angola	52	0.17	2.92
Argentina	228	0.72	3.65
Armenia	478	1.52	5.17
Azerbaijan	224	0.71	5.88
Bangladesh	1,118	3.55	9.43
Barbados	9	0.03	9.46
Belarus	55	0.17	9.64
Belize	24	0.08	9.71
Benin	282	0.9	10.61
Bhutan	115	0.37	10.98
Bolivia	126	0.4	11.38
Bosnia and Herzegovina	618	1.96	13.34
Brazil	466	1.48	14.82
Bulgaria	515	1.64	16.46
Burkina Faso	165	0.52	16.98
Burundi	397	1.26	18.24
Cambodia	219	0.7	18.94
Cameroon	56	0.18	19.12
Cape Verde	77	0.24	19.36
Central African Republic	7	0.02	19.39
Chad	162	0.51	19.9
Chile	10	0.03	19.93
China	2,699	8.58	28.51
Colombia	101	0.32	28.83
Comoros	26	0.08	28.91
Congo	103	0.33	29.24
Costa Rica	11	0.03	29.28
Cote d'Ivoire	2	0.01	29.28
Croatia	345	1.1	30.38
Democratic Republic of the Congo	301	0.96	31.34
Djibouti	141	0.45	31.78
Dominica	13	0.04	31.83
Dominican Republic	78	0.25	32.07
Ecuador	44	0.14	32.21
Egypt	127	0.4	32.62
El Salvador	69	0.22	32.84
Eritrea	184	0.58	33.42
Estonia	13	0.04	33.46
Ethiopia	327	1.04	34.5
Gabon	5	0.02	34.52

Gambia	74	0.24	34.75
Georgia	493	1.57	36.32
Ghana	590	1.88	38.2
Grenada	83	0.26	38.46
Guatemala	102	0.32	38.78
Guinea	277	0.88	39.66
Guinea-Bissau	31	0.1	39.76
Guyana	41	0.13	39.89
Haiti	25	0.08	39.97
Honduras	161	0.51	40.48
Hungary	9	0.03	40.51
India	2,651	8.43	48.94
Indonesia	385	1.22	50.16
Iran	452	1.44	51.6
Iraq	248	0.79	52.39
Jamaica	32	0.1	52.49
Jordan	136	0.43	52.92
Kazakhstan	89	0.28	53.2
Kenya	140	0.44	53.65
Kosovo	60	0.19	53.84
Kyrgyzstan	179	0.57	54.41
Lao People's Democratic Republic	166	0.53	54.94
Latvia	111	0.35	55.29
Lebanon	416	1.32	56.61
Lesotho	186	0.59	57.2
Liberia	13	0.04	57.24
Lithuania	68	0.22	57.46
Macedonia	97	0.31	57.77
Madagascar	401	1.27	59.04
Malawi	127	0.4	59.45
Malaysia	53	0.17	59.61
Maldives	6	0.02	59.63
Mali	191	0.61	60.24
Mauritania	258	0.82	61.06
Mauritius	2	0.01	61.07
Mexico	457	1.45	62.52
Moldova	173	0.55	63.07
Mongolia	136	0.43	63.5
Montenegro	26	0.08	63.58
Morocco	94	0.3	63.88
Mozambique	349	1.11	64.99
Nepal	409	1.3	66.29
Nicaragua	331	1.05	67.34
Niger	112	0.36	67.7
Nigeria	619	1.97	69.67
Pakistan	371	1.18	70.85
Panama	44	0.14	70.99
Papua New Guinea	218	0.69	71.68

Paraguay	24	0.08	71.76
Peru	131	0.42	72.17
Philippines	648	2.06	74.23
Poland	65	0.21	74.44
Romania	471	1.5	75.94
Russian Federation	637	2.02	77.96
Rwanda	147	0.47	78.43
Saint Kitts and Nevis	21	0.07	78.49
Saint Lucia	63	0.2	78.69
Saint Vincent and the Grenadines	36	0.11	78.81
Samoa	59	0.19	79
Sao Tome and Principe	6	0.02	79.02
Senegal	365	1.16	80.18
Serbia	158	0.5	80.68
Seychelles	1	0	80.68
Sierra Leone	181	0.58	81.26
Slovakia	3	0.01	81.27
Slovenia	9	0.03	81.29
Solomon Islands	3	0.01	81.3
South Africa	15	0.05	81.35
South Sudan	54	0.17	81.52
Sri Lanka	98	0.31	81.84
Sudan	14	0.04	81.88
Syrian Arab Republic	2	0.01	81.89
Tajikistan	439	1.4	83.28
Thailand	23	0.07	83.35
Timor-Leste	249	0.79	84.15
Tonga	16	0.05	84.2
Trinidad and Tobago	31	0.1	84.3
Tunisia	278	0.88	85.18
Turkey	302	0.96	86.14
Uganda	361	1.15	87.29
Ukraine	128	0.41	87.69
United Republic of Tanzania	293	0.93	88.62
Uruguay	60	0.19	88.82
Uzbekistan	167	0.53	89.35
Venezuela	7	0.02	89.37
Vietnam	2,233	7.1	96.47
West Bank and Gaza	369	1.17	97.64
Yemen	459	1.46	99.1
Zambia	284	0.9	100
Total	31,462	100	

Appendix D. Goodness of fit for propensity score matching

FIGURE 5. COMPARISON OF PROPENSITY SCORES IN THE CONTROL AND TREATMENT GROUPS

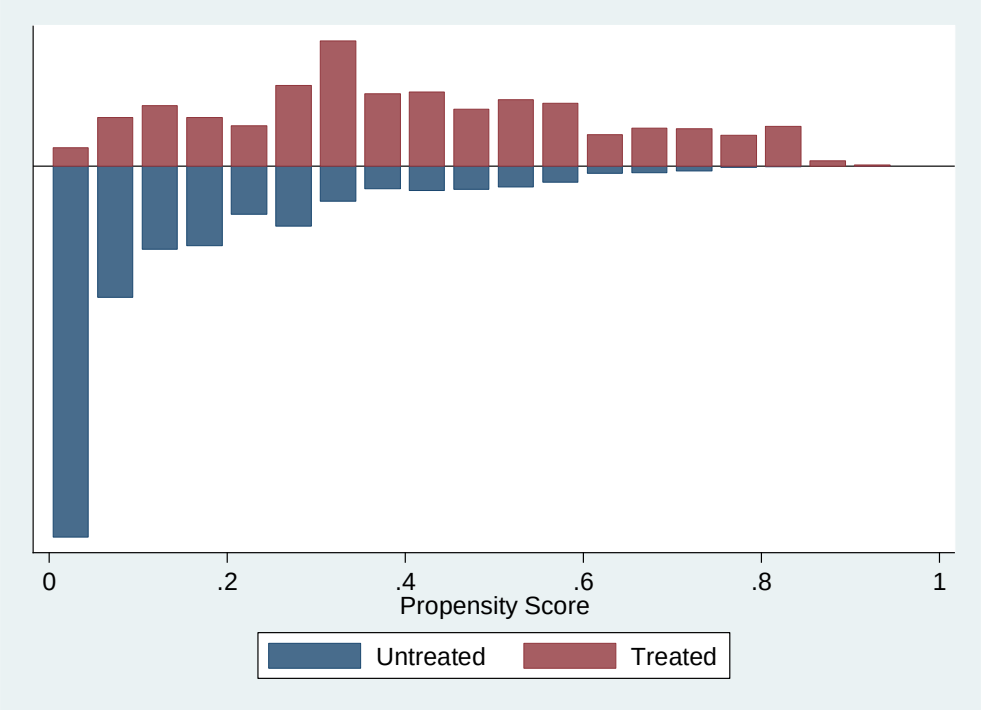


FIGURE 6. VARIABLE LEVEL BALANCE IN THE MATCHED AND UNMATCHED COMPARISONS

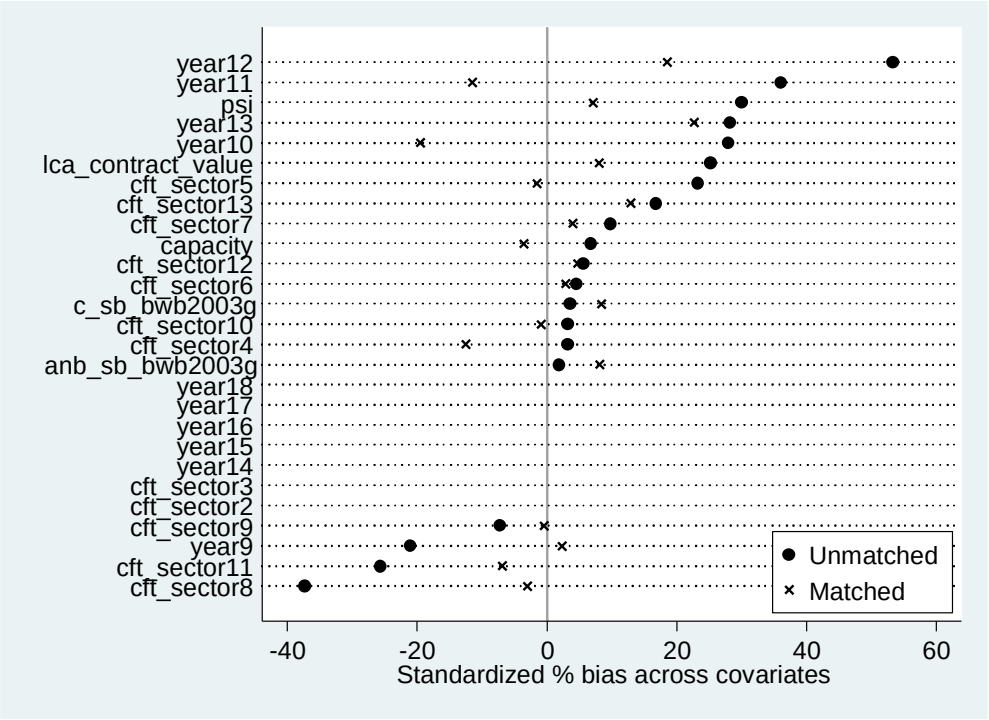

year12
year11
psi
year13
year10
lca_contract_value
cft_sector5
cft_sector13
cft_sector7
capacity
cft_sector12
cft_sector6
c_sb_bwb2003g
cft_sector10
cft_sector4
anb_sb_bwb2003g
year18
year17
year16
year15
year14
cft_sector3
cft_sector2
cft_sector9
year9
cft_sector11
cft_sector8
Unmatched
Matched
-40
-20
0
20
40
60
Standardized % bias across covariates

TABLE 3. SUMMARY OF BALANCE BEFORE AND AFTER MATCHING

Sample	*Ps R2*	*LR chi2*	*p>chi2*	*Mean Bias*	*Median Bias*	*B*	*R*	*% Var*
Unmatched	0.256	1721.74	0	18.5	18.9	142.6*	0.57	60
Matched	0.025	95.22	0	8	7	37.2*	1.96	60