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Isabelle Adam¹, Mihály Fazekas², Bence Tóth³

Measuring the benefits of open contracting

Case studies on Mexico, Paraguay, and Slovakia

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¹ Government Transparency Institute

² Central European University, University College London, Government Transparency Institute

³ University College London, Government Transparency Institute

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Executive summary

Enhancing the transparency of government in general and of public procurement processes in particular has been increasingly on the agenda of governments, civil societies and businesses as evidenced by initiatives such as the Open Government Partnership which has seen 70 OGP members making 189 open contracting commitments by March 2019¹. In spite of such major policy developments, we still lack the specific and rigorous evidence on the impact of transparency interventions and which types of transparency matter for which actors to support desirable societal outcomes such as high quality public services, procedural justice or public sector integrity (Bauhr et al, 2019).

In order to address this evidence gap, this research explores the short-term effects of public procurement transparency reforms on corruption risks, institutional efficiency, competition and prices by comparing procurement outcomes before and after the change in transparency regulations. It was supported by DFID and a consortium of not-for-profit organisations (Open Contracting Partnership, HIVOS, The B Team) interested in improving procurement policy and impact. It establishes a robust methodology to explore what impacts can be measured and also explores the channels through which transparency is indeed impactful - e.g. who are the stakeholders and enablers that are the actual drivers of change using increased transparency. We analyse three countries: Mexico, Paraguay and Slovakia. They were selected based on the implementation of recent open contracting reforms and the availability of procurement data for both before and after the reforms. By implication, each of these cases represent a data rich environment to start with. The transparency interventions selected for each country predominantly led to more data in a more accessible format to be published by the government for the general public, including civil society, businesses, but also government agencies themselves (Table 1). Each of these interventions were accompanied by some publicity, workshops, and trainings, hence we consider the analysis to estimate the effects of change in data publication largely on its own holding demand for data, user skills, and related environmental conditions constant.

Table 1: Intervention overview

	Mexico	Paraguay	Slovakia
Transparency reform	Transition to OCDS format on open contracting portal with different functions, e.g. visualizations, in addition to continuing national publication	Launch of a new public procurement transparency portal with different functions, e.g. visualizations tools, including transition to OCDS format	Mandatory comprehensive online publishing of procurement documents, most importantly contracts
Date of implementation	8th November 2017 (OCDS data release)	20th April 2015 (launch of <i>Contrataciones</i>)	1st January 2011 (law entering force)

From a theoretical perspective, transparency interventions' beneficial effects are conditional on two sets of factors: (i) the nature of the transparency intervention, including which public procurement phase it targets, the scope of change (i.e. the quantity and depth of new information) and whether new information is actionable for key stakeholders such as bidding firms; and (ii) the nature of demand for

¹ <https://www.opengovpartnership.org/wp-content/uploads/2019/05/Open-Contracting-Fact-Sheet-May-2019.pdf>

transparency, that is the existence of data users who are willing and able to act upon the information published. Following our theoretical framework, we also expect transparency effects to unfold over time with many effects arising through the help of stakeholders – journalists picking up stories based on newly available data, buyers learning about procurement markets or bidder finding new opportunities more efficiently.

Methodology

Using public procurement databases, our analysis compares very similar contracts awarded before vs. after the transparency interventions. Under certain assumptions, this provides an estimation of the reforms' short-term causal effect on procurement outcomes. In order to find as similar as possible comparison groups in very diverse procurement datasets before and after the intervention, we matched contracts according to essential characteristics such as sector or contract value. To inform the quantitative analysis and fully understand the interventions in question we have also conducted desk research and in-depth interviews with key stakeholders.

A key methodological challenge was to find the right time-frame and comparable contracts before and after the transparency interventions. On the one hand, identifying causal links based on quasi-experimental settings has several prerequisites. One of them is that we should not compare too long time periods because it would risk comparing dissimilar contracts under different macro environments or other, non-transparency-related interventions may take place which impact procurement outcomes. For example, when we take a whole year of contracts after a transparency reform taking place in May, our estimation may be biased if a procurement regulatory reform happened 5 months later, such as a new reporting threshold introduced. On the other hand, we expect smaller short-term effects due to the nature of systemic transparency interventions, which take time to build and institutions change practices only slowly involving many stakeholders in a complex, highly technical area such as public procurement.

The main channels through which increased transparency affects procurement outcomes require time, for example NGOs using data for project monitoring, journalists using easily available information, public buyers understanding their markets better. We balanced these considerations for and against applying a longer time-frame by selecting one year before and after the transparency intervention which limits the incidence of confounding factors while also taking care of seasonality biases. This was a feasible strategy in Slovakia and Paraguay but due to data availability constraints, we had to use a quarterly time window in Mexico.

Moreover, our comparisons of contracts before and after the transparency intervention allow for identifying the causal effects only if the contracts from the two groups are similar in all relevant characteristics impacting outcomes. Hence, we matched contacts in the before and after groups according to key characteristics such as contract value, sector, or buyer type.

Data limitations

In all 3 countries, data quality has several important problems even after combining data from multiple sources and applying a range of data cleaning procedures. For example, in Mexico, around 20% of the contracts do not have information on the number of bids received; but the missing rate is similarly high for other variables: 23% for product codes and 29% for submission period length. In Paraguay, buyers are not legally required to record all bids they have received. According to the interviews, this leads to an under-estimation of the number of bids which can bias our effect size calculations if there is a

systematic change in under-reporting from the before to after periods. In Slovakia, the data collection process is prone to error due to the several Call for tenders and Contract award publication form types that were also changed throughout the year (i.e. the same information is reported in very many different and changing formats).

Main findings

Overall, no policy relevant short-term impact, that is both statistically significant and of substantive size, of transparency interventions was identified in the 3 countries' public procurement datasets.

While some individual effects are statistically significant in each of the 3 countries, in neither of the cases do they reveal a consistent picture of systemic impact (i.e. robust to alternative sub-samples or to the use of different indicators tapping into the same concepts). We see some early signs of a potential impact in selected cases where a longer time window or more investment into user take-up may lead to robust, sustained, systemic change. These deserve further investigation.

Selected results are highlighted country by country below.

Mexico

- The Mexican dataset was more limited than data on the two other countries because our estimations could only be based on a very short time-window: a quarter year before and after the intervention of the open contracting portal and its transition to OCDS. Hence, the results may under or overestimate the true short term effects. This ambiguity is further amplified by the fact that federal elections took place around the same time as the intervention. Unfortunately, even if we apply the most appropriate empirical strategy for estimating the effects with before-after analysis with matching, our results are only tentative and capture very short-term effects.
- Given these qualifications, we find a 4 to 9 percentage points increase in the share of single-bidder contracts - depending on whether direct procedures are included in the sample. However, the average number of received bids increases by 0.5 bids when direct contracts are included in the sample, while we see an increase of 4.2 bids without direct contracts considered. This suggests that the intervention increased the level of competition in tenders that were already competitive, but it increased the share of high-corruption risk, single-bidder contracts in the very short-run.
- The share of non-open procedures² decreases by 0 to 2 percentage points depending on whether we include direct awards in the sample. This is a somewhat more robust result as missing data is not affecting our estimations.
- Submission period length decreases by 0.5 to 0.6 day on average. Given that the average submission period length in Mexico falls in the 12-16 days band, in substantive terms this effects is rather marginal.
- Buyer's average decision period length decreases by 1 to 2.7 days depending on whether direct awards are included in the sample. Given that average decision period lengths vary in the range of 7-20 days, these effects are considered substantive.
- Nonetheless, according to the interviews, the intervention seems to have generated awareness and interest in open contracting leading to increased usage of public procurement data by media and civil society.

Paraguay

- Among the 3 countries, Paraguay has the highest quality dataset allowing for the most robust estimation in our sample, while the likely bias in recording bidders due to buyers not being

² We simply categorized everything besides the explicitly open procedures as non-open.



obliged to publish all bids on the *Contrataciones* website means that estimations related to bidder numbers should be treated with caution.

- The short-term (1-year) estimations regarding bidder numbers show substantially small and statistically weak deterioration after the launch of the new public procurement transparency portal. The share of non-competitive tenders – the ones receiving exactly the same number of bids as many companies they awarded – increased slightly from 48% to 50%, while the level of competition - the ratio of number of bids and the awarded companies per tender - decreased by 4%. These weak, albeit counterintuitive, results only hold if reporting discipline remained unchanged throughout our two years observation period. While we cannot quantitatively verify it, if anything, reporting discipline is likely to have improved hence making our estimates conservative.
- The only competition-related indicator which is not biased by the likely lack of recording losing bidders is the share of recurring winners. For this variable, we find a 5% increase, that is a deterioration, which is both substantive and statistically significant. While this result may appear counterintuitive, it is consistent with theories predicting complex, efficiency-enhancing technologies exacerbating market concentration. However, more research is needed to better understand the reasons behind this identified effect.
- The share of non-open procedures and decision period length both remained unchanged.
- The average submission period length got longer by 8 days which may be due to increased scrutiny thanks to better availability of data. Our background interview with the national procurement agency DNCP suggests that this might be driven by the introduction of an electronic complaints system in 2015 which might have pushed buyers into extending advertisement periods due to bidders' complaints about the tendering processes.
- Nonetheless, according to our interviews, the launch of the *Contrataciones* portal has made contracting data more reusable and understandable for the public to some degree.

Slovakia

- In the Slovakian case, a number of other regulatory changes took place shortly after the transparency intervention of mandatory comprehensive online publishing of procurement documents. These other regulatory changes could also have an effect on the procurement market outcomes we analyse, for example the scope of public buyers was expanded and value thresholds for mandatory publication were changed shortly after the transparency intervention took place.
- To explore alternative options, we used two different samples for estimating the differences in our indicators from before and after the intervention:
 - A broad sample which only filters out atypical contracts; and
 - a narrow sample which filters out contracts that are potentially related to newly regulated buyers and that were below the original publication threshold. This considerably increases the consistency of the before-after samples at the expense of reducing sample sizes.
- Based on the broad sample, we found no significant difference in the share of single bidder contracts, however, the number of received bids per contract increased by one bid on average. Also, the use of non-open procedures decreased significantly. Relative prices (final price divided by the initially estimated price) decreased by 1.9 percentage points.
- Based on the narrow sample, we found a decrease of 19 percentage points in the share of single bidder contracts, and the number of bids per contract increased by two on average. However, the share of non-open procedures and relative prices did not change significantly.
- Underlining our concerns about the multitude of policy changes happening in a short period of time, interviews confirmed that parts of the observed impacts are probably due to changes in

government staff, a host of new regulations, and an overall shift in priorities and values in public contracting.

Policy conclusions and lessons learnt

The lessons learnt throughout this research exercise are policy-relevant both in terms of methodology and substance.

Methodologically, data quality remains a challenge even in countries with good quality data by global standards. Importantly, public procurement data needs to be of high quality throughout the whole comparison period both in terms of its scope, the availability of data fields and the truthfulness of the recorded information. However, as a second best alternative, the data has to at least remain consistent, that is of similar scope and quality for both before and after the transparency intervention which is often problematic as transparency interventions tend to impact on publication formats, practices and effort, hence data quality.

Transparency reforms improving the scope and quality of public procurement data are highly valuable on their own as open data is as good as the data going into it; however, evaluating such reforms will remain a challenge as the reform influences the data used to measure outcomes as well as potentially the outcomes themselves. Our interventions were selected specifically to keep data quality constant. The OCDS publications made public procurement data available in a standardized format in Mexico and Paraguay, but due to regulatory deficiencies the data quality remained problematic in spite of the interventions. For example, if collecting information on the number of received bids is not mandatory, it is hard to gauge market competition.

Countering challenges of interpretation and the identification of causal impacts, subsequent research could adopt a mixed methods research strategy adding further data sources to the administrative data on public procurement. It might make sense to combine procurement data with interview evidence, document reviews and survey data. Surveying data users – for example, public buyers – could reveal whether and how open data is used, and how it could be made more useful.

Substantially, our research has revealed that **increasing the amount and accessibility of data publication in public procurement is unlikely to lead to short term improvements in procurement outcomes in countries with considerable data transparency at the outset.** While data quality and scope limitations imposed constraints on the effect sizes detectable, the identified small, and inconsistent changes in key outcome variables, such as bidder number or decision period length, suggest that there are no systemic, large-scale impacts. Moreover, intervening changes happening during the period after the transparency intervention in Slovakia (e.g. government change, e-auction expansion), further warn us about interpreting the significant and sizeable quantitative effects as causal impacts. Overall, it remains to be seen, using alternative methods and data sources, if there are small-scale impacts on the short term or effects for particular sub-samples (e.g. for high capacity buyers) which may build up over time in the right supporting environment; or **whether more and better open data in combination with a substantial investment in promotion, skills, practice change, and data use would produce the effects predicted by theory.**

Putting these findings in the light of prior research on transparency, especially transparency in public procurement, it furthers our understanding that it is not the mere availability of more data which matters rather the timely and easy availability of the right information for the right actor. For example, data on bidding opportunities matters most to bidding firms who are both motivated and able to act on it (Bauhr



et al, 2019); or the reliable provision of contract performance data to local civil society groups who are also supported by law enforcement agencies (Lagunes, 2017); or where there are specific feedback and mediation channels available.



1. Introduction

With the rise of the digital age, recent decades have witnessed a global move to transforming government information into machine readable data which become increasingly standardized and publicized. Thereby, enhancing government transparency has gotten on the agenda of governments, civil societies and businesses as evidenced by initiatives such as the Open Government Partnership which has seen 70 OGP members making 189 open contracting commitments by March 2019³. This global movement is underpinned by expectations about the impact on desirable societal outcomes such as high quality public services, procedural justice, public sector integrity. It also promises to create an overall change in mindsets enabling actors to make informed decisions which can contribute to new forms of interactions and engagements between government, civil society, and private sector actors.

In spite of these large policy developments and many transparency reforms targeting diverse policy domains, we lack specific and rigorous evidence on achieved benefits of such reforms and the enabling conditions facilitating them (Bauhr et al, 2019). To date, there are only a handful of high-quality research papers focusing on how transparency is translated into benefits for private sector actors and better government performance such as lower corruption or higher spending efficiency. Particularly, very few rigorous assessments were produced on the impact of large-scale transparency interventions in the field of public procurement – also called open contracting reforms – even though this is a particularly data rich and economically sizeable government function with a long history of transparency reforms through which government interacts with the private sector and which results in delivery of public goods and services that directly matter to people. Public procurement is therefore a policy area well-suited and important to scrutinize the assumptions and expectations about the impact of transparency.

In order to fill the gaps in the evidence base, this research investigates the effects of three notable open contracting reforms by comparing procurement outcomes before and after the change in the transparency regime. We analyse procurement datasets containing public contracting data to measure outcomes such as corruption risks, institutional efficiency, level of competition, and prices. We compare those outcomes for tightly matched groups of contracts from a short timeframe before and after open contracting reforms. Through interviews, we additionally explore the channels through which transparency affects procurement outcomes - e.g. who are the stakeholders and enablers which use increased transparency to drive policy change.

Based on the availability of sufficient quality procurement data and recent open contracting reforms, we selected three cases from different countries: Mexico, Paraguay and Slovakia. In Mexico, the federal-level public procurement data were translated to the international Open Contracting Data Standard (OCDS) and published on a purpose-built transparency portal in 2017. In Paraguay, a new open contracting portal was designed and launched, including the transition of national procurement data to OCDS format in 2015. In Slovakia, new legislation entered into force obliging contracting authorities to publish contracts from public procurement in 2011. In a nutshell, the selected open contracting reforms predominantly led to more data in a more accessible format on tenders already covered by national public procurement legislation to be published by the government for the general public, including civil society, businesses, but also government agencies themselves. Each of these interventions were accompanied by only limited publicity, workshops, and trainings, hence we consider the analysis to estimate the effects of change in data publication largely on its own holding demand for data, user skills, and related environmental conditions constant.

³ <https://www.opengovpartnership.org/wp-content/uploads/2019/05/Open-Contracting-Fact-Sheet-May-2019.pdf>

The report is structured as follows: the theoretical underpinnings for the transparency interventions' impacts are outlined in section 2, the research methodology is explained in section 3, followed by the findings for each country – Mexico in section 4, Paraguay in section 5, and Slovakia in section 6. Finally, we conclude and bring the findings together.

2. Theory of change

This section outlines the theory of change linking increased transparency to better public procurement outcomes. We clarify the overarching concept of transparency in public procurement, then we discuss the four main expected outcomes and mechanisms leading to them, yielding four distinct hypotheses.

The concept of transparency in public procurement

Although there is no agreed-upon definition of transparency, commonly cited definitions such as those by Florini (2007) and Meijer (2013) emphasize the importance of the availability of information about an organization or process that allows for monitoring by outsiders. In the context of this research, increased transparency in public procurement is understood as more government contracting data becoming publicly and freely available.

Scholars and policymakers frequently advocate more transparency as a promoter of good governance with its effects being commonly derived from principal agent theory (e.g. Kolstad & Wiig, 2009). The logic here is that transparency reduces information asymmetries between principals (the public) and agents (the government) leading to more efficient monitoring of the government and eventually better performance. There is considerable scholarly support for this idea (e.g., Alt, Lassen, & Skilling, 2002; Brunetti & Weder, 2003; Reinikka & Svensson, 2005; Winters & Weitz-Shapiro, 2013), highlighting the beneficial effects of increased transparency on public demand for accountability and government performance. Such a broad literature on transparency suggests that transparency interventions have the potential to improve public procurement outcomes which we define in terms of competition, corruption risks, administrative efficiency, and prices as discussed below.

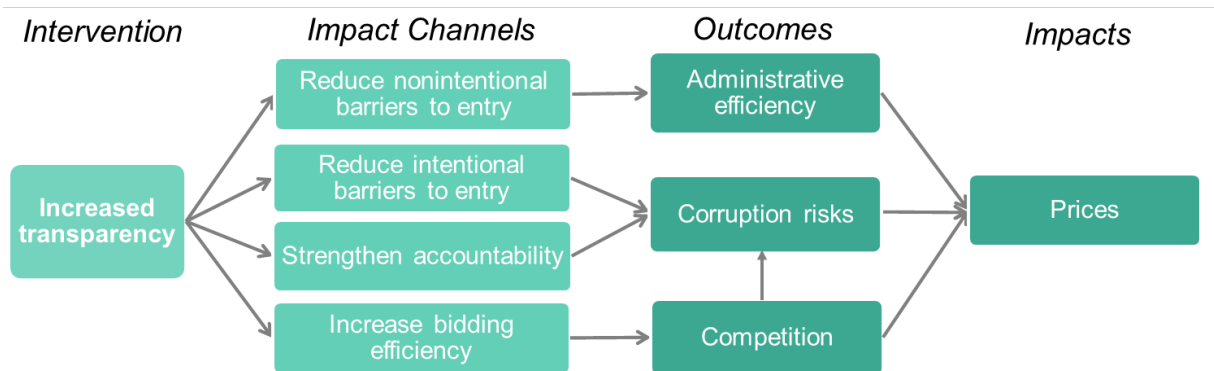
Outcomes, mechanisms and hypotheses

Transparency interventions in government contracting are intended to improve public procurement performance, which includes ensuring open and fair competition among bidders, reducing corruption risks, improving procurement efficiency, and lowering prices. While recognizing their interdependence, we consider these four distinct sets of outcomes and impacts separately in order to identify the main mechanisms through which transparency can affect them, leading to four hypotheses.

The main conceptual challenge of linking different transparency interventions to the above outcomes is that every transparency intervention is dependent on contextual factors and bundles together a range of impact channels. We narrow down to four main impact mechanisms: (i) transparency can reduce nonintentional barriers to entry erected by buyers; (ii) transparency can make it more costly to erect intentional barriers to entry by reducing public officials' de facto discretion and increasing risk of detection; (iii) transparency can strengthen vertical or horizontal accountability aiming to hold governments responsible; and (iv) transparency can increase bidding efficiency by lowering the transaction costs for bidding firms and offering new intelligence to inform bidding processes. The interactions and effects of these mechanisms on each outcome (competition, corruption risks, administrative efficiency, and prices) are summarized in Figure 1 and discussed in detail in each subsequent section.



Figure 1: Summary of our theory of change



Competition

The competition outcome captures the extent to which public procurement tenders result in many and high quality bids. Many scholars and policymakers suggest that competitiveness of public procurement tenders largely depends on the transparency of the procurement process, that is the ready availability of relevant information on tenders (e.g. Bauhr & Grimes, 2014; Kosack & Fung, 2014). With increased transparency, competition is expected to intensify because the number of bidders increases, the diversity of bidders improves (e.g. non-local bidders) and because bidders are better informed supporting higher quality bids in terms of lower prices and better specified technical offers (Soudry, 2004).

The primary, albeit most certainly not the only, channel through which transparency contributes to better competition is through improving bidding efficiency. Potential bidders benefit from transparency as it decreases costs of staff time, information collection, and analysis. Gathering information on bidding opportunities is made easier by more information on tenders available in a readily accessible electronic format. Lower information costs are likely to lead to more companies bidding as the cost of bidding falls. In addition, bidders can access market analysis and business intelligence tools, providing structured information on previous tenders of a certain buyer, other bidders' prices, or likely upcoming main tenders each of which makes putting together quality bids cheaper. Better market intelligence due to transparency hence is expected to improve bidding quality and by implication competition.

In terms of empirical evidence, a quasi-experimental impact evaluation of transparency-increasing e-procurement for road infrastructure in India and Indonesia finds that e-procurement raises the prevalence of non-local winners, but fails to increase the number of bids submitted (Lewis-Faupel et al., 2014). In a global, cross-country analysis, Knack, Biletska, & Kacker (2017) used a sample of 34,000 firms in 88 countries to show that in countries with more transparent procurement systems, firms are more likely to engage in bidding and pay fewer and smaller kickbacks to officials. Other studies from Italy (Coviello & Mariniello, 2014) and Japan (Ohashi, 2009) also showed that publicity requirements improving readily available tendering information, increase the number of bidders.

However, when more transparency is linked to the introduction of a new electronic system or more extensive data provision requirements, SMEs and low capacity public organizations likely face relatively higher adoption costs (Croom & Brandon-Jones, 2007). This potentially puts low capacity organizations at a disadvantage (e.g. decreasing instead of increasing the number of bidders where competition was weak to start with). Furthermore, evidence from Paraguay raises a fundamental barrier



to the positive outcome of increased competition due to transparency, namely there have to be companies who can potentially enter the market once access is widened (Straub, 2014). This ambiguity of transparency effects on competition yields our first null hypothesis:

H1: Increased transparency improves competition in public procurement.

While transparency impacts on corruption are discussed in the subsequent section, the likely interaction effects between competition and corruption must be noted already here. Increased competition induced by higher transparency can also lower corruption risks (which indicate an intentional curtailing of competition). More companies bidding makes it harder for a colluding public official and company manager to exclude non-wanted competitors hence create opportunities for inflating prices.

Corruption risks

Corruption risks refer to a situation in which public procurement contracts are allocated to a closed network of firm(s) and government official(s), while intentionally denying access to others (North, Wallis, & Weingast, 2009). This typically involves bending explicit rules of open and fair competition in public procurement as public officials steer contracts to a favored bidder, for example through unjustified sole sourcing, sharing inside information, or tailoring tender specifications to a certain bidder (World Bank, 2009). We expect that increased transparency makes it harder for public officials to create such intentional barriers for undesired competitors, as it increases the costs of buyers' abusing their discretion and reduces information asymmetries between corrupt insiders and potential market entrants (excluded outsiders) (Knack et al., 2017). Transparency interventions also make corrupt deals riskier, e.g. when an easily and publicly accessible electronic trail about the decisions leading to contract award is produced. This facilitates internal as well as external oversight not only by lowering transaction costs for audit but also by giving rise to more systematic analysis of procurement activities by oversight bodies (Di Tella & Schargrodsky, 2003; Olken, 2007). The monitoring net can tighten additionally when oversight is coupled with demand-side accountability from civil society holding government responsible for procurement activities (Lagunes, 2017).

Moreover, Czibik, Fazekas, Bauhr, & Licht (2017) suggest that the beneficial effects of transparency on corruption in public procurement depend on whether it allows for horizontal accountability, i.e. the monitoring between different elites. Whereas the standard principal-agent perspective focuses on vertical information provision to outsiders, they emphasize the role of insiders, such as (potential) bidding firms, as those with the highest motivation and sufficient technical expertise to monitor the process, to point out irregularities, and to act as whistleblowers on wrongdoing. Importantly, the evidence also suggests that ex ante transparency (making information available before the contract is awarded) has a stronger negative effect on corruption risks than ex post transparency (making information available after the contract has been awarded) (Bauhr et al., 2017).

On the other hand, Bac (2001) found that transparency may increase corruption by making it easier to identify whom to bribe; and Bauhr & Grimes (2014) showed that in highly corrupt countries government transparency may lead to demobilization and resignation of citizens instead of more demand for accountability. Additionally, corrupt actors may respond to reduced discretion or tighter monitoring in one part of the procurement process by finding alternative strategies for rent-seeking in other procurement phases or aspects of the tendering process (David-Barrett & Fazekas, 2018).

Generally, these mechanisms hinge upon the existence of public authorities, bidding firms, and civil society which have the skills and resources to turn information released through transparency



interventions into actions that counter corruption risks. We need to acknowledge that no transparency intervention can eliminate all corruption risks; at best it can make many widely exercised tactics more expensive and hence less likely. Given the wide array of substitute corruption techniques in public procurement (Fazekas, Tóth, & King, 2016), the net effects of transparency on corruption risks are ambiguous, which produces our second null hypothesis:

H2: Increased transparency reduces corruption risks in public procurement.

Administrative efficiency

The concept of administrative efficiency captures the administrative costs incurred by the government for achieving the predetermined outcome of public procurement, i.e. the successful completion of the contract.

We expect that increased transparency improves administrative efficiency because it reduces non-intentional barriers to entry erected by governments, as the costs of tender information collection, preparation, and analysis decrease. The costs of preparing a tender and checking bids can reduce when more tender documentations become publicly available online in a standardized format, buyers can have free and timely access to tender information on market conditions (e.g. main suppliers in a market) and typical product specifications, regardless of their location. For example, buyers realizing the range of companies and prices achieved by other, comparable entities may opt for harnessing competition to a greater degree (e.g. using more open procedures rather than direct contracting).

However, such transaction cost savings depend on the type of transparency intervention – the opposite effect is also conceivable, namely that new transparency requirements, like having to publish all tender documentation, increase administrative costs for buyers. This is especially problematic when public officials need to improve their computer literacy or system-specific knowledge to satisfy additional data provision requirements (Blum, Siddique, Fazekas, & Samaddar, 2018). New systems intended to improve transparency may also increase administrative costs by introducing new types of costs such as system design rigidity (i.e. not being able to accommodate certain atypical cases) and IT system breakdowns.

This ambiguity of increased transparency effects on administrative efficiency results in our third null hypothesis:

H3: Increased transparency improves administrative efficiency of public procurement processes.

Prices

Prices capture the ultimate outcome or impact of transparency interventions which, in an ideal scenario, captures the full life-cycle cost of goods and services procured, but typically simply approximated by unit prices of goods, works, or services procured at the same quality at the time of contract award (Saussier & Yukins, 2018).

Prices are considered as the final impact of transparency interventions in public procurement as they are determined not only by the four impact mechanisms identified but depend on the outcomes we discussed so far, competition, corruption, and administrative efficiency (Fazekas & Kocsis, 2017; Yakovlev, Bashina, & Demidova, 2014). When bidding efficiency is high, i.e. the number of bidders is high and bidders are informed about all prices, bidders have the best chance to lower their prices for

winning the contract (Soudry, 2004). Moreover, the combination of reducing non-intentional and intentional barriers to entry by buyers, as discussed earlier, could lead to lower corruption and higher administrative efficiency which by nature are expected to drive prices down (Lewis-Faupel et al., 2014). Lower corruption typically means lower corruption rents, hence lower prices. In addition, higher administrative efficiency often implies better prepared and formulated tenders hence more healthy competition and lower prices. Finally, stronger accountability, horizontal or vertical, may also discipline public buyers to exercise their discretion for the public good and achieve lower prices.

Empirically, a non-experimental study assessing the impact of e-procurement which improves transparency of tender notifications in Chile suggests that an increase in the number of bidders and the corresponding decrease in bid prices is the key driver in cost savings to the Chilean central procurement agency (ChileCompra) amounting to 2.65% of total spending (Singer, Konstantinidis, Roubik, & Beffermann, 2009). A number of government reports claim much larger price savings of a magnitude of 20% in Brazil, Mexico and Romania (Auriol, 2006). While the above studies cannot be directly compared, they partially reinforce the claim that fair and open access through transparency and lower transaction costs improve value for money.

However, in the impact evaluation of infrastructure e-procurement in India and Indonesia, Lewis-Faupel et al. (2014) finds no evidence of lower prices, only that of higher quality. Furthermore, evidence from Paraguay raises a fundamental barrier to the positive outcome of increased competition driving down prices, namely there have to be companies who can potentially enter the market once access is widened; if there are none to very few such companies short to mid-term positive effects are null (Straub, 2014). In addition, desirable impacts may not materialize or even turn into negative depending on users' computer literacy and SMEs' ability to access online services, as discussed previously. Plus, high intensity competition at the bidding stage may well bring prices down, but could lead to the so-called winner's curse whereby the lowest price bidder is compelled to renegotiate the contract after the award (Soudry, 2004). Lastly, the use of transparent procurement has been criticized for being costly, whereas the use of informal, non-open mechanisms such as reputation and long-term relationships may in some cases actually save public money (see e.g. Bandiera, Prat, & Valletti, 2009; Coviello, Guglielmo, & Spagnolo, 2018).

The net effect thus depends crucially on the characteristics of the transparency intervention itself and on firms' adaptiveness, which leads us to our fourth null hypothesis:

H4: Increased transparency reduces prices through better competition, lower corruption, and higher administrative efficiency.

In sum, we need to recognize that the beneficial effect of transparency may not be universally applicable across contexts and interventions (Malesky, Schuler, & Tran, 2012) and acknowledge the crucial role of the audience of newly available information (Fukuyama, 2015; Kolstad & Wiig, 2009). Transparency interventions' beneficial effects appear to be highly conditional on two sets of factors: (i) the nature of the transparency intervention in question, including which public procurement phase it targets and the scope of the change, i.e. the quantity and depth of new information becoming transparent compared to before and whether it is motivational and actionable for different receivers at certain times in the process; and (ii) the nature of the demand for accountability, i.e. the presence of users for data becoming available and these stakeholders' willingness and ability to act upon the information received (in horizontal as well as vertical accountability arrangements).



3. Methodology

In order to identify a change in public procurement transparency, we identified the introduction and implementation of new rules governing the amount and form of data made publicly available. Hence, our transparency measurement is consistently, narrowly defined to capture changes in the availability of data to the wider public rather than the collection or storage of data within the public sector.

Our analysis compares very similar contracts awarded in the period before vs. after the transparency interventions. Under certain conditions, this provides an estimation of the transparency reforms' short-term causal effect on procurement outcomes. In particular, we analyze the following outcome indicators: i) *level of competition*, ii) *corruption risks*, iii) *institutional efficiency*, and iv) *prices* (Table 2). We analyze two variables to assess the level of competition: number of bids and the share of recurring companies. For corruption risks we use single-bidding, submission period length and closed procedures. Institutional efficiency is captured by buyers' average decision period length. Finally, we also look at price changes where either unit price or relative price is available. Relative price is defined as the final contract (or tender) value divided by the initially estimated price.

Although we try to analyze all of the above-mentioned indicators, we have to exclude some of them in specific countries. First, certain variables are simply not available – for example, unit prices are not published in Slovakia. Second, data quality can vary a lot which makes parts of the analysis infeasible – for example, estimated price is almost entirely missing before the intervention in Paraguay.

Table 2: Indicators (dependent variables) by indicator group used in the transparency reform analysis

Category	Indicators	Included in analysis		
		Mexico	Paraguay	Slovakia
Level of competition	Number of bids	Yes	Yes*	Yes
	Share of new companies	No	Yes	No
Corruption risks	Single-bidding	Yes	Yes*	Yes
	Submission period	Yes	Yes	No
	Closed procedure	Yes	Yes	Yes
Institutional efficiency	Decision period length	Yes	Yes	No
Prices	Unit or relative price	No	No	Yes

* We construct a tender level non-competitive tender and level of competition indicator in Paraguay as bids are listed at the tender level. See the details in section 5.

Estimation strategy

In all country chapters we follow the same estimation logic. First, we group the procurement contracts into 'before' and 'after' transparency intervention categories. Second, we prune the dataset so that we only keep very similar contracts from both comparison groups. Third, we estimate the average difference of the procurement indicators before and after the transparency intervention in a weighted⁴ OLS or LOGIT regression models, depending on the outcome variable. We control for the most important tender characteristics in all estimations.

⁴ Weights are given by the matching process – see detailed description below.

To estimate causal effects, we have five important considerations and assumptions about how procurement markets work and how transparency affects them that underpin our estimation strategy.

First, following the theory of change, we expect transparency effects (if any) not to unfold immediately. Many of the advantages would be realized by the help of stakeholders – journalists picking up stories based on newly available data, buyers informing themselves about tendering procedures or companies finding out new opportunities more efficiently, all of which takes time.

Second, procurement markets are affected by supply and demand factors - similarly to any other market. On the one hand, procurement spending is characterized by bureaucratic inertia: the vast majority of public contracts are planned a year ahead, hence spending is secured. Plenty of recurring and similar size contracts run every year. A typical road refurbishment contract in the same region will not face significantly different conditions from one year to another. On the other hand, economic growth or decline is likely to affect companies' capacities that have spillovers to procurement markets as well. Centrally funded special programs running for short time periods might come and go (e.g. an organizational development program leading to hundreds of municipal consultancy contracts running for only a year). Furthermore, seasonality in public spending makes choosing a longer comparison time frame more appropriate. Comparing contracts from the winter with the ones from the summer can be misleading. For example, construction companies have much less capacity to submit bids in the mid-season. The demand side is also volatile: budgeting cycles affect the timing of procurement spending within year. Conclusively, in most countries – except Mexico where data availability constrained us – we compare a +/- 1-year time-period.

Third, procurement regulations change almost yearly through amended laws or decrees which may on the one hand, alter the definition of some of our key variables such as procedure type; while on the other hand, they may influence the scope of the dataset, for example by modifying mandatory reporting thresholds. In order to alleviate this potential bias, we carefully mapped all potentially relevant procurement regulatory changes and appropriately trimmed the datasets. For example, in Slovakia where municipalities were brought under to scope of the procurement law in the period after our transparency intervention, these additional municipal contracts were removed from the sample to avoid any bias due to changing sample composition (for transparency, we also report results with the full sample).

Fourth, parliamentary and local elections can also have a large effect on procurement market outcomes. For example, municipal elections in Paraguay might affect federal spending – even though we exclude municipal contracts – through impacting on overall market demand and hence potentially imposing supplier capacity constraints.

Fifth, adequate comparison groups would also require the absence of strategic sorting of tenders around the intervention. Sorting means that buyers foreseeing the transparency reforms might strategically schedule their public contracts in order to avoid the reform's effects. For example, if low integrity buyers rescheduled their problematic contracts to just before the intervention, then we would observe relatively more fishy contracts before and less after the intervention. Consequently, we would overestimate the potential positive effects of the reform as a big chunk of problematic contracts were just clustered before the intervention. The key reason to regard this challenge to be less important is that public procurement tenders are budgeted typically a year ahead and also announced in public procurement plans which are hard to deviate from (albeit countries' regulations and enforcement differ in the strictness of such constraints). In addition, the actual implementation date of the transparency

reform is hard to predict for individual buyers other than those who actually participate in the lawmaking process which is a minority of buyers (i.e. ministry of economy and procurement authority). Hence, both the constraints on strategic sorting are high and motivations are low due to implementation uncertainty.

Nevertheless, to resolve the above discussed problems as much as possible, we pruned our contracts based on their most important observable tender characteristics, such as product code, size, month of delivery, and procedure type. The underlying assumption is that filtering out extreme contracts based on their observable characteristics – such as an extremely big, non-open, IT contract – we control for unobserved characteristics as well. For example, we assume that by dropping a huge IT contract (as nothing similar has been purchased in the comparison period), we also tackle the potential bias due to a government change or simply an upcoming election. Although matching might resolve some of the bias introduced by these changes, we cannot claim that our estimations capture the unbiased short-term effects. We always discuss these possible biases in the country chapters.

Matching and regressions

In order to find better comparison groups in the periods before and after the intervention, we look for contracts that are comparable (i.e. similar in many dimensions). The problem we want to solve by finding suitable comparison groups stems from the fact that spending structure can be different after the intervention. It might be the case that most road construction contracts after the intervention are spent though expensive highway constructions, while there might have been more small-scale road maintenance work before it. Therefore, comparing the corruption risks and price differences of these projects would bias our estimations. For example, while the price of an ordinary road maintenance work is easy to estimate, a more complex, high-value road construction work is less trivial. Therefore, while the final price could be relatively close to the estimated one in the first case (as it is easy to estimate), it would have a much higher variance and structural under- or overestimations that are unknown in the second case. It is also straightforward, that much less companies exist in the market capable of managing a high-value road construction than those competing for smaller maintenance jobs. Comparing the two would show a difference in number of bidders or the probability of single-bidding, whereas it would only be the consequence of the changed spending structure. Therefore, we use a so-called coarsened exact matching technique (Iacus, King, & Porro, 2012) before estimating the before-after differences.

This matching procedure can be thought of as a process whereby we throw away data that makes the comparison of before and after intervention contracts biased, as we only want to analyze contracts that are truly similar. In practice, the matching has two steps. First, we create several contract groups (strata) based on the tender characteristics, such as product and procedure type, year and contract size. For example, it groups all consultancy services from the same year below a specific value threshold that were purchased through an open call. However, the same type of purchases in the same year and value bought in a negotiated procedure would create a separate group. In the second stage, the matching keeps only those contract groups that contain both before and after intervention tenders – those, that are truly similar. The brief matching results (the number of contracts included in the final analysis and the variables used for matching) can be found in Appendix 5.2.

We used the following dimensions for matching contracts:

- a) month,
- b) buyer type,
- c) product code,



- d) tender value (categorical), and
- e) procedure type.

For example, we included 64% of the contracts from the time period after the transparency intervention and dropped the other 36% out of the 15,169 contracts in Paraguay (see Appendix). It means that 36% of the contracts were so specific in either of the dimensions – e.g. extremely big or small IT services – that we could not find anything similar from one year before the intervention.

We estimate weighted OLS and LOGIT models, depending on whether the dependent variable is continuous or binary, with several control variables – see Table 3. We use high-level product codes in all countries. 2-digit CPV codes⁵ are used in Slovakia, 2-digit NACE codes are used in Paraguay⁶, and 3-digit Cucop codes in Mexico. These are wide categories, such as construction – including both building and road construction – or IT services – including both IT consultancy and internet services. Buyer type controls for differences between central bodies or municipal government. Procedure type can be, for example, open, negotiated, restricted, or direct award. Contracts are split into five equal groups by size, while we also create a category for missing values. Months are included to control for seasonal demand-supply factors.

Table 3: Control (independent) variables included in the final regression models

Control variables	Mexico	Paraguay	Slovakia
Product market	yes	yes	yes
Buyer type	yes	yes	yes
Month	no	yes	yes
Procedure type*	yes	yes	yes
Contract size	yes	yes	yes

* except for non-open procedure analysis

Qualitative research

In order to fully understand the transparency interventions in question, we conducted desk research and in-depth stakeholder interviews. This includes mapping all the details of the implementation, focusing not only on the formal rule changes but also on the actual practices followed by the contracting authorities (e.g. whether there are any mechanisms – formal or informal – that enforce contracting authorities to publish accurate information on time). Besides understanding the intervention itself, we also explored the possible confounding factors that might affect the quantitative analysis. For example, regulatory changes affecting procedural rules or minimum bidding period length might affect the tendering outcomes that we analyze in the quantitative analysis, thus the insights from the desk research and interviews directly informed the quantitative analysis.

We remotely conducted 3-4 in-depth interviews per country with individuals from relevant government regulatory agencies and local enablers (NGOs, sectoral advocacy groups etc.), that use open data to monitor public tenders (see appendix 5.1 for a list of interview partners). The interviewees were selected based on convenience and snowball sampling, choosing them based on their experience and insights into the interventions and the public procurement system in question.

⁵ <https://simap.ted.europa.eu/cpv>

⁶ http://ec.europa.eu/competition/mergers/cases/index/nace_all.html

4. Mexico

Intervention description

The following section shall give a detailed insight into the transparency intervention analyzed in Mexico, namely the introduction of OCDS on a new open contracting portal in November 2017, offering data search, downloads and visualization tools. The information below are based on desk research and stakeholder interviews (see Appendix 5.1 for a list of interviewees).

Context

Since late 2012, the Peña Nieto government has shaped Mexico's current federal procurement regime by passing new anti-corruption laws and initiatives that were prompted by corruption scandals, the launch of key infrastructure projects, and pressure from civil society and media. The president's office created an open data team working on open data policy and technology tools. From 2015, the team started to develop special initiatives to create value with open data for certain sectors, one of which was public procurement. As a consequence, a group made up of representatives of government, civil society, and the private sector representatives established the Alliance for Open Procurement Mexico which formed the governance framework for the implementation of open contracting in the following years. This collective included the Federal Government, *Transparencia Mexicana*, the National Institute for Transparency, Access to Information and Data Protection (INAI), the Alliance for Open Contracting, the Open Contracting Partnership (OCP), and the World Bank.

Implementation

Previously to 2017, public procurement data were only published on the *Compranet* system controlled by the federal public administration. That system only includes information about the bidding process and does not provide information on the budget, planning, execution and expenditure control, thus it only contains data on a part of the procurement process. In order to improve this situation and to comply with the obligations of the General Law on Transparency, the Alliance decided to use the OCDS format as a basis to develop a data standard for open contracting in Mexico that matches the specifications of the country's procurement system and includes data of all stages of a contract, from planning to execution.

In 2014, work began on establishing an adequate translation of the local, legal terminology to OCDS. After testing it with the Mexico City Airport Group, the government committed to implementing OCDS at the federal level. One of the main challenges was to make the systems of the Ministry of Finance (MoF) and the Ministry of Public Administration (MoPA) interoperable in terms of the five stages of procurement: while MoF collected data on the 1st and 5th stage (planning and execution), MoPA was responsible for stages 2-4 (tendering, contract award, contracting). Negotiations mediated by the president's office focused on the fact that most information required by OCDS were already being published by both ministries. This strategy led to an agreement and the available data was reviewed, linked to *Compranet*, and transformed to OCDS by the open data team of the president's office. Ultimately, on 8th November 2017, the final structure of the Mexican OCDS together with its extensions was implemented including both the API hosted in the Open Data Platform, as well as the newly released open contracting portal. Besides providing data search and download functions, the portal also offers different data visualizations intended to make the information more easily understandable and actionable.

Specifically, the federal government began publishing data in OCDS on the new portal which contains information on procurement that went through *Compranet* in the area of acquisitions, services, leases,



public works and related services for 2017 and 2018, downloadable in JSON format and updated weekly. Under this scheme, data of a number of systems have been integrated and structured on the Open Data Platform, including information from *Compranet*, the Accounting and Budget System (SICOP) of the Secretariat of Finance and Public Credit (SHCP), and the Integral Module of Investment Programs and Projects of the SHCP. It is planned that gradually, more data, institutions and functionalities will be incorporated into the portal. At the federal level, generating open contracting data is obligatory as mandated by MoPA's and MOF's open data regulations, requiring that all federal entities use *Compranet*. However, while any federal, state or municipal governmental entity may adopt OCDS as a data format, they are not obliged to. Particularly, procurement at the state and municipal level often remains a black box, as they have own regulations and systems. The resulting data quality challenges are discussed below.

Users of the federal open contracting data made available after November 2017 on the new platform were mainly academics and small circles of public servants and civil society organizations (CSOs). Some examples include: Spaceship Labs has built a [platform](#) displaying open contracting data in simple terms, the CSO PODER is using the open contracting data for corruption risk assessment; and the Mexican Chamber of Construction uses open contracting data for a construction observatory. However, according to the interviews, the use of open contracting data, particularly in OCDS format, has not yet spread widely to citizens, CSOs, media, or the private sector, as the types of analysis that it enables are often seen as very technical and too distant from the needs of the stakeholders.

Perceived impact

Based on the expert interviews, there appears to be a variety of perceptions of the impact of the new open contracting portal with OCDS data. Overall, the interviewees established that this intervention falls short of changing the whole procurement system and curbing corruption in ways that are observable in open contracting data. Nonetheless, the intervention seems to have generated awareness and interest in open contracting leading to increased usage of public procurement data by media and civil society. Particularly, the watchdog community previously tended to focus on specific corruption cases detected by journalists, not on patterns in data to see a bigger picture. This is where the publication of open contracting data helped to move the conversation towards trying to identify networks and patterns of corruption risks. According to civil society and corruption experts, open data generation and analysis is the next step in transparency in Mexico, which has permeated to some institutions at the federal level using the notion of open contracting to create permanent institutional changes. In addition, the discussion of open contracting at the federal level has been picked up in some states and municipalities, with some even developing their own open contracting initiatives, such as Mexico City.

One factor mentioned frequently which inhibits more fundamental impact observable in the data is that the Open Data Platform and OCDS effort merely changed the style of publication from *Compranet* and added some information from the MoF, but the overall data availability and quality did not see large-scale changes. To illustrate this, most organizations analyzing open contracting data, like IMCO and PODER, still prefer to rely on *Compranet* data. Furthermore, the implementation process was reportedly mainly driven top-down by executive directions from the president's office, which was under pressure to demonstrate transparency efforts in the run-up to the 2017 presidential elections, and did not include sustainable commitment and institutional transparency efforts that involved and trained procurement officials.

In order to generate more impact from open contracting data, the interviewees were calling for several changes. Firstly, this includes preventative action through legislative change in the federal procurement

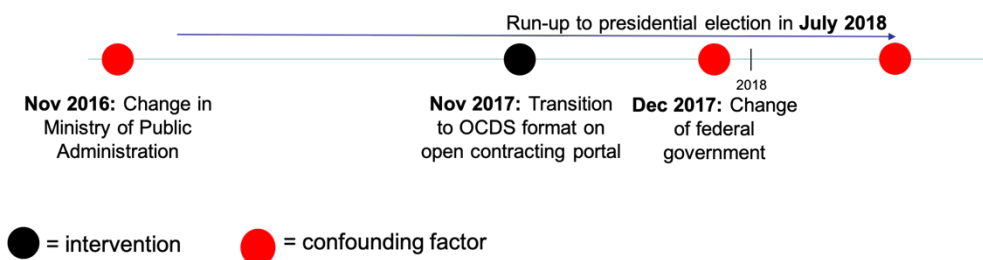
law using insights from data analysis, as well as improved reactions from a strong independent judiciary that punishes corruption appropriately. Secondly, it was demanded to reform *Compranet* from being an archive of transactions which are often uploaded post-contract award, into a truly transactional platform with all details and documents required. Lastly, the open contracting data need to be transformed into products that are useful for the public, civil society, and private sectors and that can guide clear policy recommendations.

Confounding factors

Figure 2 lists confounding factors and developments that occurred at the same time period that we investigate, such as large-scale political changes or reforms in procurement regulations or publication practices other than the one we identified as the main intervention. It is important to be aware of those interventions that potentially had an impact on the data and outcomes we observe.

Generally, the time period of 2017-2018 has seen several major changes in government. Firstly, a new minister of Public Administration, Arely Gómez González, took office in around November 2016. She brought about a renewed focus on open contracting and pushed transparency reforms and tighter control of public procurement processes. Secondly, the run up to the presidential election in July 2018 was marked by a heightened focus on anti-corruption and transparency for political campaigning. Lastly, the federal government changed in December 2018, which ordered the migration of public procurement processes from MoPA to MoF and which many perceive to have a lesser commitment to open contracting than the previous administration.

Figure 2: Overview of confounding factors in 2017-2018 in Mexico



Data

The analysis in Mexico can be based on three different data sources that cover federal public contracts: a) the official yearly data dumps published by Compranet⁷ as CSV, b) the OCDS publication by Compranet⁸, c) IMCO. These sources differ in terms of their yearly coverage. Yearly publications are available since late 2010, OCDS publications are only available since 2017, while the IMCO dataset covers the years 2010-2017.

Unfortunately, the scope of available variables and the share of missing information made data preparation a lengthy process. We had to exclude IMCO data entirely from the analysis as the

⁷ These are CSV publications, available for download here: <https://sites.google.com/site/cnetuc/descargas>

⁸ Download available here: <https://datos.gob.mx/busca/dataset/concentrado-de-contrataciones-abiertas-de-la-apf>

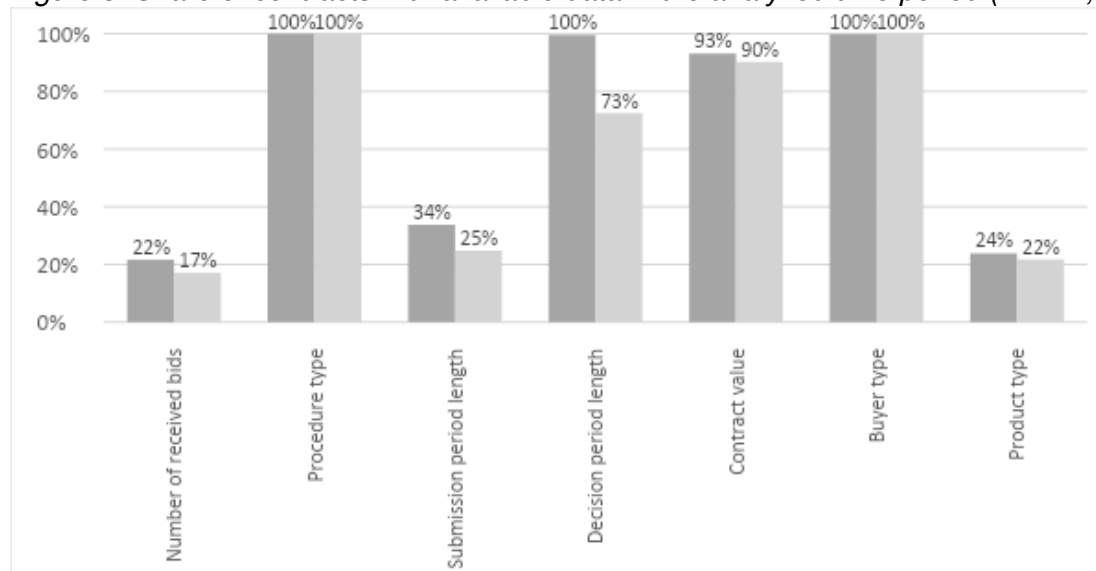


intervention happened late 2017.⁹ The overlap between the yearly CSVs and OCDS publications is also not perfect. More than 162k contracts in 2017-2018 in the yearly CSV files do not have a matching OCDS publication (those are the tenders which are funded by the federal government but not contracted by it).

The share of missing data points is very high for a number of variables (Figure 3). The number of bids received is only available for around 20% of the contracts, product codes for 22-24%. While product codes are not directly subject to our analysis, it plays an important role in matching before and after intervention contracts (see Methodology)¹⁰. The advantage of the OCDS publication is that it contains information in a structured format, but data quality remained low for certain variables due to the lack of a strong enforcement mechanism. While the submission period availability is also low (25-34%), it is mostly explained by the high share of direct contracting.¹¹ Decision period length is the last problematic variable in terms of data availability – its availability drops by 27% after the intervention.

Fortunately, other key variables – such as procedure type, contractual value or buyer type – have significantly better data coverage irrespective of the transparency intervention. Procedures are atypical in Mexico in an international comparative perspective as direct procedures (around 68% of all contracts) also often have more than one bid shown in the data. This can be explained by a regulation requiring at least 3 quotes for direct contract above a certain threshold. However, asking for 3 quotes certainly means a very different exposure to competition than receiving 3 bids on an open call.

Figure 3: Share of contracts with available data in the analyzed time period (N=122,168)¹²



⁹ Including IMCO data would bias the data we use for the before-after comparison – as we would have much more data (e.g. number of bids) before the intervention.

¹⁰ To avoid losing a huge part of the contracts, we constructed a separate category for missing product codes. This way, we could use all contracts both for matching and the analysis.

¹¹ Although submission deadlines are available for 14% of direct contracts, given the nature of these contracts, we do not expect bid deadlines attached to this kind of procedures.

¹² Analyzed time period refers to our widest sample we use, that includes contracts that we could only categorize with extrapolated call for tender publication dates (see the discussion in later in this section).



As the transparency intervention took place in November 2017, we do not have a whole year of data available for the period after the intervention even when combining yearly data dumps and OCDS. Therefore, we used a conservative approach and only compared a quarter year before and after the intervention which unfortunately is not long enough to account for all seasonality effects.

To compare contracts before and after the intervention, we had to choose a date for grouping them. We used two different approaches: a) we grouped contracts only based on call for tender publication date, b) we used call for tender dates where it was available, and extrapolated the call for tender date where it was not available.¹³ The other dimension we considered categorizing as control and treatment groups is whether the procedure was a direct contract or not. Given that the procedural logic of direct contracts differs significantly from the usually more thoroughly regulated open or invitational procedure, we wanted to see effects separately on these different samples. Therefore, we estimated before-after differences using four samples¹⁴ based on a) the dates used for categorizing contracts before-after and b) inclusion of direct contracts. For the sake of brevity, we only include the estimations based on the samples using the extrapolated call for tender dates in the main text. However, we report both the estimations with and without direct awards.

Panel A and B show the significant difference between the number of contracts included in the estimations (before matching) by the inclusion of direct procedures (Figure 4). The number of contracts as displayed on the y-axis is a magnitude higher without filtering direct awards.

¹³ To extrapolate call for tender dates, we calculated the median difference in each product market between the call for tender dates and contract award dates. In a second step, we deducted the median difference from the contract award dates for those contracts, where call for tenders were not available. For example, if a contract award was published 20 days after the intervention date but the median difference between call for tender and award publication is 30 days on that market, we added the contract to the group that is still unaffected by the transparency intervention. However, the same contract on a market with only 10 days of average difference between these publications would be categorized as a contract affected by the intervention. This regrouping is not perfect, but contracts without clear information on their start (i.e. call for tender publication date), no (clearly) better solution exists to categorize contracts.

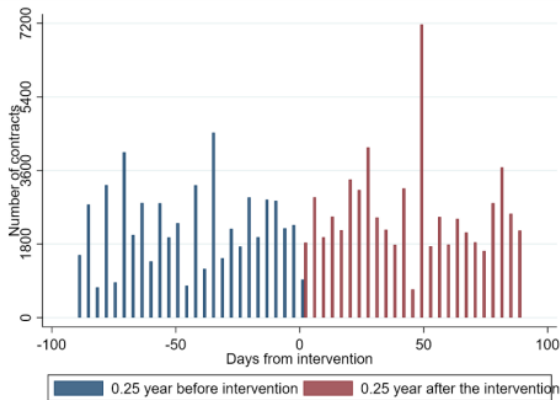
Interestingly, the share of missing call for tender publication date is negligible in 2016-2017, whereas it is significant both before and after. Unfortunately, we have not found any clear explanation of why this is the case.

¹⁴ The number of contracts included before and after the intervention (before the matching) can be found in the Appendix.

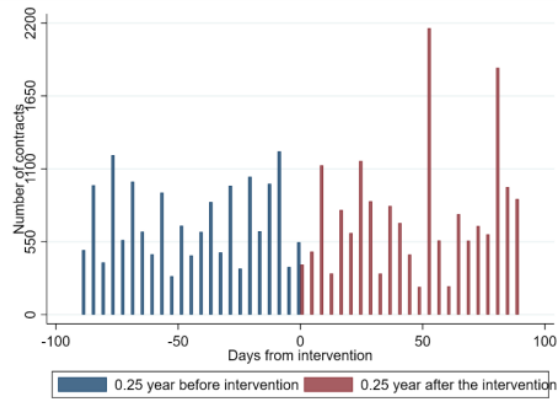


Figure 4: Number of unique contracts before and after a quarter year of the intervention (sample with extrapolated date)

Panel A: with direct procedures



Panel B: without direct procedures



Results and discussion

Panel A and B in Figure 5 show the predicted indicators for the level of competition and corruption risks before and after the transparency intervention. First, the share of single bidding increases by 4 to 9 percentage points depending on whether direct procedures are included in the sample. Interestingly, the number of received bids increases by 0.5 in the whole sample (that is only significant at a 10% level), while it increases by 4.2 bids without the direct procedures. This suggests that the intervention only increased the level of competition in tenders that were already competitive, but it increased the share of high-corruption risk, single-bidder contracts in the very short-run too. Note, that these results are only tentative as the number of bids are missing for 80% of the contracts. The estimations that use strictly the call for tender publication date for categorizing contracts before and after the intervention, show very similar results. However, if we exclude all contracts without a product code, the difference in single bidding and received bids becomes insignificant. This suggests that there is a change in the spending structure that affects the difference in single bidding and number of bids, or that the subsample having product codes behaves differently from the whole sample. Unfortunately, in the absence of better product information, we cannot resolve this issue.

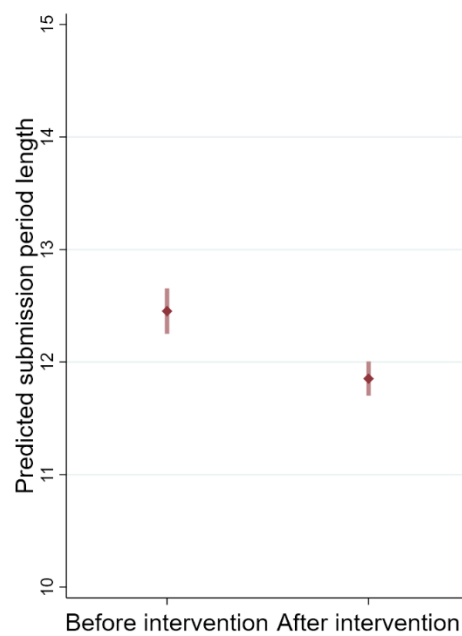
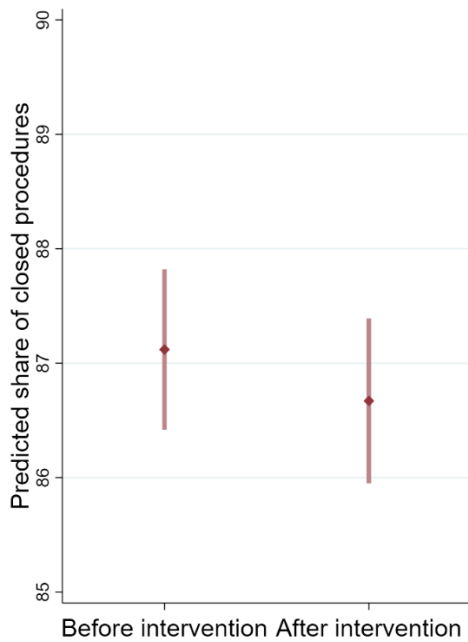
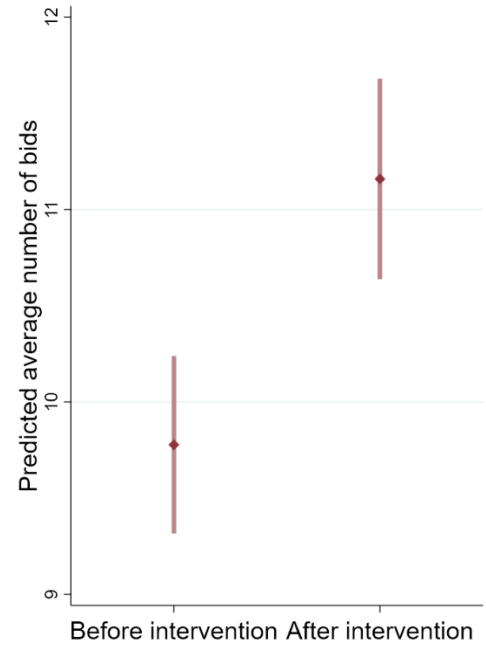
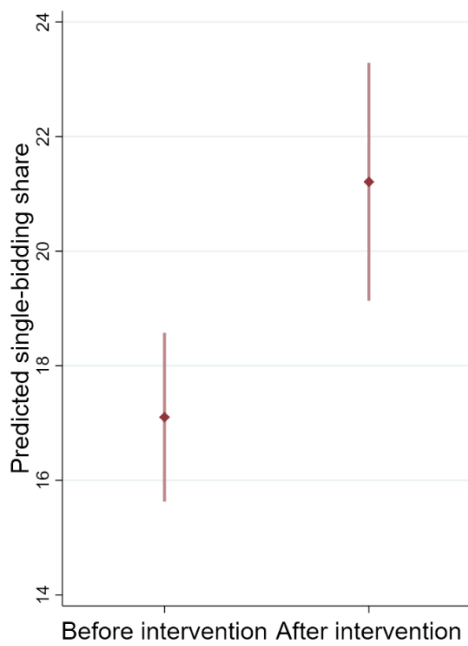
The share of non-open procedures¹⁵ remains unchanged if we look at the whole sample, that includes direct procedures as well. However, without the direct awards, it decreases by two percentage points. Using the samples generated without using the extrapolated contract start dates give similar and even bigger effects. The share of non-open procedures decreases by 2.7 percentage points when direct awards are included; and by 9 percentage points when they are not. Given that procedure types are available for each contract, this result is significantly more robust. Lastly, the submission period becomes shorter by 0.5-0.6 day depending on the sample used. This change is very similar even if we use the samples without the extrapolated dates (see the Appendix).

Figure 5: Predicted share of single bidding, number of bids received, share of non-open procedures and submission period length comparing a quarter year before and after the intervention

¹⁵ We simply categorized everything besides the explicitly open procedures as non-open.

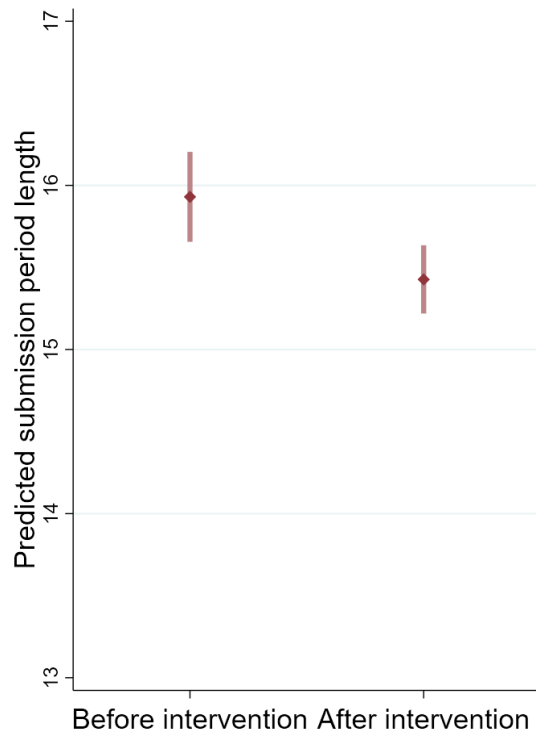
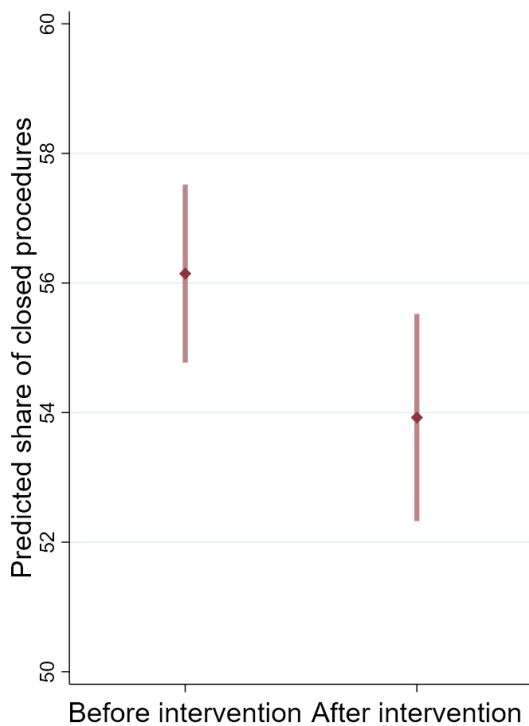
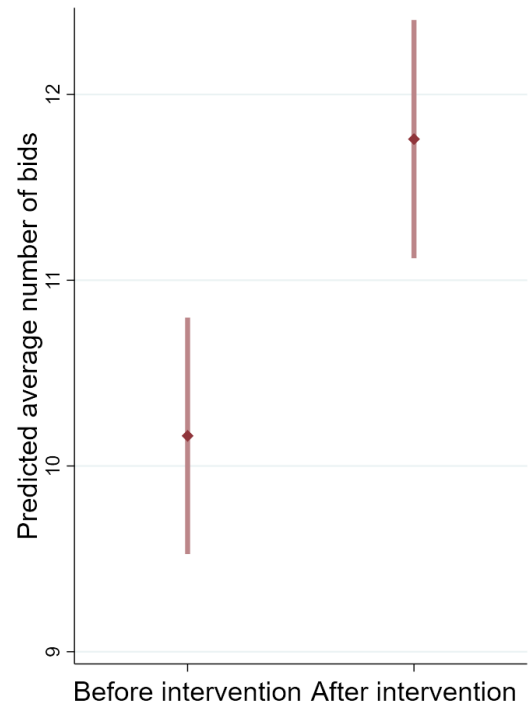
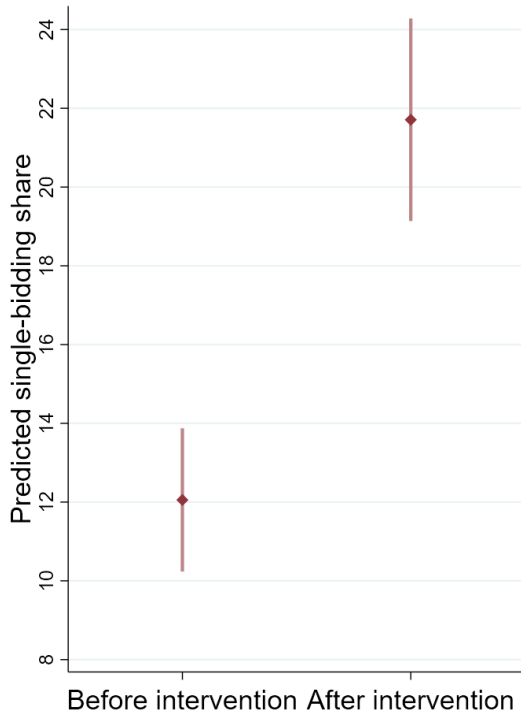


Panel A: with direct procedures





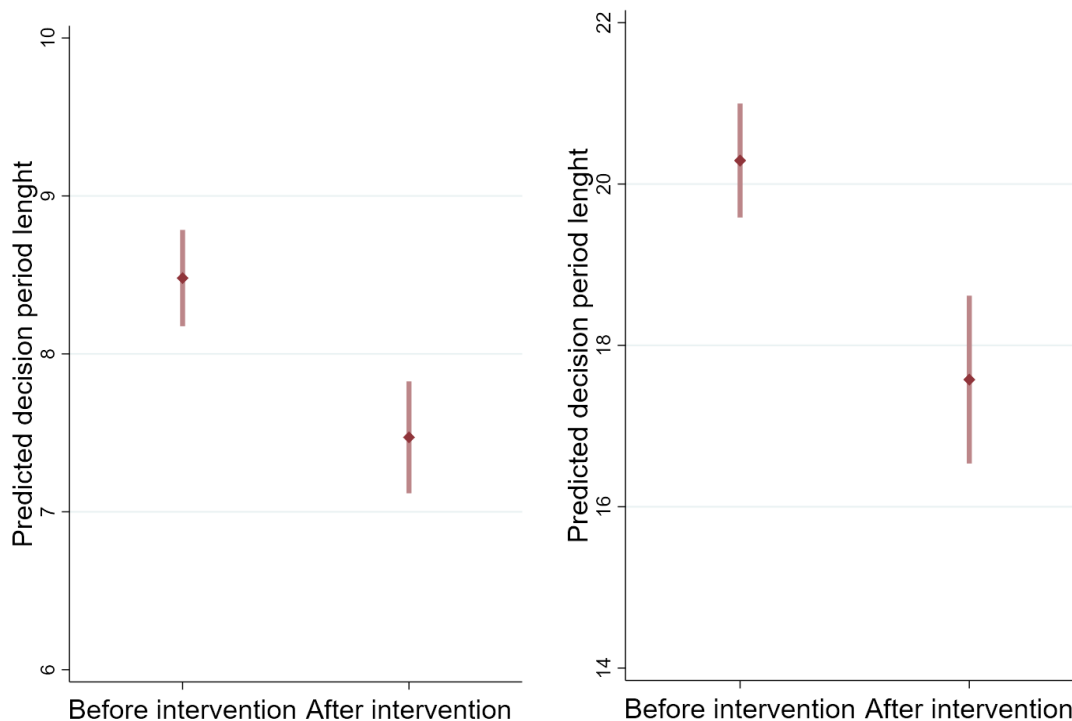
Panel B: without direct procedures





Decision period length also decreases significantly after the intervention (Figure 6): it is 1 day shorter on average if we include direct procedures and 2.7 days shorter without them. The differences are somewhat higher if we use the samples without the contract start date extrapolations.

Figure 6: Predicted decision period length with direct procedures (left) and without direct procedures (right) comparing a quarter year before and after the intervention



As we discussed above, data availability makes it hard to identify precise and robust effects of the transparency intervention. On top of that problem, there are several confounding factors around the intervention. As explained in section 4.1, the federal government changed right after the transparency reform, and the presidential election was coming within a year as well. Both can severely affect tendering processes. As our interviews suggested, there was a lot of commotion during the time around the election with people leaving office and new ones coming in and state support dwindling for many previous initiatives. In procurement, some purchases might have been blocked, and others pushed through quickly as prior research on election effects in public procurement has shown (David-Barrett & Fazekas, 2016).

5. Paraguay

Intervention description

The transparency intervention analyzed in Paraguay takes shape in the publication of an open contracting portal in April 2015. The open contracting portal has several components targeting different types of users thus showing the data in different formats, one of them being OCDS. The information below is based on desk research and stakeholder interviews (see Appendix 5.1 for the list of interviewees).



Context

Paraguay's recent transparency reforms go back to 2003 and have steadily evolved since. In the early days, the National Directorate of Public Contracting (DNCP) was created as the country's procurement oversight body for monitoring and publishing procurement processes. It has launched an integrated e-procurement system in 2007 which incorporated an increasing amount of functionalities over the following years. In 2012, Paraguay joined the Open Government Partnership (OGP), and following a change in government in 2013, the new administration began working towards fulfilling its OGP commitments and to comply with the new Law 5282/2014 on Free Citizen Access to Public Information and Government Transparency that came into effect on January 1, 2015.

Simultaneously, in 2013, the United States Agency for International Development (USAID) had a call for a governance and democracy program in Paraguay implemented by civil society, for which the non-profit organization Centro de Estudios Ambientales y Sociales (CEAMSO) won with a proposal to move forward the agenda of transparency.

CEAMSO had already been working with ministries in rolling out an open data initiative for the country, including training officials, educating people on open data, designing the central data catalogue and guides on its usage, for example. On the basis of this previous interaction, CEAMSO selected the most promising institutions for further initiatives, which included the DNCP. In 2014, CEAMSO pitched the idea of a transparency portal to the DNCP and offered the funding for its implementation, to improve the ways in which the information on procurement processes were being published on the DNCP's website. As the president at the time was pushing the transparency agenda and the national director of the DNCP was in favor of technological innovation (and the DNCP was already redesigning their website at the time), CEAMSO and the DNCP decided to implement the idea of an open contracting portal.

Implementation

Paraguayan procurement data was already publicly available prior to 2015 but not in a machine-readable format. Having compared different models of publishing procurement data, CEAMSO and the DNCP chose OCDS (then still under development) as the most appropriate structure for the publication of open contracting data. Hence, Paraguay's national public procurement data needed to be translated into the international standard format of OCDS, where a number of differences between the two data models transpired, as detailed below.

The differences between the data model of OCDS and the data model of public contracting of Paraguay required various attributes to be added. For example, the data model of OCDS provides for the existence of a single call for each procurement process, whereas in the Paraguayan public contracting data model there may be more than one call in the same contracting process, with the exception that only one of them can be active at the same time. The solution adopted was to create a release for each call corresponding to a particular procurement process, which can be grouped using the OCID identifier. Furthermore, concerning lots and items, the data model of OCDS takes into account the existence of items, which are included as attributes in the stages of call, award and contract, however, the existence of lots was not expected. This differs from the Paraguayan (and many other countries') contracting model, in which lots are used as logical units of item grouping. This is important at the time of making the awards, given that the allocations to a supplier can be in batches or by items or by total. The solution was to add a lots class that indicates the items that correspond to it included in the calls for tenders as well as in the contracts data.



Moreover, regarding contract awards, in the Paraguay contracting model, a call for tenders results in a single award process and document which may have multiple suppliers with specific lots and specific items awarded and different contracts for each of these providers. In OCDS, the supplier is related to the award level instead of the contract, hence the solution adopted was to add a supplier attribute to the contract class, in order to be able to identify the supplier of each particular contract, using the same provider class provided by OCDS. Furthermore, in Paraguay, amendments are modifications or extensions made to contracts, which have a new amendment code and are related to the contract of which they extend, while in OCDS, amendments mean changes in the attributes of a particular contract and overwrite its value. The solution adopted was to present the data of an addendum through the class contracts, with a number of new attributes to extend the contract ID and title, to include the DNCP's contracting code, and the amendment type (DNCP, n.d.).

As part of implementing the OCDS format, the DNCP divided the publication and availability of data in two different ways: API services and static file downloads. The API services make real-time data available for each phase of the tender (planning, call, award, and contract and contract modifications), while the download of static files makes historical data of the bidding processes available per year in CSV files, from 2010 onwards. Nevertheless, as the implementers looked for ways to increase the usability of open procurement data for different audiences, they decided to not only create the online, constantly updated set of data following OCDS, but also publishing other formats for non-specialist groups to download (as CSV). Moreover, they published the data in html grids for people to filter, browse, and download the filtered data, accompanied by easy-to-use visualizations for journalists to embed in articles (DNCP, n.d.). With these components in place, the new open contracting portal *Contrataciones* was ultimately launched in April 2015.

In the first release, the DNCP published all stages for all data in the e-procurement system from 2010-2014. From this launch, the work was continued to have data from an increasing number of institutions published on the portal. As of 2018, the entities publishing on *Contrataciones* have increased to: 13 executive power bodies, 9 legislative/judicial bodies, 17 departmental governments, 25 autonomous entities, 6 national universities, around 150 municipalities, and 19 other bodies. The published contracts include direct contracts, exceptional contracts, contest of tenders, leasing of real estate, national and international public bids, as well as including all 25 groups of goods or services or categories (fuel, medical products or instruments, construction, office supplies, etc.) (DNCP, n.d.).

The portal is integrated with the Public Procurement Information System (SICP), the DNCP's central procurement database and allows users to search for detailed information about planning, tender, award and contract documents by the institutions included, dating back to 2010. The portal automatically synchronizes with the database in real time, the data are machine-readable, and an API allows users to create new apps to reuse the data and combine it with other datasets. Nevertheless, for procurement officials entering the data in the DNCP's central database, the publication practice did not change as such, except that some information that were already in the system but previously remained unpublished, e.g. the tender.value attribute at tender stage, was required to be published.

Impact

Overall, it appears that the launch of the *Contrataciones* portal and the adoption of OCDS has increased the publication of contracting information, as new variables have been added in the process of translating the national publication format to the OCDS format. According to the interviews, the portal has made contracting data more reusable and understandable for the public. The structured data helped to uncover a number of corruption scandals, for example, the Minister of Education had to resign following the uncovering of overpricing practices, and DCNP adopted a series of new government-wide policies in 2016 to combat overpricing and establish rules on estimating costs. As a

result, the DNCP has reported increases in savings on procurement costs and decreases of adjustments and amendments to contracting processes (Open Contracting Partnership, 2017).

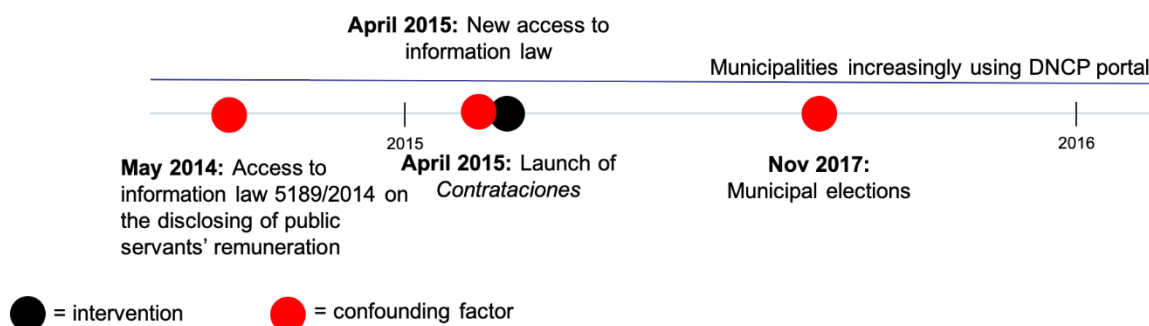
In addition, the DNCP has reported growing usage and media reports on procurement relying on data offered by the portal and there is a prominent example of a civil society organization using the data. The civil society organization *reAcción* has been a key user of the open contracting data newly available since the launch of *Contrataciones*. Since 2013, they were monitoring the part of the National Investment Fund FONACIDE that focuses on investments in education in the region of Ciudad del Este. They confirm that the open contracting portal greatly facilitated their work: before, it took them six to eight months to collect the documents and information needed for monitoring FONACIDE-related spending in education; after the launch of the portal it took a maximum of three weeks to identify all parts of a relevant procurement process. Nevertheless, *reAcción* also experienced persisting drawbacks, such as the fact that it is hard to match contracts to schools that were receiving funding. The founder of the organization, David García Riveros criticized that “the rules of the game underlying the data and technology have remained the same and still enable corruption”. Comparing Asunción and Ciudad del Este, he argues that evidence suggests that open contracting data only generates a noticeable impact when used for sustained grassroots action.

Confounding factors

Figure 7 lists confounding factors and developments that occurred in the same time period that we investigate such as large-scale political changes or reforms in procurement regulations or publication practices other than the one we identified as the main intervention. It is important to be aware of those interventions that potentially had an impact on the data and outcomes we observe.

Firstly, in May 2014 and April 2015, new Access to Information Laws entered into force (Law 5189/2014 and Law 5282 “Free Citizen Access to Public Information Act and Government Transparency Act” & Decree No. 4064/2015). Additionally, there were municipal elections in November 2015 and it was reported that municipalities were increasingly using the DNCP procurement portal throughout the timeframe of 2014-15.

Figure 7: Overview of confounding factors in 2014-2015 in Paraguay





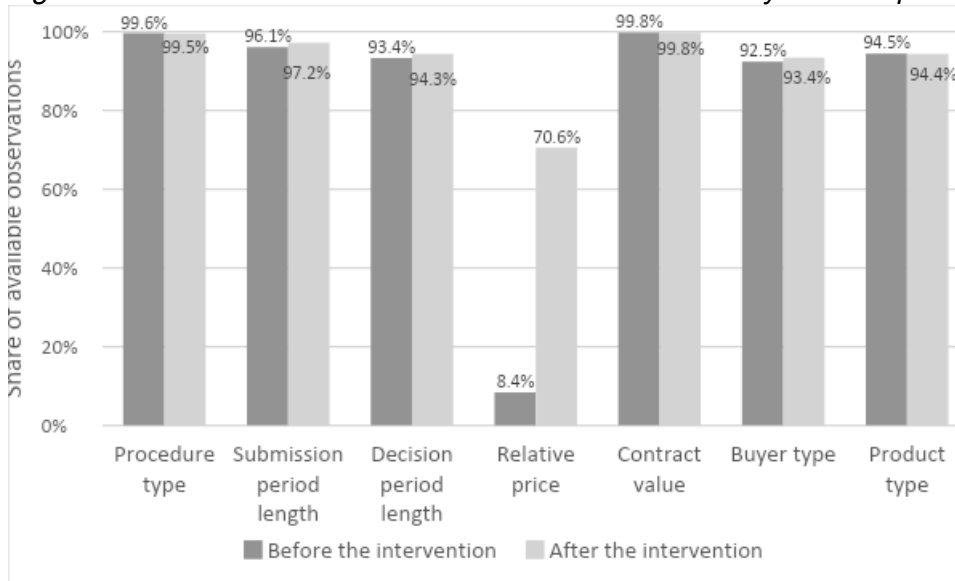
Data

The Paraguayan dataset consists of a combination of three sources: a) OCDS publication, b) yearly CSV publications¹⁶, and c) bidder data downloaded from contrataciones.gov.py. Although the OCDS publication helps to create the main chunk of the dataset, key variables had to be added from the two other sources such as the number of bids or procedure type.

To obtain the number of bids, we calculate the number of companies listed in the CSV publication that can be downloaded at the “*Oferentes Presentados*” section of each tender. Unfortunately, this variable has at least two problems. First, the number of bids can only be calculated at the tender level, whereas multiple contracts can be awarded by each tender. Second, as our interviews underlined, buyers are not obliged to publish all bids at the *Contrataciones* website, it is enough to make the winner companies’ name public. This means that the share of tenders awarded without competition – for example, tenders concluding one contract with only one bid received or concluding three contracts to three different companies and showing three received bids – will be overestimated.¹⁷ Given that the number of bids variable is constructed by us, it has a value for each contract that we consider awarded – hence we do not report the share of missing values separately.

Figure 8 shows the share of available data for the key indicator and control variables. Procedure type – that is obtained from the yearly CSV publications - has barely any missing values, and the missing share for submission and decision period, tender level contract value, buyer and product type is always less than 10%. As no information is published on the type of bidders, we constructed it based on the buyer’s name (see Appendix for more detail). Unfortunately, relative price (tender level final price divided by estimated price) has barely any values before the intervention, hence we exclude this indicator from the analysis.¹⁸

Figure 8: Share of contracts with available data in the analyzed time period (N=26,121)



¹⁶ <https://contrataciones.gov.py/datos/convocatorias>

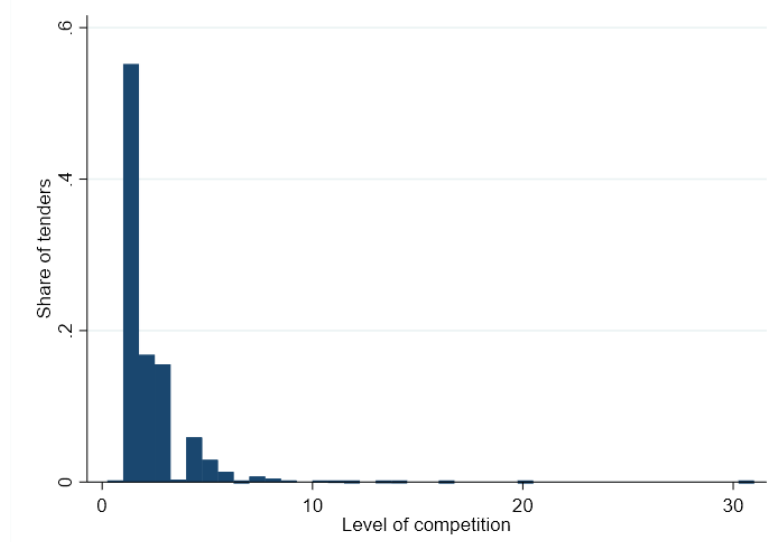
¹⁷ According to our interviews, losing bidders are only missing for around 10% of the tenders, and the reporting practices improved over time.

¹⁸ Tender level estimated prices were published in less than 10% of tenders before the intervention took place.



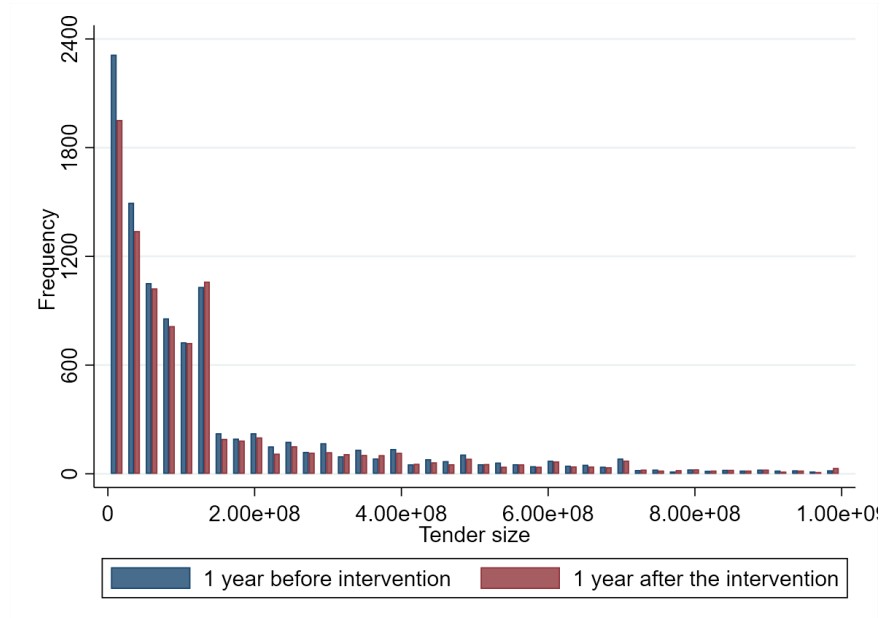
Given that we only have tender-level data on the number of bids and winner companies, we define a level of competition variable as the ratio of the number of unique companies that submitted a bid on the tender and the number of awarded companies per tender. This indicator captures whether the whole tender – irrespective of individual lots or items – was competitive or not. For example, a tender awarding 2 companies and receiving 6 bids will take the value 3 for the level of competition indicator, whereas the same tender receiving only 2 bids will have the indicator value of 1. Figure 9 shows that there are many tenders with the same number of winners as received bid – the indicator is exactly 1 for around 50% of the tenders.

Figure 9: Distribution of the level of competition per tender +/- 1 year around the intervention (N=14683)



The number of unique tenders that have at least one awarded contract does not show any significant changes after the intervention (Figure 10). The graph also shows some manipulation of the tender value below PYG 20m, that remained unchanged after the intervention.

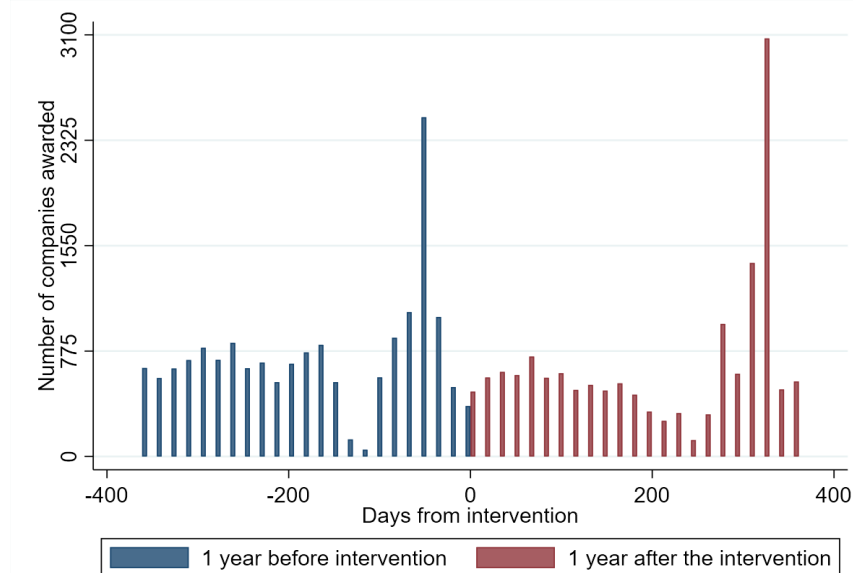
Figure 10: Number of unique tenders with at least one winner by tender size one year before and after the intervention





The number of awarded contracts shows significant seasonality based on the call for tenders publication date (Figure 11).¹⁹ The number of tenders is much higher in the earlier months of the year, while barely any is initiated in December.

Figure 11: Number of awarded contracts before and after one year of the intervention



As municipal governments' reporting practices were reported to be problematic (e.g. not all of them publishing their contracts), we only include non-municipal buyers in the analysis.²⁰

Results and discussion

Regarding the contract level indicators, we found two significant changes in Paraguay. Our recurring bidder indicator shows a significant 5% increase. However, the submission period got longer by around 8 days on average²¹. As it is shown in Figure 13, it seems that contracts with extremely short bid submission periods became less common after the intervention (red bars are significantly lower). Our interviews suggest that this increase might have been caused indirectly by the introduction of an electronic complaints system in 2015. Buyers might have been pushed into extending advertisement periods due to bidders' complaints about the tendering processes. Changes in the procedure types used might give an alternative explanation.²² Buyers might have switched to procedure types with a longer advertisement period requirement. Although further research is needed, the increase of recurring winner companies might be explained by low (IT) capacity or new companies not being able to use the new electronic system – or parts of it. Non-open procedures were used in around 67% of cases which remained unchanged after the intervention as well.

¹⁹ Note, that the distribution of contract award publication date shows a very different picture: most contracts are awarded in December. However, our research question evaluates whether there is any change in procurement outcomes after the intervention, hence we need to split the sample based on the tendering process' start date.

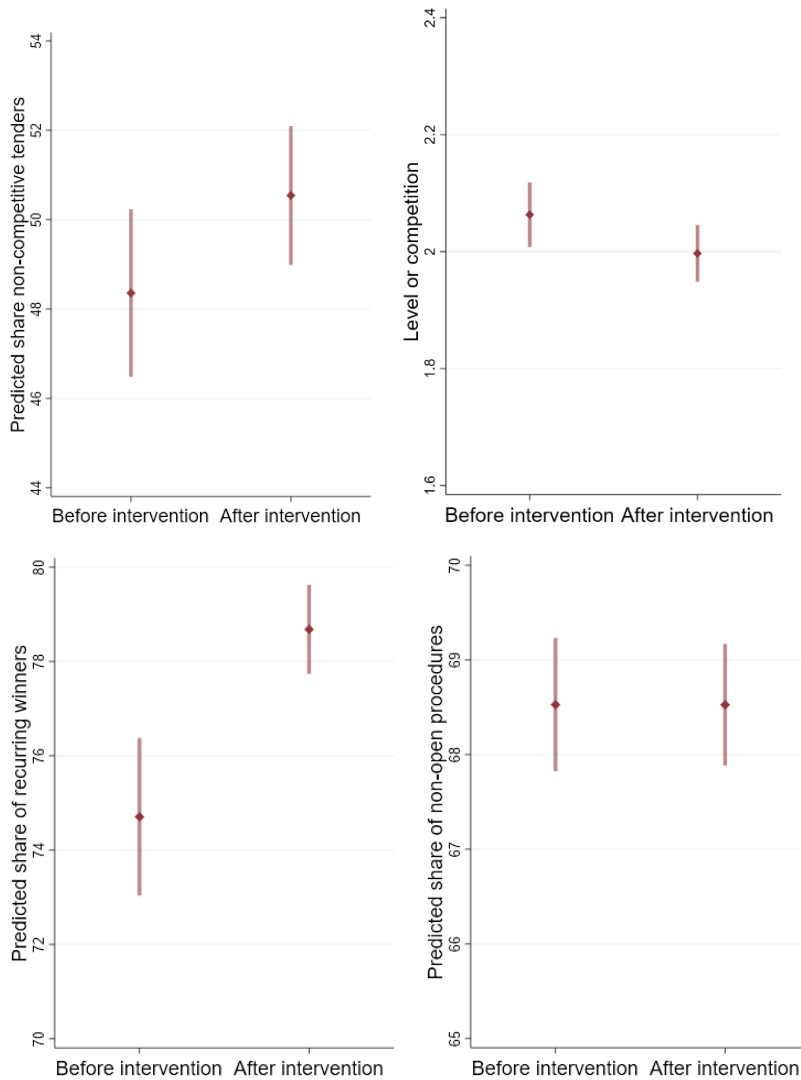
²⁰ Our interviews suggest that around 17% of municipal buyers (our of 254 municipalities) were not publishing their awards even in 2018.

²¹ This increase is not driven by outliers, we have checked several different scenarios and we have found comparable increase in bidding period length.

²² Note, that the overall share of open vs. non-open procedure types do not have to change, only the procedure types within these broader categories.



Figure 12: Predicted share of non-competitive tenders, level of competition, share of recurring winners, share of non-open procedures and submission period length comparing one year before and after the intervention



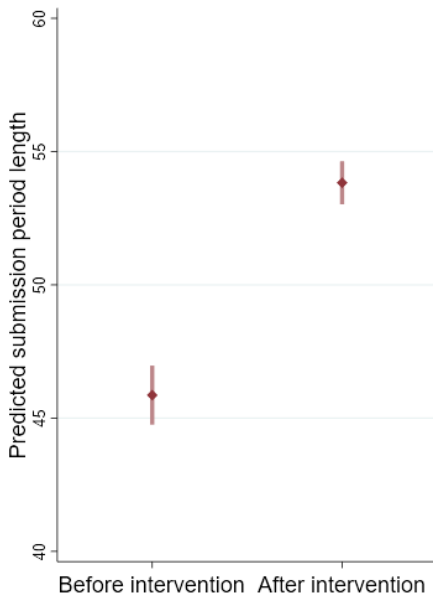
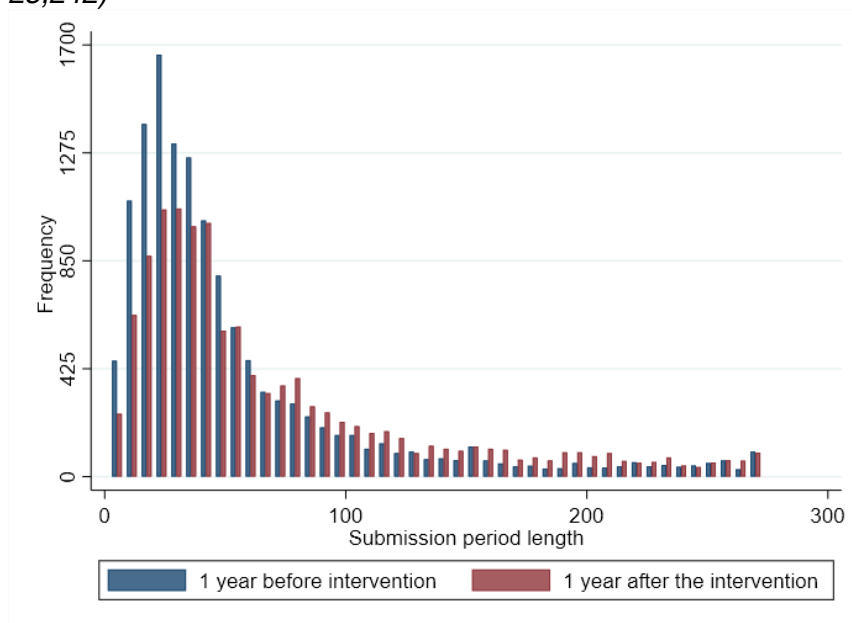
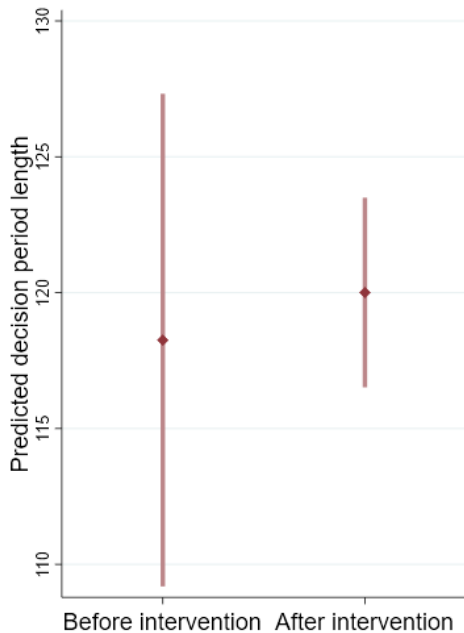


Figure 13: Distribution of submission period length one year before and after the intervention (N= 25,242)



As we introduced in the Methodology section, we measure the institutional efficiency by decision period length. Figure 14 shows that buyers take the same amount of time for announcing a decision even after the intervention took place.

Figure 14: Predicted decision period length



Unlike in the two other countries, the indicators related to the level of competition have to be calculated at the tender level for Paraguay. As it was explained above, we can only define two indicators: a) non-competitive tenders – the ones receiving exactly the same number of bids as the number of companies awarded – and b) level of competition - that is the ratio of number of bids and the awarded companies per tender. As the data on received bids is not reliable, because buyers are not required to publish all received bids, our estimations can be downward biased. First, our results are only significant at a 10% significance level and show a roughly 2 percentage points increase in the share of non-competitive tenders. To put it differently, the share of non-competitive contracts potentially increased from 48% to 50%. Second, we find a 4% decrease in the level of competition which is also only significant at the 10% level.²³ However, these estimations cannot be interpreted as the causal effects due to unclear sample selection, given the ambiguity around bidder reporting.

Similarly to the case of Mexico, data quality poses a challenge for evaluating the Paraguayan intervention as well. Even though the publication practices are significantly better (for example, lower share of missing data, and it is relatively easy to connect data sources), the problem around the level of storing information (tender vs. item) and underreporting bidders' names make it hard to assess the intervention effects on competition and corruption risks (see Data section). Unfortunately, until reliable data is published on the number of bids, all results have to be treated with caution.

Further problems might arise from the fact that municipal elections were held roughly half year after the intervention. Municipal governments were also required to use the system around the intervention. Although we do not have any information on restructuring state spending from central bodies to local authorities, it might have happened during the time period in question. Municipal elections might have caused central procurements to be fast tracked which could have easily affected spending structure or

²³ We also checked the result without outliers – e.g. without tenders with extremely high number of bids per awarded company – and the estimations remain roughly unchanged.



market openness – that might lead to some bias in our results (for example, underestimating positive effects).



6. Slovakia

Intervention description

This section provides a detailed insight into the transparency intervention analyzed in Slovakia, namely the legislation on mandatory online publishing which entered into force in January 2011. The information below are based on desk research and stakeholder interviews (see appendix 5.1 for a list of interview partners).

Context

Following parliamentary elections in 2010, in the run-up to which corruption scandals and transparency promises were major campaign issues, there were a number of major changes to public procurement in Slovakia. The new government showed a strong commitment to making public contracting more transparent and efficient and one of the most cited reforms was a new Freedom of Information law on the mandatory publication of all public contracts on a centralized online repository which was one of the cornerstones of the new government's proclamation. The reform was strongly pushed by the Minister of Justice, Lucia Zitnanska, who had promoted the idea that a contract is only effective if it is published since 2009.

Implementation

The new legislation, known as Act No. 546/2010 Coll. supplementing Act No. 40/1964, came into effect on 1st January 2011 and the implementation was led by the Slovak Ministry of Internal Affairs and the Public Procurement Office which created the new online contract repository. Under the new law, all government entities were required to publish almost all contracts, receipts and orders online. Government contracts were not considered valid without having been published within three months of being signed. Notably, the entire process was completed within two months and technical and financial issues were reportedly minor.

Whereas before 2011, it was only obligatory to publish a report of the tender process which included information about a contract, following the enactment of the law contract documents from national and municipal level procurement were made available online at the [Central Register of Contracts](#). This online contract repository was disconnected from public procurement databases, however after 2nd of April 2011, an amendment to the public procurement act introduced the obligation to publish contracts additionally on the webpage of the Public Procurement Office (PPO). Also, the procuring authorities became obliged to send, after concluding a contract or after ending certain other procurement procedures, relevant documents (as hardcopies or by electronic means) within seven days of publication to the PPO. The PPO publishes virtually all procurement information, including contract notices, tender documentation, all delivered bids, amendments, the contract itself, the list of subcontractors, and judicial verdicts.

Inevitably, there was some pushback and opposition to the new legislation. The most vocal complaints came from mayors at the municipal level worried about being able to meet the various requirements, given their often quite limited technical and financial resources. They were particularly concerned about the law requiring all receipts and orders in their municipalities to be made available on the central registry, which they regarded as especially cumbersome. The government took a step back in the following months and in January 2012, the requirement was repealed. Now, only metadata needs to be posted on the registry. Also, they changed the requirement for the publication of scanned copies of receipts limited to those over 1000€ for municipalities and those over 3000€ for others. From 2012,

only the lists including subject, supplier and price of orders and receipts were to be published automatically, not their copies.

Furthermore, a number of different exemptions sprung up during the first year of the law's existence. In the original law, only seven exemptions to the publication regime were listed. They concerned individual work contracts, national security, diplomacy and business done on commodity exchanges. A year later, there were already 20 exemptions, for example, state-owned enterprises (SOEs) received exemptions and were only required to publish full contracts when they were out of scope of their core business.

Users

Transparency International (TI) Slovakia has generated statistics comparing 2011 to 2014 regarding usage of open contracting portals and media coverage of public procurement²⁴, which demonstrate a clear upward trend indicating that the mandatory publication of contracts has generated awareness and interest in open contracting. The usage was concentrated in journalists, but CSOs or individuals also checked some contracts, particularly very large ones. Nevertheless, the newly available information was not used extensively for analysis. This might be due to the fact that the information was not required to be published in structured datasets but were often published as files without machine-readable text. Therefore, citizens' ability to search and analyze contracts was limited by an absence of metadata and inter-linking between different databases (for example, databases containing tender notices and invoices and receipts related to a tender).

Additionally, amendments to contracts are often published in isolation, without linkages to the original contract, rendering it difficult to grasp the full context or history of a particular procurement process. Regarding the private sector, it is only known that businesses were initially wary of the idea of transparent contracts and worried about publishing sensitive information, but it remains unclear whether they actively used the newly available information.

Impact

Gabriel Šípoš of TI Slovakia categorized this transparency intervention as one of the most large-scale ones in the last 15 years, because he believes that it truly changed the way in which tenders were run compared to before 2011. One important factor here (see also confounding factors below) is that hundreds of officials were replaced in public entities ranging from SOEs to procurement departments. In other words, while part of the impact is likely due to the regulatory change making contract publications obligatory, another part of the impact is probably due to changes in staff, and an overall shift in priorities and values in public contracting as 2011 meant a change in the overall environment of procurement and government transparency at large.

Nevertheless, it is agreed that corruption in public procurement is still happening and remains hidden. Although the possibilities for public control are abundant, few people are aware of them and use them systematically due to data overload and a lack of structured datasets. Hence, the challenges that still remain are linked to the need for improvement in the data publication, so that contract monitoring can be done using the data in an effective and time-efficient way. In addition, Slovakia's almost 3000 municipalities (many of them being villages) are each in charge of their own procurement system, meaning that staff qualification and publication standards are often poor.

²⁴ For details, see: Sipos, G., Spac, G. & Kollarik, M. (2015). *Not in Force Until Published Online: What the Radical Transparency Regime of Public Contracts Achieved in Slovakia*. Transparency International Slovakia. Retrieved from <http://transparency.sk/wp-content/uploads/2015/05/Open-Contracts.pdf>

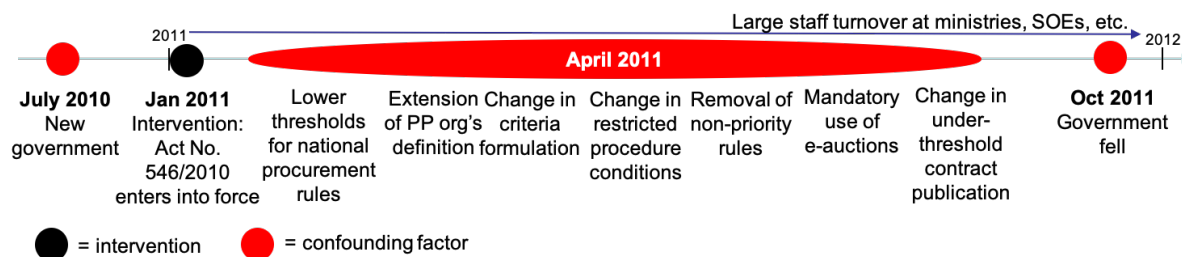


Confounding factors

The following graph lists confounding factors and developments that occurred in the same time period we investigate, such as or large-scale political changes or reforms in procurement regulations or publication practices other than the one we identified as the main intervention. It is important to be aware of those interventions that potentially had an impact on the data and outcomes we observe.

In Slovakia in 2010 and 2011, there is a large variety of confounding factors. First, in July 2010, a new government entered into office with a strong transparency agenda. Second, in April 2011, there was an extensive reform of the public procurement law which introduced a number of important changes: the lowering of thresholds at or above which contracting authorities should follow national procurement rules (from 120,000€ to 20,000€ for construction works and from 30,000€ to €10,000 for goods and services); the extension of definition of organizations that have to follow public procurement legislation; the requirement to explain necessity of every required condition in call for tenders; the raise of the lower limit of candidates that must be invited in the restricted procedure from 5 to 10; the removal of separate rules in awarding non-priority contracts (e.g. legal services, professional education) which formerly had less strict rules; the mandatory use of electronic auctions (formerly optional) in above EU-limit contracts; and the obligation to publish an invitation for under-threshold contracts in the Office Journal (previously only on procurer website). Lastly, the government fell following a vote of no confidence in October 2011 and throughout this whole time period, there was a large staff turnover at ministries, SOEs, and other public institutions.

Figure 15: Overview of confounding factors in 2010-2011 in Slovakia



Data

We use the Slovakian DIGIWHIST dataset for evaluating the Slovakian analysis.²⁵ The most significant problem with Slovakian data is the immense number of different publications that need to be collected, that were also changed twice (e.g. 17 different call for tender announcements were in use in the last 10 years). This required using several tailor-made parsers to collect information from all the differently structured announcements.

The share of available data in the close proximity (+/- 1 year) of the intervention differs a lot by variables. Contract award dates, buyer and product types are always available, and procedure type and the contract level final prices are also available for at least 96% of the contracts. However, call for tender

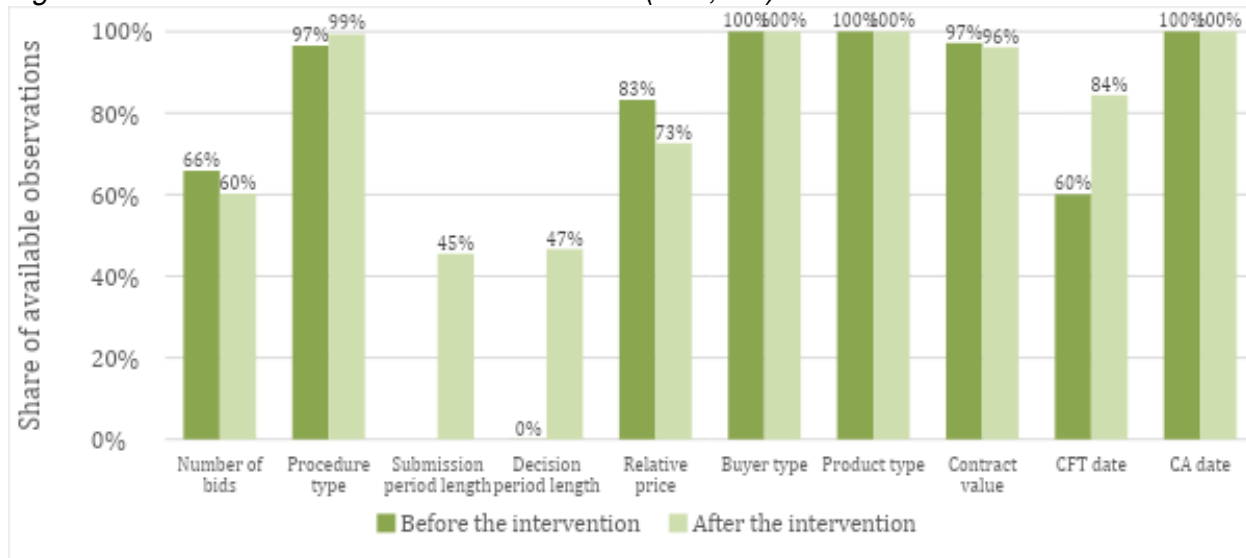
²⁵ All data was collected from the Slovakian Public Procurement Authority's website - <https://www.uvo.gov.sk/>. A detailed description of the data collection and cleaning can be found online - <http://digiwhist.eu/wp-content/uploads/2018/03/D2.8-revised-version-FINAL.pdf>.



date is 60-84%, the number of bids is only 60-66%, while the relative price is 73-83% available²⁶. Due to missing dates – submission period and decision period lengths are almost totally unavailable before the intervention took place – we exclude these indicators from the analysis.²⁷

In order to sort tenders before and after the intervention, we used a) call for tender dates and b) extrapolated the call for tender dates (based on contract award dates) where it was not available.²⁸

Figure 16: Share of contracts with available data (N=4,566)



²⁶ Note that relative price is defined as the final price divided by the originally estimated price at the lot level and we replaced all relative price values as missing if they were below 50% or above 130%. Apparently, tender level final price is much more widely available compared to contract level final prices.

²⁷ This is primarily driven by the lack of bid deadline dates. It is missing for 2,611 contracts out of 4,566.

²⁸ We followed the same steps as explained in the Data section for Mexico.



The number of unique tenders that have at least one awarded contract increased significantly after the intervention. However, as our background interviews uncovered, this is also driven by other factors, such as lowering the threshold for publication or extending the scope of organizations that have to follow procurement regulations (see previous section). For example, significantly more tenders are published around 50k EUR in 2011 after the intervention (Figure 17). Furthermore, the overall number of contracts is also significantly higher regardless of tender value size.

Figure 17: Number of unique tenders with at least one winner by tender size before and after the intervention

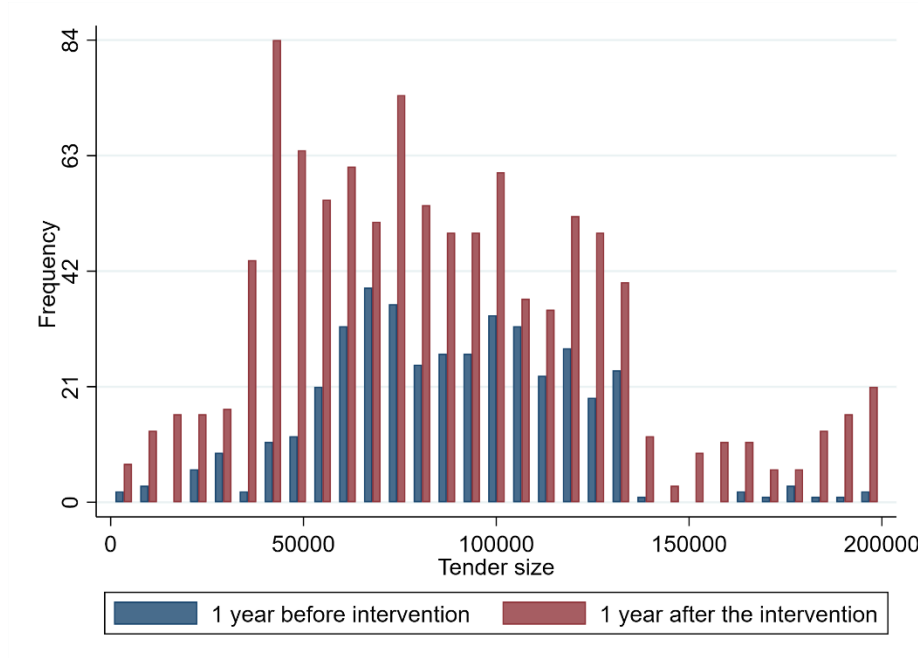
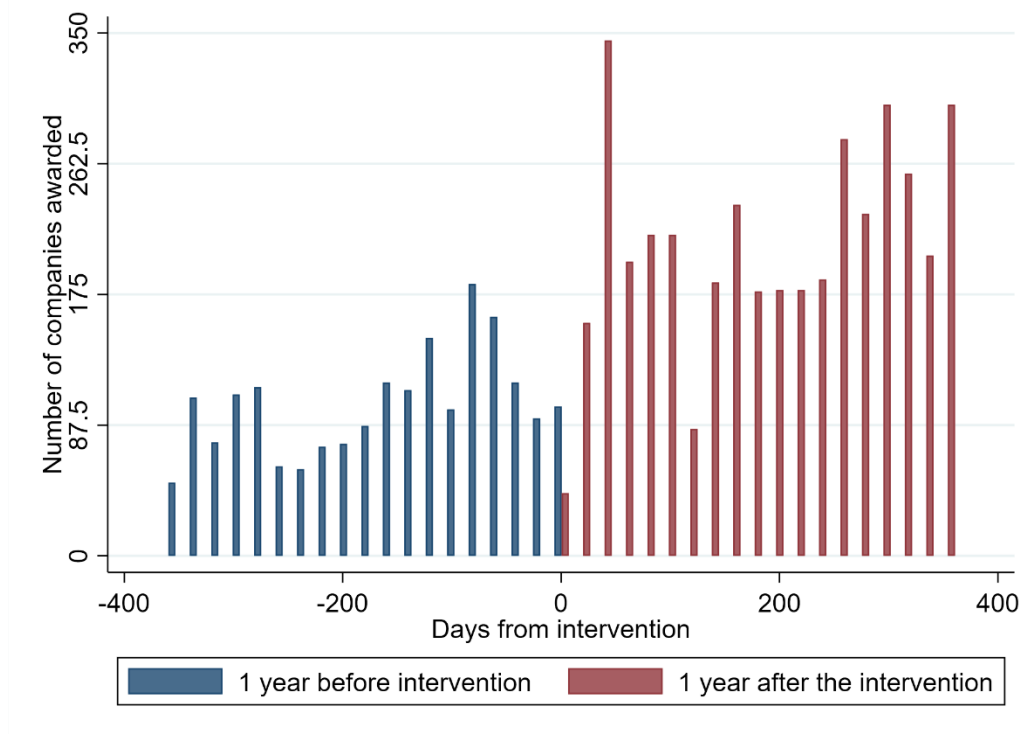




Figure 18 shows the same picture from another angle: the number of awarded contracts significantly increases after the intervention.

Figure 18: Number of awarded contracts before and after 1 year of the intervention



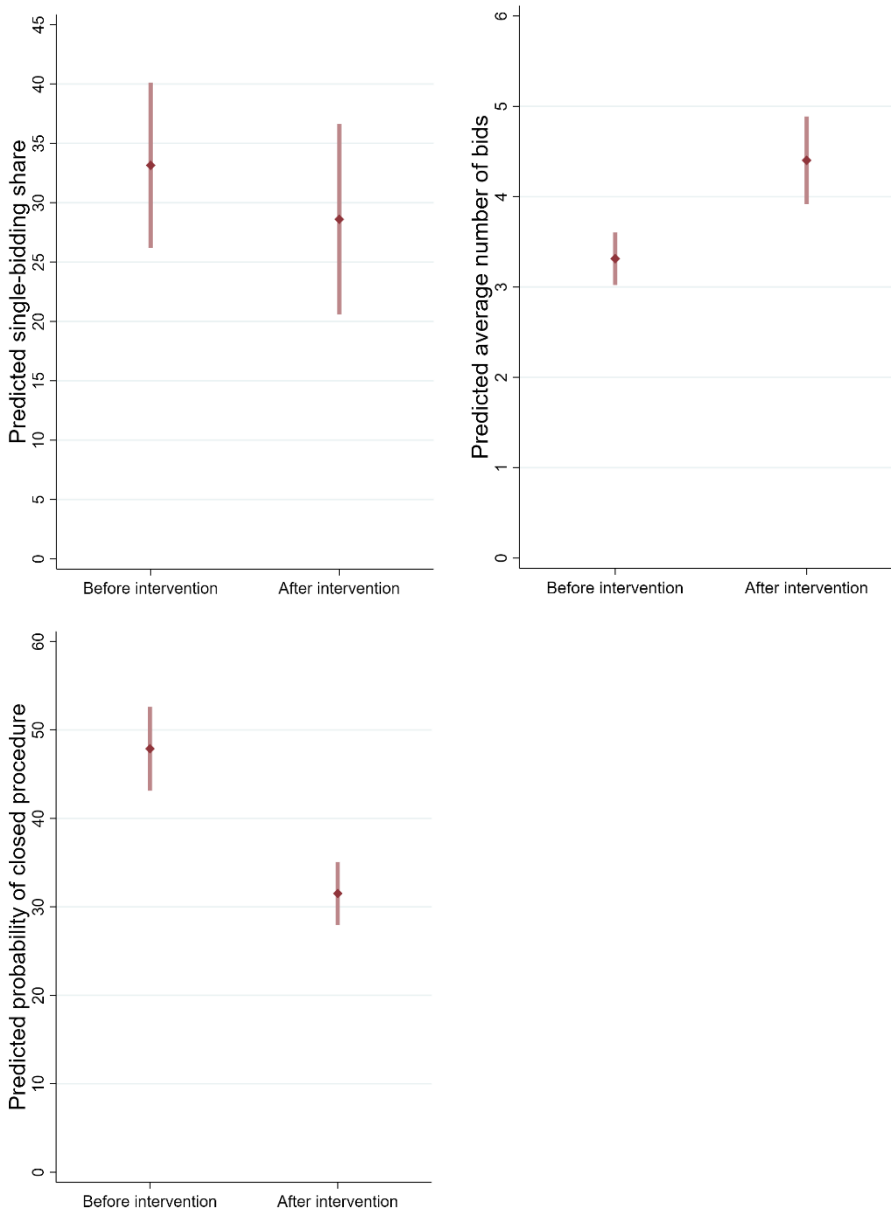
Results and discussion

As explained in the previous section, the evaluation of the Slovakian transparency intervention is problematic given the many other reforms taking place in the same time period. In the current analysis, we only used matching as explained in the Methodology section, comparing similar tenders before and after one year of the intervention. This method filters out atypically small or large tenders, but probably fails to exclude those tenders that were just below the original publication threshold – i.e. it does not handle regulatory changes entirely.

Our estimations show no significant difference in the share of single-bidding contracts. However, the number of received bids increase by one per tender from 2010 to 2011. Regarding closed procedures we apply a lenient definition in Slovakia. Besides negotiated procedures, we also mark restricted procedures as closed. Without including restricted procedures in the closed procedure category, there are not enough contracts to estimate the potential effects of the transparency interventions. Our estimation shows a significant 16 percentage points decrease in the share of non-open procedures used.

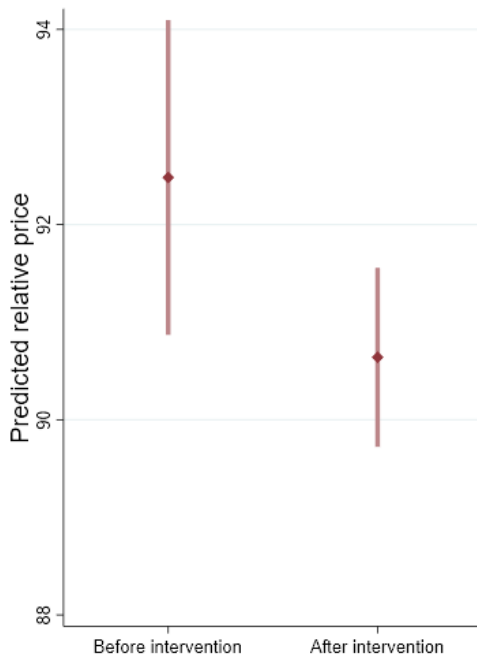


Figure 19: Predicted changes in single bidding, number of bids received, non-open procedures one year before and after the intervention



As both final and the estimated prices are available, we can also evaluate the possible transparency effects on prices. The relative price shows a 1.9% decrease after the intervention, that is only significant at a 10% significance level (Figure 20). However, this might be related to the many other interventions that took place around the transparency intervention.

Figure 20: Predicted changes in relative price from one year before to one year after the intervention



To cross-check our estimations, we also compared a smaller subset of tenders that exclude all tenders a) that are below EUR 30k and b) that are managed by buyers only having tenders after the intervention took place. These filtering rules significantly lower the number of observations (see Table 16 Appendix 8.6). Unfortunately, no silver-bullet solution exists for picking comparison groups. For example, we might exclude buyers that were regulated in 2010 but had a name change in 2011. While these buyers are essentially the same, our algorithm simply excludes them from the analysis as we cannot connect their contracts due to the name differences.

The results are partly different from the above (see Tables 12 and 13 in Appendix 8.5). First, the share of single bidder contracts shows a significant 19 percentage points decrease, while the number of bids increases by two per contract. While both the share of non-open procedures and relative price are lower, the differences are not significant. However, these results have to be interpreted with caution as the sample size got eventually very low.

Evaluating the transparency intervention's short-term effects has several pitfalls, as we explained before. The biggest obstacles stem from the multiple regulatory changes taking place around the time in Slovakia. For example, the change in the regulatory threshold might have altered the composition of tenders. Buyers might have been advertising different contracts, that led to new companies entering the market. The same logic applies to extending the scope of buyers regulated by procurement law. New buyers themselves might attract new companies or companies can simply invest more into bidding on procurement markets as the market became bigger. Therefore, it is hard to assess whether it is the changing rules or the transparency reform alone that affects the procurement market outcomes.

Other interventions – such as making electronic procurement mandatory also have unclear effects. Whereas in the long-run it probably leads to more efficient competition, these changes can be disrupting in the short-run until all buyers and companies get used to it. The turbulent political context around the intervention - a newly government got into power in 2010, until their fall in October 2011 – could also have severe effects on procurement outcomes. For example, certain purchases could have

been pushed through the administration quickly, which could have led to non-competitive tenders, hence making transparency effects lower.

Our evaluation focuses on short-term effects. As it was explained in the Theory of change section, the effects of easier data access might not come immediately. Several stakeholders – companies looking for contracts, buyers using data to improve their tendering processes or journalist writing about seemingly mismanaged contracts – need more time to learn how to use newly available information. For example, the seemingly unchanged share of single-bidder contracts (based on our first sample) might be explained by the fact that non-competitive, higher corruption risk sub-markets are lengthier to break, whereas already competitive (i.e. multi-bidder) contracts benefit from more transparency right away.

7. Conclusions and common lessons learnt

Enhancing the transparency of government in general and of public procurement processes specifically has been increasingly on the agenda of governments, civil societies and businesses underpinned by expectations about impact on desirable societal outcomes such as high-quality public services, procedural justice or public sector integrity.

In an attempt to start filling the evidence gaps on the impact of specific transparency interventions such as open contracting reforms, this research analysed procurement datasets containing public contracting data to measure outcomes such as corruption risks, institutional efficiency, level of competition, and prices. We compared those outcomes for tightly matched groups of contracts from a short timeframe before and after the selected open contracting reforms. Through interviews, we additionally explored different stakeholders' roles as drivers or users of increased transparency.

Based on the availability of sufficient quality procurement data and recent open contracting reforms, we selected three notable cases from different countries: Mexico, Paraguay and Slovakia. In a nutshell, the selected open contracting reforms predominantly led to more data in a more accessible format on already regulated public tenders to be published by the government for the general public, including civil society, businesses, but also government agencies themselves. Each of these interventions were accompanied by only limited publicity, workshops, and trainings, hence we consider the analysis to estimate the effects of change in data publication largely on its own holding demand for data, user skills, and related environmental conditions constant. In other words, the investigated reforms mainly modified data quantity and accessibility meaning that we largely estimated the 'pure' data format and publication impact.

To inform our quantitative analysis and fully understand the open contracting reform in question we firstly conducted desk research and in-depth interviews with key stakeholders and experts. The quantitative analysis used public procurement databases to compare very similar contracts awarded before the reform against those awarded after it to provide an estimation of the reforms' short-term causal effect on procurement outcomes. In order to compare as similar as possible contracts from the period before and after the reform, we matched them according to essential characteristics such as characteristics such as contract value, sector, or buyer type.

Following this methodology, a crucial challenge was to find the right timeframe and comparable contracts before and after the open contracting reforms. Balancing the considerations of trying to avoid distortions due to seasonality bias and confounding factors in longer time periods, against the nature of such reforms requiring time to reach impact, we selected a one year before and after time window. However, due to data availability constraints, we had to use a quarter year timeframe for Mexico. In



addition, for all three cases, data quality issues remained a challenge even after combining data from multiple sources and applying a range of data cleaning procedures.

In terms of substantive results, in the case of **Mexico**, our results suggest that the reform only increased the level of competition in tenders that were already competitive, but that it also increased the share of high-corruption risk, single-bidder, contracts in the very short-run. Such simultaneously positive and negative effects of more transparency might be driven by strategic responses of actors trying to avoid more external scrutiny (David-Barrett & Fazekas, 2018). Also, the average amount of time that buyers need to publish a decision on a tender became shorter by 1 to 2.7 days. Nevertheless, all our estimations could only be based on the very short time-window of a quarter year before and after the intervention meaning that the results may under or overestimate the true short-term effects. This ambiguity is further amplified by the fact that federal elections took place around the same time as the intervention. Therefore, our results are only tentative and capture very short-term effects.

Paraguay has the highest quality dataset allowing for the most robust estimation in our sample, however the likely bias in recording bidders means that estimations related to bidder numbers specifically should be treated with caution. The short-term (1-year) estimations regarding bidder numbers show substantially small and statistically weak deterioration with the share of non-competitive tenders increasing from 48% to 50%, while the level of competition decreased by 4%. These weak, albeit counterintuitive, results only hold if reporting discipline remained unchanged throughout our 2 years observation period, however reporting discipline is likely to have improved hence making our estimates conservative. For the share of recurring winners, we find a 5% increase, that is a deterioration, which is both substantive and statistically significant. While this result goes against our postulated theory, it is consistent with theories predicting complex, efficiency-enhancing technologies exacerbating market concentration. At any rate, more research is needed to better understand the reasons behind the identified effects.

In the case of **Slovakia**, a number of other regulatory changes took place shortly after the transparency intervention of mandatory comprehensive online publishing of procurement documents. These other regulatory changes could also have an effect on the procurement market outcomes we analyse, for example the scope of public buyers was expanded and value thresholds for mandatory publication were changed shortly after the transparency intervention took place. To explore alternative options, we used a narrow and a broad sample for estimating the differences in our indicators from before and after the intervention. The broad sample only filters out atypical contracts, while the narrow sample also filters out contracts that are potentially related to newly regulated buyers and that were below the original publication threshold which significantly reduced the sample size.

Based on the broad sample, we found no significant difference in the share of single bidder contracts, however, the number of received bids per contract increased by one bid on average. Also, the use of non-open procedures decreased significantly. Relative prices (final price divided by the initially estimated price) decreased by 1.9 percentage points. In contrast, based on the narrow sample, we found a decrease of 19 percentage points in the share of single bidder contracts, and the number of bids per contract increased by two on average. However, the share of non-open procedures and relative prices do not change significantly.

Overall, given the premises of our methodological approach and data constraints, our findings generally do not unearth statistically significant and of sizeable impact of the transparency reforms in the three countries' public procurement datasets. While some individual effects are statistically significant in each country, neither of them reveals a consistent picture of systemic impact that is robust against alternative specifications (e.g. using different subsamples), proxy indicators (e.g. across all indicators measuring

the same underlying concept such as competition), or largely immune to major alternative interventions (e.g. government change). The most consistent statistical effects are identified in Slovakia where, unfortunately, a plethora of intervening changes happened during the period after the transparency intervention such as a government change triggered by a snap election or an extension of e-auction use. Most of these changes are likely to contribute to the main outcomes we track, attributing effect to the transparency intervention problematic. Therefore, the effects of the data publication interventions investigated are deemed largely null with tentatively promising early signs in selected cases where a longer impact time window or more investment into user take-up may lead to robust, sustained, systemic changes.

The publication of more and better public procurement data certainly goes a long way to make government contracting more transparent. Nevertheless, after aiming to estimate statistically significant effects of open contracting reform, our results are in line with prior research suggesting that it takes more time and further investment into the supporting data environment to significantly improve a public procurement system through such reforms. As the interviews indicated, open contracting data need to be transformed into products that are useful for the public, civil society, and private sectors and that can guide clear policy recommendations. In other words, our research has revealed that increasing the amount and accessibility of data publication in public procurement is unlikely to lead to short term improvements in procurement outcomes without substantial investment in the wider data use ecosystem involving data users, such as CSOs, journalists, the judiciary, and businesses. What remains to be seen using alternative methods and data sources if there are small-scale impacts on the short term which may build up over time in the right supporting environment.

Putting these policy-relevant findings in the light of prior research on transparency in public procurement, it furthers our understanding that it is not the mere availability of more data which matters rather the timely and easy availability of the right information for the right actor. For example, data on bidding opportunities matters most to bidding firms who are both motivated and able to act on it (Bauhr et al, 2019). Or the reliable provision of contract performance data to local civil society groups who are also supported by law enforcement agencies (Lagunes, 2017).

Lastly, we can conclude that data quality remains a challenge even in countries with good quality data by global standards. Importantly, data needs to be of high quality throughout the whole comparison period both in terms of its scope, the availability of data fields and the truthfulness of the recorded information. However, as a second-best alternative, the data has to at least remain consistent, that is of similar scope and quality for both before and after the transparency intervention which is often problematic as transparency interventions tend to impact on publication formats, practices and effort, hence data quality.

Transparency reforms improving data scope and quality is highly valuable on its own as open data is as good as the data going into it; however, evaluating such reforms will remain a challenge as the reform influences the data used to measure outcomes as well as potentially the outcomes themselves. Our interventions were selected specifically to keep data quality constant. The OCDS publications made public procurement data available in a standardized format in Mexico and Paraguay, due to regulatory deficiencies the data quality remained problematic in spite of the interventions. For example, if collecting information on the number of received bids is not mandatory, it is hard to understand market competition.

Countering such challenges, subsequent research should adopt a mixed method research strategy drawing on a range of data sources rather than merely using administrative data on public procurement.



It might make sense to combine procurement data with interview evidence, document reviews and survey data. Surveying data users – for example, public buyers – could reveal whether and how open data is used, and how it could be made more useful.



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Appendix

A. List of interview partners

Mexico:

- Enrique Zapata, former General Director at National Digital Strategy, now at SESNA - Sessions of the Governing Body of the Executive Secretariat of the National Anticorruption System
- Rafael García Aceves, formerly at *Transparencia Mexicana*, now Director of Open Contracting at Mexico City Government
- Pablo Montes, Anti-Corruption Coordinator at IMCO - Mexican Institute for Competitiveness
- José Antonio García Morales, Director of Access to Information Policies at INAI - National Institute for Transparency, Access to Information and Data Protection

Paraguay:

- David García Riveros, founder of ReAcción, a watchdog NGO monitoring the implementation of the FONACIDE fund in the education sector
- David Rees, Research and development coordinator, DNCP
- Juan Pane, external consultant for the creation of the open data portal for DNCP funded by USAID

Slovakia:

- Gabriel Sipos, Head of Transparency International Slovakia
- Jozef Kubinec, Head of Works and ICT, Procurement Department, Ministry of Interior
- Michal Garaj, Department of the Council of the Public Procurement Office



B. Interview guides

General introduction for interviews

1) Introduction of interviewer

2) Introduce the purpose of the research:

- a) to produce robust evidence on the impact of large scale transparency interventions using different countries' public procurement datasets
- b) to conduct a before-after data analysis exploring whether the intervention had any short to mid-term effects on the level of competition, prices, corruption risks, institutional efficiency, and market access with a focus on 0.5-1 year before-after

3) Purpose of the interview:

We would like to gain an understanding of the circumstances, implementation, and impact of the interventions in the three case study countries:

- Slovakia: legislation on the publication of procurement documents in 2011
- Mexico: introduction of a new open contracting portal with OCDS data in 2017
- Paraguay: introduction of new open contracting portal with OCDS data in 2015

4) Ask permission to record interview for subsequent notes

5) Any questions before beginning?

Interview guide Slovakia

Run-up of the intervention is outlined in detail in TI Slovakia's report, therefore focus on clarifications, implementation and impact.

1. How did the introduction of the 2011 legislation on the publication of procurement documents play out in practice?

- a. Which groups were most active and supportive in the implementation?
- b. What did it mean this legislation mean in practice for contracting authorities?
 - i. What was the actual change in publication practice?
 - ii. Has the new legislation only affected the publication of contract, orders, and receipts? Or did the introduction of the new contract registry change something in the already existing e-procurement system and eVestnik Journal where call of tenders and contract awards were already being published?
- c. Understanding compliance:
 - i. Who were the buyers that certainly followed the new regulations right away?
 - ii. Were there groups that we should analyse separately?
- d. Who were the first key users?
 - i. How has the contract registry changed the availability of and interaction with public procurement data? (compared to the already existing PP portal?)
 - ii. Was the new availability of information used by civil society? How?
 - iii. Was it used by businesses and private sector organisations? How?
 - iv. Was it used by public sector organisations? How?
- e. For **clarification**: What procurement data (besides contracts) are mandatory to be published on which platform and since when?
 - i. Since when were data (mandatorily?) published in the eVestnik journal?



- ii. How is it that using the EVO system is not mandatory to be used but publishing procurement data above certain thresholds is - when the Journal as a publication platform works through transmission from EVO?

2. How would you evaluate the impact of the 2011 legislation on mandatory publishing of procurement documents?

- a. How do you perceive the impact on:
 - i. the level of competition and corruption risks, such as single bidding or the use of non-open procedure types?
 - ii. market access?
 - iii. administrative efficiency?
 - iv. other aspects?
- b. Were there other reforms around the same time that might confound the effects observable in public procurement data?

3. Do you have recommendations for other key players to interview on this topic from public/private/civil sector organisations?

4. Is there anything else you would like to add?

Interview guide Mexico

1. Run-up to the intervention:

- a. What were the most important developments leading to the implementation of the new *Contrataciones* portal with OCDS data?
- b. Who was leading the call to reform? (Who were the actual drivers of change?)

2. Implementation of the reform:

- a. How did the implementation of OCDS and set up of the *Contrataciones Abiertas* portal progress between 2014-2017?
- b. Which groups were most active and supportive in the implementation?
- c. Were there any groups opposed to change and if yes, was it overcome? How?

3. How did it play out in practice:

- a. What did the introduction of the *Contrataciones Abiertas* portal and OCDS mean in practice for contracting authorities?
- b. What was the actual change in publication practice? (Compared to before and the ongoing publication on *Compranet*.)
- c. Understanding compliance:
 - i. Who were the buyers that certainly followed the new regulations right away?
 - ii. Are there groups that we should analyse separately? (e.g. due to different regulations, publication exemptions)

2. Usage of newly available platform and data:

- d. Who were the first key users?
 - i. Was the new availability of information used by civil society? How?
 - ii. Was it used by businesses and private sector organisations? How?
 - iii. Was it used by public sector organisations? How?
- e. With what motivations and to what ends were the new platform and data used?



4. Impact:

- a. How do you perceive the overall impact of the reform?
- b. Do you think there was an impact on:
 - iv. the level of competition and corruption risks, such as single bidding or the use of non-open procedure types?
 - v. market access?
 - vi. administrative efficiency?
 - vii. other aspects?
- c. Were there other reforms around the same time that affected public procurement?

3. Do you have recommendations for other key players to interview on this topic from public/private/civil sector organisations?

4. Is there anything else you would like to add?

Interview guide Paraguay

1. Run-up to the intervention:

- a. What were the most important developments leading to the implementation of the new *Contrataciones* portal with OCDS data?
- b. Who was leading the call to reform? (Who were the actual drivers of change?)

2. Implementation of the reform:

- a. How was the development of implementing OCDS and the *Contrataciones* portal organised?
- b. Which groups were most active and supportive in the implementation?
- c. Were there any groups opposed to change and if yes, was it overcome? How?

3. How did it play out in practice:

- a. What did the introduction of the *Contrataciones* portal and OCDS mean in practice for contracting authorities?
- b. How were public procurement data published before 2015?
- c. What was the actual change in publication practice with OCDS?
- d. Understanding compliance:
 - i. Who were the buyers that certainly followed the new regulations right away?
 - ii. Are there groups that we should analyse separately? (e.g. due to different regulations, publication exemptions)

4. Usage of newly available platform and data:

- a. Who were the first key users?
 - i. Was the new availability of information used by civil society? How?
 - ii. Was it used by businesses and private sector organisations? How?
 - iii. Was it used by public sector organisations? How?
- b. With what motivations and to what ends were the new platform and data used?

5. Impact:

- a. How do you perceive the overall impact of the reform?
- b. Do you think there was an impact on:
 - i. level of competition and corruption risks, such as single bidding or the use of non-open procedure types?



- ii. market access?
- iii. administrative efficiency?
- iv. other aspects?
 - c. Were there other reforms around the same time that affected public procurement?

6. Do you have recommendations for other key players to interview on this topic from public/private/civil sector organisations?

7. Is there anything else you would like to add?



C. Mexico background tables

Table 4: Number of contracts before and after the intervention by contract categorization strategy and direct award inclusion

	Without call for tender date extrapolation		With call for tender date extrapolation	
	With direct awards	Without direct awards	With direct awards	Without direct awards
Before	57,469	16,048	57,615	16,094
After	46,597	13,303	64,553	17,417
Sum	104,066	29,351	122,168	33,511

Table 5: Matched regression results with direct awards and using only Call for Tender publication date for distinguishing between before and after intervention contracts - Mexico

	Single bidding	Number of bids	Non-open procedure	Submission period	Decision period
After intervention	0.0434** * (0.000)	1.371*** (0.000)	-0.0276** (0.000)	-0.677*** (0.000)	-1.409*** (0.000)
Observations	20274	20321	92463	32096	93154
R-squared		0.106		0.404	0.255

Marginal effects, p-values in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6: Matched regression results without direct awards and using only Call for Tender publication date for distinguishing between before and after intervention contracts - Mexico

	Single bidding	Number of bids	Non-open procedure	Submission period	Decision period
After intervention	0.0921** * (0.000)	1.615*** (0.000)	-0.0903*** (0.000)	-0.621*** (0.000)	-3.477*** (0.000)
Observations	10861	11171	27043	20712	27404
R-squared		0.095		0.211	0.166

Marginal effects, p-values in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7: Matched regression results with direct awards and using extrapolated publication dates for distinguishing between before and after intervention contracts – Mexico

	Single bidding	Number of bids	Non-open procedure	Submission period	Decision period
After intervention	0.0921** * (0.000)	1.615*** (0.000)	-0.0903*** (0.000)	-0.621*** (0.000)	-3.477*** (0.000)
Observations	20318	20371	109830	32138	93530
R-squared		0.111		0.401	0.237

Marginal effects, p-values in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$



Table 8: Matched regression results without direct awards and using extrapolated publication dates for distinguishing between before and after intervention contracts – Mexico

	Single bidding	Number of bids	Non-open procedure	Submission period	Decision period
After intervention	0.0967** * (0.000)	1.597*** (0.000)	-0.0222* (0.035)	-0.503** (0.003)	-2.716*** (0.000)
Observations	10875	11209	30950	20753	27584
R-squared		0.095		0.206	0.160

*Marginal effects, p-values in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$*



D. Paraguay background tables

Table 9: Search words used to identify different buyer types

Buyer category	Search word used
Ministry	Ministerio, Secretaria
Municipality	Municipalidad
University	Universidad
Hospital	Hospital
Judiciary	Justicia
National institute	Instituto

Table 10: Matched regression results of the tender-level indicators without municipal contracts – Paraguay

	No competition	Level of competition	Level of competition if bigger than 1
After intervention	-0.0218 (0.079)	-0.0666 (0.075)	-0.0662 (0.077)
Observations	7375	7403	7391
R-squared		0.099	0.099

Marginal effects, p-values in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 11: Matched regression results of the contract-level indicators without municipal contracts – Paraguay

	Non-open procedure	Submission period	Decision period	Recurring bidder share
After intervention	2.37e-17 (1.000)	7.969*** (0.000)	1.751 (0.725)	0.0398*** (0.000)
Observations	10446	11272	12837	13091
R-squared		0.215	0.362	

Marginal effects, p-values in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$



E. Slovakia background tables

Table 12: Matched regression results – Slovakia

	Single bidding	Number of bids	Non-open procedure	Relative price
Before-after intervention difference	-0.0456 (0.408)	1.089*** (0.001)	-0.161*** (0.000)	-0.0193 (0.068)
Controls	Product market, procedure type, region, year, contract value			
Observations	614	663	1166	1466
Pseudo R-squared	0.2823	0.652	0.3024	0.289

Table 13 Matched regression results with minimum threshold (30k) and buyer filters – Slovakia

	Single bidding	Number of bids	Non-open procedure	Relative price
Before-after intervention difference	-0.197* (0.021)	2.006*** (0.000)	-0.0675 (0.066)	-0.0116 (0.459)
Controls	Product market, procedure type, region, year, contract value			
Observations	256	274	521	738
Pseudo R-squared	0.397	0.558	0.3454	0.355



F. Matching

Table 14: CeM matching results – Mexico

Panel A: Using only CFT dates

Sample	With direct procedures		Without direct procedures	
Number of strata:	1444		863	
Number of matched strata:	786		393	
	Before intervention	After intervention	Before intervention	After intervention
All	57469	46597	16048	13303
Matched	56476	46137	15295	12935
Unmatched	993	460	753	368
Multivariate L1 distance:	1.705E-13		2.347E-15	

Panel B: Using extrapolated publication dates

Sample	With direct procedures		Without direct procedures	
Number of strata:	1465		861	
Number of matched strata:	823		403	
	Before intervention	After intervention	Before intervention	After intervention
All	57615	64553	16094	17417
Matched	56690	64028	15377	17051
Unmatched	925	525	717	366
Multivariate L1 distance:	1.592E-13		4.088E-14	

Table 15: CeM matching results – Paraguay

	Tender-level		Contract-level	
Number of strata:	7293		9104	
Number of matched strata:	1854		2382	
	Before intervention	After intervention	Before intervention	After intervention
All	7777	6906	13895	12226
Matched	3964	3789	7202	6769
Unmatched	3813	3117	6693	5457
Multivariate L1 distance:	5.246E-16		1.541E-15	



Table 16: CeM matching results – Slovakia

Sample	Without price and buyer filter		With price and buyer filter	
Number of strata:	1817		1157	
Number of matched strata:	300		189	
	Before interventio n	After interventio n	Before interventio n	After interventio n
All	1926	3960	1237	2376
Matched	1238	1087	644	548
Unmatched	688	2873	593	1828
Multivariate L1 distance:	1.744E-15		7.362E-17	