An Economic Analysis of Debarment*

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Abstract

With a view to reducing the consequences of corruption in public procurement, many governments have introduced debarment of suppliers found guilty of corruption and some other forms of crime. This paper explores the market effects of debarment on public procurement. Debarment is found to make little difference in markets with high competition, while in markets with low competition it may deter corruption as long as firms value public procurement contracts in the future and there is a certain risk of being detected in corruption. On the other hand, debarment – when it works – has an anti-competitive effect, and this effect will contribute to facilitate collusion between suppliers. Debarment may work as a tool against collusion, but only if targeting one firm at the time (such as a ring-leader or the specific beneficiary when the collusion is detected) – and not all the members of a cartel. If designed with an understanding of the market mechanisms at play, debarment can deter both collusion and corruption, thus improving the results of public procurement. If so, most current debarment regimes need modification.

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1 Introduction

In many jurisdictions, suppliers convicted of certain forms of crime, such as corruption, collusion, organized crime, or money laundering, are “debarred” from public tenders, meaning that they cannot be awarded any government contracts. Those who are only suspected of having been involved in illegal affairs, perhaps because of an ongoing investigation, can be debarred on a discretionary basis (that is, at the discretion of the procurement agent rather than automatically). The literature on debarment is written by legal scholars who address important dilemmas such as the question of identification (what unit is to be debarred – a company, its owners, a company division or country office?); whose judgment or verdict provides sufficient basis for debarment (which courts are accepted or not, whose suspicion or investigation should be taken into account); what rights pertain to the offender; and what a supplier must do to regain status as trustworthy (a process referred to as self-cleaning).1 As a result, the literature focuses primarily on the act of debarring, on due process, and on the legal status of those debarred. While debarment is expected to lead to greater integrity in markets, this instrument has been enacted in many countries around the globe without the support of economic analysis. No systematic attempts have been made to explore the impact of debarment in markets.

This paper contributes to fill this gap. It first reviews the evidence available on the actual practices of debarment and shows that there are inconsistent practices and shortcomings in the enforcement of these rules. We next conduct an economic analysis of the impact of debarment in public markets, assuming it is properly enforced. To what extent will this tool prevent corruption? Will it affect the risk of collusion between bidders? Keeping the focus on incentives and payoffs, while ignoring subtle/indirect signal-effects on moral standards, the analysis shows that debarment is an inadequate policy instrument for the problem it is supposed to reduce. It might deter corruption only when the number of firms competing in the market is not too large, when they care about future sales, and when the probability of detection is substantial. Given our analytic framework, to be presented in a few pages, we find the policy instrument ineffective in preventing corruption when these conditions are not met. Furthermore, debarment of firms involved in a cartel is a poor instrument to fight collusion. Upon debarment of the whole cartel there might be no firm left to serve the public demand, while indiscriminate debarment might undermine leniency programs in competition law.

A quick attempt of understanding where debarment comes from, brings us to the United States - where the US Congress enacted a law in 1884 requiring the executive branch to award contracts only to the lowest “responsible” bidder, and active debarment as a preventive strategy was introduced by the Comptroller General in 1929.2 However during the twentieth century, most governments rarely

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1 For introductions, see Piselli (2000), Williams (2006) and Arnaiz (2009).

2 For details, see the US Department of the Interior, “A Brief History of the Debarment Remedy,"
excluded contractors; when they did, it happened primarily as a result of criminal indictments and convictions. As concern about the consequences of corruption intensified, starting in the mid-1990s, the option of debarring fraudulent suppliers was brought to the fore by various actors in the development community. Debarment increasingly was seen as a strategy to curb the risk of corruption. This idea was advanced by nongovernmental organizations and multilateral organizations concerned about the propensity of private sector suppliers to exploit institutional weaknesses in developing countries, but also by the US government, the European Union (EU), the United Nations, and the Organisation for Economic Co-operation and Development (OECD). The United Nations Office on Drugs and Crime, for example, states “as anti-corruption initiatives around the world gain momentum, one device for fighting corruption – debarment, or blacklisting, of corrupt or unqualified contractors and individuals has emerged as an especially noteworthy tool.” The same report maintains that “suspension or debarment from public contracts has proven to be an effective tool in the fight against corruption” (UNODC 2013: 25). The statement is made without any reference to empirical research, and we have not managed to find evidence that supports the claim.

Despite the lack of evidence of its efficiency, during the first decade of the 2000s, the debarment option extended in scope, with procurement agencies required to perform their own assessments of suppliers’ trustworthiness, regardless of any criminal justice proceedings in the case. As a consequence, public procurement agencies were given authority to exclude suppliers (or threaten to exclude them) merely upon reasonable doubt of their integrity. Combined with more efficient whistleblower programs, increasing requests for suppliers’ self-disclosure of fraudulent conduct, and rising voter demands for anticorruption vigilance, debarment from public procurement became a real concern for many suppliers.

Today’s debarment regimes send a signal to the private sector that access to public procurement markets requires compliance with laws and regulations, a signal that may well have a long-run positive effect on overall integrity and productivity. In practice, however, the debarment instrument implies challenging trade-offs. Excluding a competitor leads to reduced competition, and this in turn may result in higher prices or lower quality, quite the opposite of what procurement rules are supposed to deliver. Oligopolistic markets are particularly exposed to these risks, and this typically characterizes markets where large government contracts are awarded. Shifting to an alternative supplier may be costly and


Likewise, Hugenette Labelle, then Chair of Transparency International, commented in a press release on 26 June 2014: “The World Bank’s sanctions process is critical to eradicate fraud, corruption and collusion from the projects it finances” (Reuters: “Fraud tops list of cases handled by World Bank’s sanctions office -report”.)

For discussion of the altered use of the debarment instrument, see Gordon and Duvall (2013) and J. Crawford “How Proposed Debarment Became Equal To Suspension” at Law 360 on 2 February 2015, see http://www.law360.com/articles/616957/how-proposed-debarment-became-equal-to-suspension
cumbersome, in some cases because of unique technical solutions with horizontal and/or vertical spillover effects on other acquisitions. From a legal perspective, exemptions from debarment rules are possible, and they are frequently used in practice, but this is not a good solution since it easily leads to a situation in which rules are applied differently depending on the player’s market position. If debarment is only applied to firms operating under competitive pressure or whose services are not preferred in any case, we are left with rules that condone illegal practices by the strong and powerful. And for all we know, their market position could be a result of the very practices supposed to trigger debarment, that is, it may be based upon corruption or money laundering that provides the extra profits needed to outbid a competitor.

This study is motivated by concerns about corruption in public procurement and about the market consequences of debarment, both of which represent departures from the premise of equal treatment and optimized price-quality combination. For insights, we need to analyze the economic trade-offs between excluding firms not found trustworthy and ensuring competition. Generally, the debarment instrument is introduced with wide discretion given to procurement agents, hence an implicit assumption that procurement agents are honest. In our perspective, however, corruption would not be a risk in these contexts if procurement agents were always honest. Since it takes two parties to cut a corrupt deal, and since the instrument’s impact depends on the extent to which it prevents corruption from taking place, this analysis place emphasis on the risk that the procurement agent herself can be corrupt; specifically, how she can facilitate bribery through the choice of acquisition mode. The direct price-quality consequences of excluding a competitor follow from elementary microeconomics, with normative implications against debarment. What complicates that logic are the more general importance of trusting business partners, the need to secure state revenues against crime, and the desire to realized the long-term benefits of more integrity among actors in public procurement markets.

Insights into the mechanisms of debarment appear relevant for policy makers. The EU recently revised its procurement rules, but the new EU directive leaves much space for member states to decide the nuances of their rules on debarment. In the United States and Canada, there are frequent debates about the functionality of debarment rules, with particular concerns about arbitrary exclusion of bidders and about consequences for the economy. International development banks boldly apply debarment rules to their own procurement operations and those of their clients (Seiler and Madir 2012; Williams

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6For an early critical debate about debarment, see the collection of papers in The George Washington University Law School Public Procurement Law Review Volume 13, and especially Schooner (2004). More recently, Tillipman (2013) discusses the motivation behind debarment rules and warns against using these rules to supplement criminal law sanctions. In Canada it has been suggested that an automatic ten-year ban on convicted suppliers will harm the economy. See Barrie McKenna, “SNC Case Shows Downside of Ottawa’s Strict Anti-corruption Regime,” Globe and Mail, February 19, 2015.
2007; Søreide, Gröning and Wandall 2016). Based on its own investigations, the World Bank dears suppliers found “more likely than not” to be guilty, meaning that a debarred supplier cannot tender for a World Bank-financed contract anywhere in the world (Leroy and Fariello 2012). Moreover, the largest multilateral development banks - including the African Development Bank Group, Asian Development Bank, European Bank for Reconstruction and Development, Inter-American Development Bank and the World Bank Group have agreed to mutually enforce each other’s debarment actions with respect to the four harmonized sanctionable practices, i.e. corruption, fraud, coercion, and collusion; a supplier excluded by one development bank is automatically excluded by the others in the sense of being excluded from all government-steered procurement covered by loans or grants from these institutions (Fariello and Daly 2013).

This article continues with a study of debarment in public procurement. While internationally, there are hardly any systematically collected data available on debarment, we have reviewed numerous cases that reveal challenges in the enforcement of these rules - as described in Section 2. The analytic approach, which follows, studies whether it is worthwhile to improve the enforcement of debarment rules to overcome the challenges observed in practice, or not. Section 3 presents the assumptions and the framework for the analysis of debarment in public procurement. Section 4 analyses how such debarment steps, once properly enforced, alter the risk of corruption and collusion in procurement. Discussion follows in Section 5.

2 Debarment practices

Over the past two decades, most countries around the globe have reformed their procurement rules, and while debarment is one of the principles associated with best practice legislation, there is no standardized way to introduce this instrument. The most important difference is between debarment administered by public procurement agencies and debarment imposed on suppliers as a criminal justice penalty. While many countries include debarment as one among alternative criminal law penalties, it is rarely used as such in practice. In the United States, where examples of debarment (or professional disqualification) used as a criminal justice verdict are most easily found, the prosecuting authorities are more inclined to point at such penalties as a threat thus speeding up their process toward a non-prosecution (or deferred prosecution) agreement with firms accused of for example corruption (Rose-Ackerman and Palifka (2016 Ch. 6). As the practice of actually imposing debarment as a punishment is rare, debates about debarment as a policy instrument refer, almost without exception, to how it is administered by public procurement agencies.

Within the world of public procurement, the specific rules and practices differ substantially across countries - especially regarding optional versus mandatory debarment, the use of registers to list debarred
suppliers, and whether there is a clear time limit for debarment. The United States appears to have the most developed and predictable public procurement debarment regime, with a procedural system intended to ensure fair treatment, including options for appeal, and federal decisions applied to procurement at the state level. The British rules resemble the US system, but enforcement is less consistent and there is little evidence that firms convicted of corruption are in fact excluded from public procurement tenders.\(^7\) In the European Union more generally, each country can determine the details of their debarment rules within the rules set forth by the EU procurement directive.\(^8\) In Africa and Asia a good number of countries introduced debarment rules in the early 2000s; they include the large economies of China, Nigeria, India, Indonesia, and Japan, but also for example Bangladesh, Liberia, Egypt, Mongolia, Pakistan, the Philippines, and Vietnam.

In lack of data it is difficult to describe enforcement patterns. By reviewing cases, we have nevertheless detected common challenges, which we now discuss in turn.

### 2.1 Enforcement failure

The notion of debarment as an important anticorruption response is obviously contingent on the assumption that governments enforce their own debarment rules. This is not necessarily the case. In 2014 Transparency International complained to the European Union, which spends around EUR 2.5 trillion a year on goods and services, that it had so far blacklisted only six companies for fraud and corruption.\(^9\) According to a report by the OECD (2014), only two out of a total of 427 foreign bribery cases in the OECD area resulted in debarment. Also in the United States debarment is used irregularly. An audit report prepared by the US Department of Justice (2012) found that the rules intended to secure debarment allow too much space for (de facto) discretion when enforced at the state level, and often, the instrument is weakly enforced when in use.

In other countries, debarment happens, yet governments rarely keep registers of debarred suppliers. In cases when a company should be debarred for criminal acts, it may be up to competitors to raise the issue, complain, and claim the competing supplier ineligible for tender participation, or; the procurement agent can check if any supplier is registered with criminal acts. If none of these two reactions take place, a supplier convicted of corruption may well take part in tenders.

What we find when reviewing cases, is that disqualified suppliers differ in size and industry, the alleged

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\(^8\) Directive 2014/24/EU on public procurement provides for a combination of mandatory and facultative debarment, and governments have substantial space for detailing the rules (Hjelmeng and Søreide, 2014).

offenses differ, and the cases occur in countries at all income levels. Within countries the rules are enforced inconsistently, and there is no international consensus of what an efficient debarment regime might look like. In practice, many procurement agencies face difficult trade-offs: while predictable enforcement of debarment rules is expected to bring integrity benefits, flexibility may be needed to avoid undesired results or unreasonable costs to society. These undesired results and costs seem to reflect challenges caused by high market concentration, resistance against rules stipulating debarment regardless of where the corruption has taken place (which means, regardless of the local risk of corruption), as well as added values associated with procurement agents’ discretionary judgment of suppliers’ trustworthiness and evidence.

2.2 High market concentration and cartel collaboration

One reason why the rules are disregarded might be the importance of protecting competition. In all categories of countries, there are sectors with significant constraints on competition; this is especially a problem in infrastructure and utility provision, which represent the largest procurement expenses for many governments.\(^\text{10}\) According to Iimi (2011), who studied worldwide infrastructure projects financed by aid or development loans, the average number of bidders is 5.2 in the water and sewerage sector, 6.2 in the roads sector, and 4.6 in the electricity sector. In the majority of electricity works and water auctions only two or three firms were competing for the contracts (Iimi 2011: 129-140, see also Estache and Iimi 2012).\(^\text{11}\) With few bidders, governments may find that they cannot afford to exclude a supplier for the sake of promoting integrity in markets - even if corruption could be one of the reasons why there are so few suppliers in the first place.\(^\text{12}\)

The difficulty of enforcing the public procurement debarment rules when a good or service is in high demand has led to calls for more flexible rules. Instead of strictly excluding (needed) suppliers, it has become common to reach an (administrative) settlement agreement, an option that gives procurement agencies discretion to list far-reaching demands. In exchange for a shorter debarment period or even complete leniency, a supplier might agree to dismiss managers, accept external monitoring, or make some form of restitution payment.\(^\text{13}\) For example, as part of a settlement with World Bank investigators, Siemens agreed to make a US $100 million payment to “support anticorruption work,” while parts of the

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\(^\text{10}\)In many markets, competition is limited, especially on large projects.

\(^\text{11}\)This is not different in competition-friendly countries, like the United States. Studies some years ago found the average number of bidders for highway construction contracts to be around 5.0 in Florida (Gupta 2002) and 3.3 in Oklahoma (Da Silva et al. 2003). According to Pittman (2011), mergers and alliances between rail freight carriers in adjacent territories in Europe and the US have weakened competition, and each new entrant/excluded supplier may matter to the price-quality combination (somewhat dependent on how customers consider rail in comparison to other transport options).

\(^\text{12}\)Several authors find a clear empirical correlation between corruption and market concentration, including Ades and Di Tella (1999), Søreide (2008) and Treisman (2007).

\(^\text{13}\)See Gordon and Duvall (2013).
corporation were also debarred.\textsuperscript{14} Another example is a three-year World Bank debarment of parts of the Alstom corporation combined with a restitution payment of $9.5 million.\textsuperscript{15}

The debarment rules are particularly hard to enforce when companies have collaborated in a cartel facilitated by corruption.\textsuperscript{16} According to procurement rules, the firms should all be debarred, and the need for reinstating trust in the incumbent regime might call for strict enforcement. At the same time, exemptions from the rules are necessary for the procurement of needed services. This is exactly the problem in Brazil, where a comprehensive corruption scandal was revealed in the fall of 2014. A large number of suppliers to the national oil company Petrobras have been involved in corrupt schemes, with parts of their bribes being channeled to Brazil’s political elite. The case involved both Brazilian and foreign suppliers, including several large Brazilian construction companies. These construction firms, it was revealed, had formed a cartel. According to the country’s public procurement regulations, they should all be debarred, but the government’s demand for infrastructure and other construction services suggests a high propensity to grant exemptions from the rules.\textsuperscript{17}

There are examples of circumstances where all suppliers present in a market have been found ineligible for future contracts.\textsuperscript{18} In 2009, for example, the World Bank debarred seven road construction companies on grounds of cartel collaboration for contracts in the Philippines.\textsuperscript{19} In a case in South Africa in 2013, 15 construction firms were found guilty of collaboration in a cartel, starting with tenders for construction of World Cup stadium projects in 2006. The majority of the firms reached a settlement with the competition authority, and as a result these suppliers were not debarred. In April 2014, this leniency resulted in public outcry as the press revealed that the firms found guilty of cartel collaboration had been given a number of new public construction contracts.\textsuperscript{20}

Under some regimes, such as the World Bank sanctions regime, cartel collaboration is a stand-alone reason for debarment, while in others, as under the EU procurement rules, it is not. In either case, firms that have benefitted from corruption, should be debarred. In concentrated markets there might be a high risk of collusion, and this problem adds to the difficulties of enforcing debarment rules. The relationship

\textsuperscript{14}World Bank press release, July 2, 2009.


\textsuperscript{16}Lambert-Mogliansky (2011) explains how cartel collaboration is facilitated by corruption, and most likely, a common combination.

\textsuperscript{17}The case has been well covered by the international press. See, for example, Joe Leahy, “Multinationals Face Scrutiny on Petrobras,” Financial Times, February 22, 2015.

\textsuperscript{18}Under some regimes, such as the World Bank sanctions regime, cartel collaboration is a stand-alone reason for debarment, while in others, as under the EU procurement rules, it is not.

\textsuperscript{19}World Bank press release, January 14, 2009. The Philippine government’s immediate reaction to the case raised suspicions that corruption could be part of the scam, as the president’s response, widely quoted in the press, was, “We can always find another development bank.”

\textsuperscript{20}The new contracts awarded in the months following the cartel case totaled at least R1.5 billion, according to Business Report, April 13, 2014: “Call to blacklist big construction firms.”
between debarment, corruption and collusion is complicated yet a real concern in the enforcement of debarment rules, and therefore, a central theme in our analysis - in Section 5.

2.3 Debarment irrespective of perceived risk in the given market

Most debarment rules stipulate that suppliers involved in corruption should be debarred regardless of where the corruption has taken place. The OECD and the World Bank, for example, emphasize the importance of operating with "universal debarment rules" in the global fight against corruption.\(^{21}\) The geographical location or exact market where a supplier’s involvement in corruption has taken place is not supposed to matter to a procurement agent. As long as involvement in corruption anywhere in the world has been reliably confirmed, the supplier is supposed to be disqualified from bidding. Under the World Bank’s debarment rules, for example, a firm found guilty of corruption in Argentina will be ineligible to place bids for contracts in Mongolia. Such rules imply that procurement agencies are not supposed to consider the risk of corruption in their own environment.

Compliance with these regulations has proven difficult for governments that need to buy services from a certain supplier, especially when they find the firm’s past performance excellent and have experienced no problems with corruption. The helicopter producer AgustaWestland, for example, paid bribes to senior officials in the Indian defense sector to secure a contract for the delivery of 12 helicopters. The case was well documented and was tested in an Italian appeals court that had to decide whether funds frozen in an Italian bank as a guarantee for payment of the helicopters could be retrieved by the Indian government upon cancelation of the helicopter acquisition. According to debarment rules, such as those stipulated by the EU, this case should lead other governments to reconsider AgustaWestland’s qualifications for participating in their future tenders. Despite knowledge about the corruption in India, the Norwegian government nonetheless decided to offer the company a contract for the delivery of 16 helicopters (with the option of six more) at the cost of around EUR 2 billion.\(^{22}\) The helicopters’ technical merits apparently overrode any concerns about the supplier’s former involvement in corruption. As far as we are aware, no extra conditions or controls were placed on the contract or the company, despite its proven willingness to offer bribes.

Another example from Norway, one of top-scorers when it comes to law enforcement,\(^{23}\) shows the practical difficulty of debarring a supplier when the (local) risk of corruption is considered low. The Norwegian firm Norconsult was found guilty of bribery in Tanzania by a lower court. When brought

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\(^{21}\) See the OECD 2014 Draft Recommendation of the Council for Public Procurement (GOV/PGC7ETH(2014)7/REV3). Also see the World Bank website for various reports about its sanctions regime, including one by the Office of Suspension and Debarment (OSD 2014).

\(^{22}\) The Norwegian government made its decision despite clear allegations of corruption in India but before the case had been confirmed by an Italian appeals court.

\(^{23}\) See the Rule of Law Index by The World Justice Project: http://worldjusticeproject.org/rule-of-law-index
up for an appeals court, the judges decided debarment would be unreasonable, and this matter in fact influenced the question of corporate criminal liability. According to the verdict, corporate criminal liability for bribery in Tanzania would have exposed the supplier to debarment from public procurement in Norway, on top of a debarment period imposed by the World Bank. The sum of consequences were deemed unreasonable, and thus the court found the supplier not criminally liable – largely because of the debarment rules. Such reasoning undermines the enforcement of debarment rules, as well as the aim of imposing predictable penalties upon corporate criminal liability, while at the same time, the case must be seen as a pragmatic attempt to reach a reasonable solution.

2.4 Discretion regarding evidence and identification

Inconsistent enforcement practices must also be understood in light of the administrative context in which the judgment of suppliers’ trustworthiness occurs. It is up to each jurisdiction to decide whether debarment should follow upon suspected corruption or upon court decisions only. Generally, however, there seems to be broad space for discretionary interpretation of the principles. The standard of proof, for example, is normally much lower for these administrative judgments than for criminal law reactions, and procurement agents may well consider themselves mandated to judge whether firms are not trustworthy or not. Of course, broad discretion can lead to biases, both in terms of too many firms being debarred, or too few.

In Tanzania, for example, the country’s Public Procurement Regulatory Authority in a case from 2014 suspended 19 firms from competing for public procurement contracts for one year. While the suppliers were debarred due to their engagement in corrupt practice and their failure to fulfill contractual obligations, the details of each individual case were not provided. The authority justified its decision as a more efficient reaction against corruption than single-case contract termination.

For all we know, there may be clear evidence behind each of these debarments in Tanzania. In general, however, a tendency to exclude suppliers on the mere suspicions of corruption will pose different forms of risk to good procurement. One concern is a possible inflation in the number of firms found ineligible for bidding. Another is that the debarment rules may become a handy tool for those seeking a reason to exclude a supplier or terminate a contract. Society may find it difficult to tell in these cases whether the debarment decision is motivated by a supplier’s lack of integrity, or by some challenge on the side of the procurement agency, such as lack of funds to finance the completion of a contract. A procurement agency’s opportunity to cancel contracts and exclude suppliers on a discretionary basis may increase the risk of arbitrary deviation from contractual obligations – with potentially damaging consequences for the

24Norwegian Supreme Court judgment of June 28, 2013, in case 2012/2114. Two Norconsult employees were found personally liable, while the corporation avoided any criminal sanctions.
country’s trade and foreign direct investment. Wide authorities to exclude suppliers on a discretionary basis may even be abused to extort bribes, thus completely undermining the purpose of the debarment regime.25

The space for discretionary judgment can also undermine enforcement in cases where there is uncertainty regarding which corporate entity should be debarred. In some cases, the disqualified supplier restructures and reappears in the market with a different name. This is what happened in a case involving the German corporation MAN. In December 2009 the company was found guilty of bribery for contracts in Africa, Asia, and Europe, with proven bribe transactions totaling around EUR 75 million. According to EU procurement rules, the corporation should have been disqualified from taking part in public procurement tenders as a result of the verdict. One month after the verdict, however, the corporation had established Rheinmetall MAN – owned 49% by MAN and 51% by another corporation allegedly involved in corruption, Rheinmetall – and had already entered into a contract with the Norwegian Ministry of Defense. Even though the Norwegians had negotiated the contract with the sentenced MAN corporation, they claimed that the actual contractor was the newly established unit, a completely different (and honest) supplier – and that, therefore, the debarment rules would not apply.

A further example of such circumvention of the principles was observed in Pakistan. A contract for construction of a hydroelectric power project was awarded to Sinohydro Group, a newly established daughter company of Sinohydro Corporation, which had been suspended from tenders because of proven and admitted corruption in Africa. Sinohydro Group shared the same address as Sinohydro Corporation, and when listing its qualifications for a contract, Sinohydro Group included the projects conducted by Sinohydro Corporation. Nonetheless, as pointed out by Dawn, an English-language Pakistani newspaper, the authorities chose to ignore the obvious connection between the entities.26

3 Assumptions and Framework for Analysis

Section 2 shows that debarment is not enforced properly, nor in a predictable way. Enforcement is challenged in different ways: It is impractical to disqualify the supplier of a good or service in high demand. The debarment of all suppliers in a market hits those in need of the services unreasonably hard.

25 The practice of misusing added authority for extorting bribes is what Rose-Ackerman (1978, chapter 4) refer to as "milking suppliers." This unintended consequence is pointed out by the Asian Development Bank and OECD: “Debarment is a two-edged sword: while it might deter corruption, it could also be part of a corrupt scheme of competitors or corrupt officials to extort bribes or to eliminate honest competitors, especially if the conditions for debarment are not clearly specified. Worse, under certain conditions, qualified and honest companies consider abstaining from bidding to avoid being subject to debarment” (ADB/OECD 2006: 23) - a report that summarizes initiatives to curb corruption in 25 Asian countries. The risk of abuse of debarment rules, due to the extent of discretion associated with such rules, is explicitly mentioned in the review of practices in Bangladesh, Kyrgyzstan, and Pakistan.

26 In response to the allegations, the relevant authorities explained that they would never award a contract to a firm suspended from taking part in public procurement. See “Wapda Awarded Contract to Firm Suspended by World Bank,” Dawn, February 6, 2014.
Debarment regardless of where the corruption has taken place implies exclusion from tenders with a very low risk of corruption. Discretionary debarment can easily be exploited by corrupt public officers to serve other agendas than promoting value for money. For these different reasons, the rules do not function well, and while governments may claim they act against corruption when such rules are introduced, the anticorruption impact of the rules will be meagre if they are not consistently enforced.

The question now is if the rules were applied properly, would debarment then deter corruption? Before promoting a strict enforcement of debarment rules, we should be certain that the rules would work as intended. In what follows we will, therefore, try to answer the following question: under what circumstances will debarment of corrupt suppliers reduce the risk of corruption in public procurement?

### 3.1 Analytic preliminaries

To investigate the function of debarment rules we will now study the mechanisms at play within a stylized setting. Let us consider a society where the government (the principal) oversees public spending, while various public procurement agencies conduct contract allocations given stipulated procurement rules. These procurement agencies cannot be assumed 100% honest - since if so, there would be no need for anticorruption initiatives, and thus, for this study we assume that procurement agencies can accept bribes from suppliers. For simplicity we assume the procured services/goods to be homogenous as this simplification allow us to avoid unnecessary technicalities.

The government (the principal) aims at securing value for money to the benefit of society. Debarment rules are introduced as a strategy to promote this aim as dishonest suppliers are excluded from bidding while the remaining suppliers are more likely to be deterred from offering bribes. Regardless of the reviewed practical problems with debarment rules, we assume for now that the rules function as intended once they are introduced. With a certain probability, corruption is detected and the suppliers involved are truly debarred. Procurement agencies have sufficient information about disqualified suppliers to reveal any attempts of restructuring operations in order to compete for contracts, for example under a new company name.

In practice, procurement-related corruption takes many different forms. Public contracting can be manipulated to the benefit of a certain supplier at the planning and budgeting stage, through the tender criteria, during the bidding process, and after a contract has been allocated (for example in contract renegotiations, sometimes informally agreed ahead of the tender). The abuse of authority can affect the choice of supplier, the quality of what is procured, or the price. Moreover, the crime can happen in subtle ways (for example by exploiting politicians’ discretionary authority), it can be done in ways that

make it look like as if all procurement rules have been respected, or it can be done by exploiting the rules of exemption - which is a risk under most procurement regimes.

In our stylized analytic framework we lose precision if we try to keep room for the many forms of corruption, and for this reason, we have chosen to focus on a specific procurement decision that captures a central aspect of corruption, namely the opportunity to direct a contract to a specific supplier. For now, therefore, bribery refers to the cases where a procurement officer in exchange for a bribe grants the supplier a contract, and it may well be at a higher price than what would be the outcome of fair and undistorted competition. A case of fair and honest contract allocation with respect to cost efficiency would lead the most efficient firm to win the contract at a price that is marginally below the costs of the second most efficient firm. In the model below, corruption increases the expected cost for the contract and creates a social dead-weight loss.

The extent to which debarment deters suppliers from entering into corrupt schemes must be assumed to depend on how much value they place on future government contracts. This estimated value will depend on the likelihood that they will win future procurement auctions, and this probability depends on the number of firms that may compete in the market in the future. With well-functioning debarment rules and no entry, the number of firms decreases as corruption is detected, and this fact influences the firms’ estimated value of future contracts. In our stylized analytic framework we will capture some of this dynamics in repeated purchase games.

A decreasing number of firms in turn will increase the likelihood of future cartel formation as fewer firms make collusion more likely, and therefore, we include in our study the implications of debarment for cartel collaboration. In cartel cases debarment may have several effects. These effects depend on how competition takes place in the given market. If there is competition for the market, as is typically the case in procurement auctions, only one firm will actively supply the market both under competition and collusion. When firms compete for the market collusion may be structured in several different ways. For example, firms can agree explicitly or implicitly to bid in separate auctions, i.e. they divide the market between them, they can pay each other side payments for not submitting bids in a specific auction, or alternate on submitting bids when auctions are run on a regular basis. In the analysis below - when we come to the problem of cartel formation - we focus on the latter case. First debarment reduces future profits in the market by depriving the firms from future participation, which may have effects on cartel formation. Second, debarment alters the set of bidders in future auctions.

Given these assumptions, the respective impact of debarment on corruption and collusion are now investigated by help of the following model.
3.2 The model

We consider a repeated purchase game between a public purchaser and \( N \geq 1 \) potential suppliers. The horizon is infinite. The paper considers a three-tier hierarchy: principal, delegate, firms. The principal (i.e., an agency acting on behalf of the taxpayers), conventionally referred to as “he”, wants to acquire in each period of time a commodity or a service on the best possible terms. He entrusts the responsibility of the acquisition to a delegate (i.e., a public purchaser), conventionally a “she”. The principal’s objective is to maximize the net social surplus associated with the public acquisition. All the players are risk-neutral.

The size of the market varies from one period to the next in a random way: \( Q_t = \bar{Q} + \epsilon_t \) where \( \epsilon_t \) is independently and identically distributed over \([0, \bar{Q}]\) \( \forall t = 0, 1, 2, \ldots \). The distribution of \( Q_t \) is common knowledge. The minimum size of the market, \( \bar{Q} \), is known to all, but not the random part \( \epsilon_t \geq 0 \) so that \( Q_t \in [\bar{Q}, \bar{Q}+\epsilon_t] \). The idea is that there are random shocks affecting public demand, which therefore must be adjusted at each period. We denote by \( \bar{Q} \) the expected value of \( Q_t \). Procuring \( \bar{Q} \) generates in period \( t \) a gross surplus \( \bar{S}(Q_t) \geq 0 \) increasing with \( Q_t \) \( (\bar{S}'(Q_t) > 0) \). We assume that \( \bar{S}(Q) \) is large so that it is always worth producing the commodity even for the lowest possible quantity \( Q > 0 \).

The firms: There are \( N(\geq 1) \) firms in the economy that can produce the good. Since these firms procure the same type of goods or services they face some common costs. However, their production process are not perfectly identical, nor their economic activity outside the public procurement arena. We model this by assuming that at each period their cost to procure the commodity is affected by some random shock so that their marginal cost parameter is the sum of the common part, identical to all firms, and the idiosyncratic part, random and firms’ specific. Since it is common to all firms, the information on the common part of the cost can be extracted by the principal at zero cost by implementing some form of yardstick competition (see Auriol-Laffont 1992). The firms can have an informational rent solely on the independent part. To avoid introducing new notation we therefore set the common part to 0. This is done without loss of generality (i.e. the surplus function \( S(Q) \) is defined net of this common cost part).

To produce a quantity \( q \geq 0 \) the firm \( i = 1, \ldots, N \) is confronted with cost

\[
C(\beta^i_t, q) = \beta^i_t q
\]

where the marginal cost \( \beta^i_t \) is drawn in \([0, 1]\) according to the uniform distribution at the beginning of period \( t = 0, 1, 2, \ldots \).

**Assumption 1** \( \beta^i_t \) is independently and uniformly distributed over \([0, 1]\) \( \forall i = 1, \ldots, N, \forall t = 0, 1, \ldots \).

---

28 The density \( f(\beta_i) = 1 \) is associated with the distribution function \( F(\beta) = \beta \) for \( \beta \in [0, 1] \). The uniform distribution assumption is not crucial for our results. It simplifies the exposition as we are able to find closed-form solutions.
The firms are hence ex ante symmetric. We assume that at the pre-contracting stage a firm does not
know the exact value of $\beta_i^t$. This assumption reflects the fact that there are idiosyncratic shocks affecting
the production process. The firm needs to prepare a bid to discover the exact value of its marginal
cost to serve the market in period $t$. Moreover, once it is revealed, $\beta_i^t$ is the private information of firm
$i = 1, \ldots, N$. By contrast, the quantity produced by firm $i$, and the law of $\beta_i^t$ are common knowledge.
Finally the firms all have the same discount factor $\delta < 1$.

The delegate: The delegate’s job is to collect information to implement the optimal acquisition pro-
cedure. She has two options. She can negotiate the market with a producer, in which case she needs
to identify one supplier without competition. If so, this corresponds to the case of limited tendering
as termed by the General Procurement Agreement (GPA). Alternatively, she can allocate the contract
through a competitive bidding procedure; this corresponds to open tender, as termed in the GPA. The
optimal decision depends on the relative cost of fostering competition compared to the expected benefit.
The cost of running an open tender is $K_t \geq 0 \ t = 0, 1, 2, \ldots$. It embodies the monetary and non-monetary
(delay) costs of the procedure. In practice these costs may be very high and vary from one market to the
next.\footnote{It takes time and money to organize open tenders. First the purchasing entity has to specify its need in writing. Next it
has to advertise tender information in official gazettes, newspapers, bulletin boards, or bidding information journals. If the
firms that receive the information are interested they have to work out detailed offers. The purchasing entity has to review
and evaluate the offers, and finally, it has to write a report to justify its choice. For instance in 2011 the annual procedural
costs of compliance with EU public procurement legislation were estimated by the European Commission at 5.3 billion euro
in 2009 terms or 1.4% of the value of procurement covered by the EU Directives. Consistently with our assumption the
study shows that procurement costs are almost invariant across a wide range of contract values (i.e., there are fixed cost).
The average procurement procedure took 108 days to complete and the average cost per procedure was approximately 28000
euros, with considerable variance depending on the country and the nature of the market (see European Commission 2011).}
We assume that $K_t$ is independently and identically distributed in the set $[K, \overline{K}]$. We denote
by $EK$ the expected value of $K_t$. Intuitively it is more profitable to organize a competitive bidding
procedure when $K_t/Q_t$, is low than when it is high.

Sole Sourcing: In the sole source case, $N = 1$, the acquisition cost is equal to the monopoly price
$t(1) = Q_t$.\footnote{With a single producer we drop for notational simplicity the index of the firm.} The sole-source case corresponds to fixed-price purchase. The identity of the producer
then is irrelevant to the taxpayers. The principal’s net surplus is $W^t(1) = S(Q_t) - Q_t$ and the firm’s net
expected profit is $\pi(1) = Q_t \int_0^1 (1 - \beta) d\beta = \frac{Q_t}{2}$.

Competitive Bidding: Since the firms’ cost parameters are independently and identically distributed,
it is optimal under asymmetry of information to organize a type of second-price auction (see Myerson
The net expected surplus from competitive sourcing with sole bidding is ya_n1 that the variable expected surplus from competitive sourcing with sole bidding is ya_n1 which is the probability that a firm of type ya_n1 is not minimizing the acquisition cost.

Let \( f_{m_{\beta}}^{N} = \frac{N}{1 - \beta} - 1 \) denotes the density function of \( \beta = \min(\beta, \ldots, \beta^{N}) \) the minimum of \( N \) independent variable of type \( \beta^{i} \), and \( F_{m_{\beta}}^{N}(\beta) = 1 - (1 - \beta)^{N} \) the cumulative distribution function. We show in appendix 7.1 that the variable expected surplus from competitive sourcing with \( N \) bidders is:

\[
W(N) = S(Q_{t}) - Q_{t} \int_{0}^{1} 2F_{m_{\beta}}^{N}(\beta) d\beta = S(Q_{t}) - \frac{2Q_{t}}{N + 1}
\]  

The net expected surplus from competitive sourcing with \( N \) bidders is: \( W(N) - K_{t} \). A comparison of the welfare under sole sourcing with the welfare under competitive bidding, omitting the fixed cost, yields

\[
W(N) - W(1) = Q_{t} \int_{0}^{1} 2(F_{m_{\beta}}^{N}(\beta) - F(\beta)) d\beta = Q_{t} \frac{N - 1}{N + 1} \geq 0.
\]

By introducing competition, the delegate reduces the producers’ expected rent. Since this rent reduction implies a gain on the principal, competitive bidding increases his surplus by the same amount. The benefit grows as competition intensifies (the difference between \( F_{m_{\beta}}^{N}(\cdot) \) and \( F(\cdot) \) increases with \( N \)). Indeed, when the number of bidders is large they collectively bid more aggressively, which reduces the final cost. We define \( k(N) \) as the marginal social benefit of introducing competition:

\[
k(N) = \frac{N - 1}{N + 1}
\]

The choice between sole sourcing and competitive bidding is now reduced to a trade-off: Competitive bidding yields a fixed procedural cost \( K_{t} \in [K, \infty] \) but gives a higher probability of a small acquisition cost, resulting in a net effect that is captured by \( k(N)Q_{t} \) (i.e., the sampling effect). We deduce the following result.

**Proposition 1** Competitive bidding is the optimal acquisition strategy if and only if \( k(N)Q_{t} \geq K_{t} \).

---

31 Each firm submits independently a price above which it accepts to serve the market. The contract goes to the firm with the lowest bid, but the price it gets in exchange for the production is the second-lowest bid. With this form of auction it is a dominant strategy for each producer to announce its true marginal cost.

32 The expected rent to a bidder with type \( \beta \) is \( \pi(\beta, N) = Q_{t} \int_{0}^{1} (1 - x)^{N-1} dx \). So ex ante (i.e., before discovering the exact value of \( \beta \)) the rent is the expected value of \( \pi(\beta, N) \): \( \pi(N) = E_{\beta} \pi(\beta, N) = Q_{t} \int_{0}^{1} \int_{0}^{1} (1 - x)^{N-1} dx \). Integrating by part yields (2).

33 In this model welfare refers to public aims only, and as expressed, the winning supplier’s profit is not included in this expression. "Welfare" in this setting could also be referred to as benefit for the public, or government payoff.

34 They individually bids the same, but since the price paid is the second lowest bid, an increase in the number of bidders make it more likely to obtain a lower second price.

35 For more on the sampling effect, see Auriol and Laффont (1993) and Auriol (1996).
Otherwise, sole sourcing is the superior strategy.

Competitive acquisition is more valuable when the number of bidders \( N \) is large and when the level of procedural cost \( K_t \) is low. Moreover, the expected gain associated with competitive bidding increases with \( Q_t \). The impact of a decrease in the marginal acquisition cost is proportional to the market size. This is why most countries operate with minimum thresholds for open tendering. With this framework for analysis we now turn to the optimal delegation scheme when the delegate is corruptible.

4 Analysis of debarment

In this section we examine the impact of debarment in the setting described above, first in the stage game, thereafter in the case of repeated purchase and debarment, and third, we study how debarment may affect collusion between bidders. The case of entry of new firms is discussed at the end of the section.

4.1 Corruption in the stage game

As \( K_t \) and \( Q_t \) are unknown ex ante, the benefit of organizing a competitive procedure is uncertain. The optimal acquisition policy consists of choosing open tendering whenever \( K_t \) is lower than \( Q_t k(N) \) and limited tendering otherwise. Since debarment is a strategy to fight capture (i.e., grand corruption), we focus on cases where capture can occur:

\[
\frac{K}{Q} \leq k(N) \leq \frac{EK}{EQ} \tag{5}
\]

Condition (5) implies that if \( \frac{K}{Q} \leq \frac{K_t}{Q_t} \leq k(N) \) the optimal acquisition strategy is competitive bidding, while if \( k(N) < \frac{K_t}{Q_t} \leq \frac{EK}{EQ} \) the optimal acquisition strategy is sole sourcing (see Proposition 1). Moreover, since \( EK \geq k(N)EQ \), in the absence of additional information the acquisition strategy is sole sourcing.\(^{36}\)

The job of the delegate is to choose the acquisition strategy to maximise value for money, which, in the context of the model, requires to collect information on the appropriateness of implementing an open tender. Following Laffont and Tirole (1993) we assume that the information acquisition process is exogenous. The delegate holds information, denoted \( \sigma \), on the subset, \( C = [\frac{K}{Q}, k(N)] \) or \( M = (k(N), \frac{EK}{EQ}) \), in which \( K_t/Q_t \) is drawn from. With positive probability \( \xi > 0 \) the delegate information is pertinent:

\(^{36}\)When \( Qk(N) \leq K \) the optimal acquisition policy is always limited tendering (i.e., the market is too small to organize an auction), and when \( Qk(N) \geq K \) it is open tendering (i.e., the market is too big to organize a direct purchase). In both cases there is no risk of corruption (as defined in this analysis) because the purchasing procedure is fixed by law, and the delegate has no authority to favor any of the suppliers. When \( \frac{EK}{EQ} \leq k(N) \leq \frac{K}{Q} \) in the absence of information the optimal acquisition strategy is open tendering. The only form of corruption that can possibly occur is extortion. We rule out this possibility here to focus on the more relevant case of capture.
σ = S, where S = M if \( \frac{K_i}{Q_i} \in M \) and S = C if \( \frac{K_i}{Q_i} \in C \). And with complementary positive probability 1 − ξ > 0 it is uninformative: σ = ∅. 37

**Assumption 2** \( \sigma \in \{S, \emptyset\} \) with \( \xi = \text{Prob}(\sigma = S) \in (0, 1) \)

The information received by the delegate is hard evidence. When she is informed that implementing competitive bidding is optimal (i.e., when \( \sigma = C \)) she can prove it in court. However she can always hide her information and pretend that \( \hat{\sigma} = \emptyset \). This claim is impossible – extremely costly – to verify. Under assumption (5) the probability that \( K_i/Q_i \) belongs to C is \( \mu > 0 \) and the probability that it belongs to M is \( 1 - \mu > 0 \). We deduce that the probability that \( \sigma = C \) is \( \text{Prob}(\sigma = C) = \nu = \xi \mu \).

**The timing:**

\( t = 1 \) The principal sets the delegate’s contract and the acquisition rules. He entrusts the enforcement of the acquisition rules to the delegate.

\( t = 2 \) Nature chooses \( K_i \in [\underline{K}, \overline{K}] \) and \( Q_i \in [\underline{Q}, \overline{Q}] \); The delegate obtains information \( \sigma \in \{\emptyset, S\} \).

\( t = 3 \) The delegate and a firm meets; side contracting occurs; 38

\( t = 4 \) The delegate announces \( \hat{\sigma} \in \{\emptyset, \sigma\} \); competitive bidding or sole sourcing is implemented according to the rule edited by the principal based on \( \hat{\sigma} \).

– If competitive bidding, the delegate opens the market by sinking \( K_i \), which value has been chosen by nature at stage \( t = 2 \); nature chooses \( (\beta_1^i, \ldots, \beta_N^i) \); the N potential producers discover \( \beta_1^i \); bidding takes place.

– If sole sourcing, the delegate selects a firm; nature chooses \( \beta_1^i \); the firm discovers \( \beta_1^i \).

\( t = 5 \) \( Q_i \) is revealed to all. Contracts are signed, production and transfer occur.

Stage 3 corresponds to the corruption stage. To avoid competition with the others producers, a firm is willing to pay up to the additional rent it makes in a monopoly position. It is not important which firm pays the bribe and is chosen; at stage \( t = 3 \), they are all symmetric. Then if a firm successfully captures the delegate, the principal ends up with the wrong decision, namely limited tendering in favor of the briber, whenever \( \sigma = C \).

Capture is damaging to society because it involves sole sourcing instead of competitive bidding when

37 If the delegate has the proof that the optimal policy entails limited tendering she could extort a firm to pay a bribe by threatening to claim \( \hat{\sigma} = \emptyset \). Extortion occurs when the optimal acquisition strategy is the fixed-price purchase and the delegate threatens to implement competitive bidding instead. For analyses of extortion see Rose-Ackerman (1978), Auriol (1996) and Auriol and Lassebie (2015).

38 At this stage of the game, both the firm and the delegate ignore the size of \( \beta_1^i \). The bribe depends on the firm’s future expected profit.
\( \sigma = C \) is pivotal information. The social loss associated with capture is\(^{39}\)

\[
L(N) = Q_t k(N) = \frac{N - 1}{N + 1} Q_t.
\] (6)

The expected social loss associated with capture, \( L(N) \), is increasing and concave in \( N \), the number of bidders that would have competed in a fair open procedure. It varies between \( L(N) = \frac{Q_t}{2} \) when \( N = 2 \) and \( L(N) = Q_t \) when \( N \to +\infty \). This result is consistent with the empirical study by Iimi (2006) on procurement auctions for official development assistance. It shows that the bid prices decrease with the number of bidders in a convex fashion. Moving from open to limited tender hence yields a loss increasing and concave in \( N \). In comparison the firm’s benefit from capture is:

\[
\Pi(N) = \pi(1) - \pi(N) = \frac{Q_t}{2} - \frac{Q_t}{N(N + 1)}.
\] (7)

The firm’s benefit from capture is smaller than the social loss from capture because \( L(N) \geq \Pi(N) \) \( \forall N \geq 2 \). In addition to undermining taxpayers confidence in public institutions and inflating the price they pay for the public commodities, capture thus implies a dead-weight loss. Even if the principal could tax the corrupt firm and the delegate to distribute their excess profits back to the taxpayers, he would not be able to restore efficiency. This result explains why it is important to fight corruption.

In case of corruption, the company has to give a bribe to the public official to obtain the market without having to compete with other firms. The bribe rate is \( b \in [0,1] \) so that the net expected profit of the firm when it engages in corruption, assuming there is no risk of detection, is \( \pi(1)(1-b) = (1-b)\frac{Q_t}{2} \). The maximum bribe rate \( b^{static} \in [0,1] \) that the firm is willing to pay ex-ante to avoid competition is so that:

\[
\pi(1)(1-b) = \pi(N). \quad \text{It yields:} \quad b^{static} = 1 - \frac{2}{N(N + 1)}.
\] (8)

### 4.2 Corruption in repeated purchases and debarment

Now we consider the infinite repetition of the purchase stage game. To keep the exposition simple we assume that when the optimal acquisition procedure is sole sourcing (i.e., when either \( \sigma = \emptyset \) or \( \sigma = M \)) the honest delegate picks a firm at random to serve the market. We introduce some notations to ease the exposition. Let \( E_{C}Q \) denotes the expected value of \( Q_t \) conditional on the fact that it belongs to set \( C \) and let \( E_{M}Q \) denote the expected value of \( Q_t \) conditional on the fact that it belongs to set \( M \). Let \( E_{\sigma \neq C}Q = \xi EQ + \xi(1-\mu)E_{M}Q \) denote the expected value of \( Q_t \) when \( \sigma \neq C \). We have: \( E_{M}Q < E_{\sigma \neq C}Q < EQ < E_{C}Q \). Corruption might arise when the delegate information is \( \sigma_t = C \), which occurs with probability \( \nu = \xi \mu > 0 \).

\(^{39}\)If the competitive bidding procedure is optimal then the social loss of capture is \( W(N) - W(1) = Q_t \frac{N-1}{N+1} \geq 0 \).
In the infinite repeated public purchase game the expected payoff of a firm when there is no corruption is:

$$\sum_{t=0}^{+\infty} \left\{ \frac{\nu E_C Q}{N(N+1)} + \frac{E_{\sigma \neq C} Q}{2N} \right\} \delta^t = \frac{1}{1 - \delta} \left\{ \frac{\nu E_C Q}{N(N+1)} + \frac{E_{\sigma \neq C} Q}{2N} \right\}.$$ \hspace{1cm} (9)

By contrast, if the selected firm is corrupt, in addition to the bribe it has to pay to the public official, the firm faces the risk of detection and punishment (i.e., debarment).\(^\text{40}\) Let \(1 - p \geq 0\) be the probability that corruption is uncovered (i.e., \(p\) is the probability that corruption is not discovered). If corruption is detected the firm is debarred permanently from the public market. There are two options for debarment. Either debarment is market specific or it is universal. If it is market specific the firm will be debarred from the market where corruption occurs but it will be able to operate in other markets. If it is universal it will be debarred from all future public procurement markets, which here means that it will also lose the possibility to procure \(E_{\sigma \neq C} Q\). We compute the expected profit of the firm in the latter case. The case of market specific debarment is simply obtained by setting the loss \(E_{\sigma \neq C} Q = 0\) in our formulas. A ratio which plays an important role in the analysis below is

$$\Delta Q_{univ} = \frac{E_{\sigma \neq C} Q}{\nu E_C Q}.$$ \hspace{1cm} (10)

The expression in (10) denotes the volume of public contracts available outside the corrupt transactions relative to the volume of corrupt public contracts. In case of universal debarment the firm loses both the access to \(E_{c} Q\) and to \(E_{\sigma \neq C} Q\). The ratio \(\Delta Q_{univ}\) is therefore a measure of the additional loss imposed on the firms by universal debarment.

So if corruption occurs, there is a probability \(1 - p\) that a firm will disappear from the pool of potential bidders. The probability that a corrupt firm is not debarred and therefore is around in the next period is \(1 - \nu(1 - p)\). To ease the computation of the firms’ payoff, we assume that if corruption occurs it is always the same firm that is chosen for the corrupted deals until it is permanently debarred. In practice the firms that benefit from corrupt deals tend to be always the same (e.g., because of a political connection). The corrupt firm’s expected payoff is:

$$\sum_{t=0}^{+\infty} \frac{(1-b)\nu E_{c} Q}{2N} (1-\nu(1-p))^t \delta^t = \frac{1}{1 - \delta(1-\nu+\nu p)} \left\{ \frac{(1-b)\nu E_{c} Q}{2} + \frac{E_{\sigma \neq C} Q}{2N} \right\}.$$ \hspace{1cm} (11)

A firm is not willing to enter into a corrupt deal if its payoff (11) when it pays a bribe to win the

\(^{40}\)In a static context debarment is not a problem for the firm as there is no future contractual relationship. It becomes relevant only in a dynamic context.
contract is smaller than its payoff (9) when it is honest:

\[
\frac{1}{1 - \delta + \delta v(1 - p)} \left\{ \frac{(1 - b)vE_rQ}{2} + \frac{E_{\sigma \neq C}Q}{2N} \right\} \leq \frac{1}{1 - \delta} \left\{ \frac{vE_rQ}{N(N + 1)} + \frac{E_{\sigma \neq C}Q}{2N} \right\}
\]  \tag{12}

We show in appendix 7.2 that the forever-honest strategy is subgame perfect when (12) holds. Moreover one can easily check that condition (12) is equivalent to \( b \geq \bar{b} \), where

\[
\bar{b} = 1 - \frac{2}{N(N + 1)} - \frac{\delta v(1 - p)}{1 - \delta} \left\{ \frac{2}{N(N + 1)} + \frac{\Delta Q_{univ}}{N} \right\}
\]  \tag{13}

The maximal bribe rate \( \bar{b} \) that the public official can demand increases with \( N \) and \( p \), and decreases with \( \delta \). Comparing equations (8) and (13) it is straightforward to check that \( \bar{b} < \bar{b}^{static} \) for all \( p < 1 \) and \( \delta > 0 \). By contrast if either \( p = 1 \) or \( \delta = 0 \) then \( \bar{b} = \bar{b}^{static} \). This result is intuitive. If the firm does not care about the future (i.e., if \( \delta \) is very small), debarment is useless as a deterrence tool. Similarly if the probability of being caught is 0 the debarment threat carries no weight. If \( p > 0 \) the risk of being detected and punished by debarment reduces the benefit of corruption, and hence, the public purchaser’s room for demanding bribes. This is the desired effect of debarment rules. The effect is larger when debarment is universal (i.e., when \( \Delta Q_{univ} > 0 \)) than when it is market specific (i.e., when \( \Delta Q_{univ} = 0 \)). The more the firm has to lose with debarment, the less it will be inclined to pay bribes: \( \bar{b} \) decreases with \( \Delta Q_{univ} \).

Now it remains to be seen whether the effect is sufficient to deter corruption. Let

\[
\delta_p = \frac{N(N + 1) - 2}{N(N + 1) - 2 + (1 - p)v(2 + (N + 1)\Delta Q_{univ})} \leq 1 \quad \forall p \in [0, 1].
\]  \tag{14}

We deduce the next result.

**Proposition 2** Debarment will deter corruption if and only if \( \delta \geq \delta_p \).

**Proof:** See appendix 7.3.

If the probability of corruption detection, \( 1 - p \), is almost 0 then \( \delta_p \to 1 \) and the public official can ask for large bribes. Conversely if \( 1 - p \) and \( \Delta Q_{univ} \) is large enough, then \( \delta_p \) is small, and the firms are less willing to pay bribes. Universal debarment implies the loss of a larger production volume of public procurement than market specific debarment. This additional loss matters when the detection threat is real and the firm is patient enough. If the firm values future payoffs almost as much as its payoff today (i.e., \( \delta \) is larger than \( \delta_p \)), then the firm will never want to corrupt the public official.

\[41\] The firm - starting from a baseline of honest behavior - does not want to deviate for \( T \geq 1 \) periods and take the corrupt deal, before returning to the honest behavior. Such deviation is not profitable under (12).
4.3 The dynamics of debarment: endogenous $N_t$

We focus in this section on cases where $p < 1$ and initially $N$ is large so that corruption occurs in equilibrium. As time passes, and corrupt suppliers are debarred, the number of firms qualified to compete for the market will be reduced. Indeed, in each period there is a probability $\nu(1-p)$ that a firm is caught and debarred. Let $N_t$ denote the number of firms that are allowed to compete for the market at time $t \geq 0$. We can rewrite the maximum value in (14) as follow:\footnote{\textsuperscript{42} As $N_t$ decreases over time, $k(N_t) = \frac{N_{t-1}}{N_{t+1}}$ decreases too so that $E_{Q_{xt}}$ increases. However this does not change the result from equation (12), and the limit value in (14) is preserved.}

$$
\delta_{tp} = \frac{N_t(N_t + 1) - 2}{N_t(N_t + 1) - 2 + (1 - p)\nu(2 + (N_t + 1)\Delta Q_{\text{univ}})}
$$

(15)

If the probability of detection $1 - p > 0$ is low and $N_0$ is large, debarment will be an ineffective strategy to prevent corruption at date 0. From the welfare point of view, if debarment is not effective in preventing corruption, it does not decrease the cost of the purchase for the taxpayers. Indeed, if debarment is ineffective society ends up with the same decision as without debarment (i.e., sole sourcing in both cases). However, with debarment measures in place, the number of firms that are not debarred decreases over time, as more and more get caught, until $N_t$ is either too low for competitive bidding to be optimal or for corruption to be a preferred strategy for the firm. In other words debarment has an anti-competitive effect that can undermine the debarment mechanism’s intended incentive effect. Let

$$
N_{\text{c}} = \frac{Q + K}{Q - K}
$$

(16)

If $N_t$ falls below $N_{\text{c}}$ then the anti-competitive effect of debarment is so strong that organizing a competitive procedure is no longer optimal. That is, if $k(N) = \frac{N - 1}{N + 1} \leq \frac{K}{Q}$ the optimal acquisition strategy is always to implement sole sourcing. In this particular case debarment has only costs and no benefit. The number of firms decreases with debarment, without reducing the risk of corruption, until this number is so low that organizing a competitive bidding procedure is no longer optimal. This negative effect is stronger if debarment is universal.

More positively, debarment works as intended when $N_t$ reaches the critical number $N_{\text{d}}$ that determines whether corruption is attractive to firms when debarment measures are in place. The number $N_{\text{d}}$ is so that $\delta = \frac{N(N+1)-2}{N(N+1)-2 + (1-p)\nu(2+(N+1)\Delta Q_{\text{univ}})}$. This second-degree equation admits two roots. Only one is positive.

$$
N_{\text{d}} = \sqrt{\frac{1 + \delta(1-p)\nu\Delta Q_{\text{univ}}}{1 - \delta(1-p)\nu\Delta Q_{\text{univ}}}} + 8(1 + \frac{\nu(1-p)}{1-\delta(1-p)\nu\Delta Q_{\text{univ}}}) - 1 + \frac{\delta(1-p)\nu\Delta Q_{\text{univ}}}{1 - \delta(1-p)\nu\Delta Q_{\text{univ}}}
$$

(17)
Let $\text{Int}\{X\}$ denote the inferior integer part of $X$. We deduce the following result:

**Proposition 3** In the long run debarment reduces the number of firms to

$$N_\infty = \text{Int}\{\max\{N_t, N_{\infty}\}\},$$

below which corruption does not occur anymore.

As a result, once $N_t$ has fallen below $N_\infty$ because of debarment procedures, corruption stops. A critical parameter in determining whether debarment is effective in fighting corruption is the probability that firms will actually get caught while bribing a public official. Indeed, the threshold $N_t$ decreases with $p$, that is, with the probability that the firms’ corruption goes undetected. For $p$ close to 1 (i.e., corruption is rarely uncovered) or for $\delta$ close to 0 (the firms do not care much about future contracts) $N_t = 1$. In this case debarment has only an anti-competitive effect and no incentive effect. It yields a higher social loss than the status quo.

For $p < 1$ (i.e., corruption is uncovered sometimes) and $\delta \rightarrow 1$ (the firms are extremely patient), corruption will never occur in equilibrium: $N_t \rightarrow +\infty$. It is worth noting that $N_t$ decreases with $\Delta Q_{\text{basic}}$. Provided that firms care about future sales and are patient enough, universal debarment is more effective at preventing corruption than market specific debarment.

Our analysis shows that debarment will be efficient in reducing corruption if the firms are in (an implicit) long-term relationship with the principal and value future sales, if the number of firms is not too large (i.e., lower than $N_\infty$), and if the probability of corruption detection is high enough. In this context universal debarment is more efficient to fight corruption than market specific debarment. For instance, large international contractors seeking to secure on a regular basis projects financed by the World Bank or the French Development Agency (AFD) might become more reluctant to bribe public officials if the threat of cross-debarment is perceived as real. Similarly, the effect of debarment is substantial for small suppliers who operate on World Bank financed projects in one market only; those that have specialized on such markets may have no alternative customers. By contrast, debarment threats from international organizations will carry little weight for local contractors applying on a one-shot basis. The anticompetitive effect of debarring these contractors is limited as they do not intend to compete elsewhere.

We have considered only one instrument - debarment, a tool that concentrates reactions against corruption on the suppliers in public procurement, and we have shown its limitation as an instrument for fighting corruption. As Rose-Ackerman (2010) points out, bribery is deterred if at least one side of the corrupt transaction faces penalties that reflect its own gains - that is a multiple of these gains because
there will always be limits on the risk of detection. From a pure focus on deterrence, either side can be punished, but in practice, there are various obstacles to the use of optimal sanctions, and it is essential to keep open the opportunity to impose penalties on both sides of the transaction. In practice, policy makers cannot rely on debarment as an efficient strategy against corruption; criminal law sanctions against public officials as well as firms and managers - with fines and prison terms in case of conviction, and private enforcement, including liability in tort and contractual nullity, are likely to be far more efficient in terms of deterring corruption (Auriol 2006, Hjelmeng and Søreide 2016). Combining different law enforcement measures could help to cleanse public procurement of corruption.

The problem is that in countries where corruption runs high, elite actors are often involved, and they will often discourage the enforcement of anticorruption legislation. Most countries have introduced a comprehensive set of integrity mechanisms to promote good governance and to detect misdealing in the state administration. The performance of these integrity mechanisms varies substantially across societies. Especially among development partners offering aid and cheap loans, debarment in public procurement is seen as an opportunity to “deal with the problem” when other integrity mechanisms fail. In this case, debarment is one of the few options that international organizations have to influence the incentives of some of those involved in corruption when they cannot rely on the support of national authorities, and as such, debarment is one of the attempts to act on corruption in the (second-best) ways possible. After all, there are circumstances where it will make a difference - on top of possible norm-generating indirect effects not included in this analysis. However in countries where the elite benefits from corrupt deals the probability of corruption being uncovered and prosecuted is very low and this problem neutralizes the potential benefit of debarment. The involvement of civil society (such as Transparency International) can play an important role in increasing firms’ exposure (see Auriol, Flochel, and Straub 2016), but as the examples presented in Section 2 illustrate, procurement-related corruption often continues despite media attention to the cases.

Debarment with the aim of fighting corruption has an anti-competitive effect by preventing the firms debarred from competing in future public markets. This in turn leads to a different concern: if there is a limited number of bidders in the market they can more easily collude in a bidding ring. If collusion occurs the principal ends up again with the monopoly price. The next section studies whether the debarment mechanism can be used efficiently to prevent collusion, or not.

43 Auriol (2006) focuses on the optimal contracts that should be offered to the public procurement officer to deter corruption. It derives optimal procurement guidelines and optimal wage structure to fight both capture and extortion at the receiving end. By contrast the debarment mechanism puts all the sanctions on the firms, as analyzed in the paper.

Hjelmeng and Søreide 2016 discusses the importance of private enforcement as complements to public enforcement.
4.4 Debarment and cartels/bidding rings

In this section we assume that $Q_t$ is sufficiently large so that organizing a competitive bidding procedure is mandatory for all $N \geq 2$:

$$Q \geq 2K. \quad (19)$$

Since the public procurement officer has no influence on the acquisition procedure, there is no corruption threat in the context of our model. However with large repeated purchases, a cartel of firms can easily emerge and stall competition. We explore in this context how debarment rules might help in fighting such collusive practices.

We first compute the expected payoff of a firm $i = 1, \ldots, N$ when it participates in an infinite sequence of competitive auctions.

$$\Pi(N) = \frac{EQ}{N(N + 1)} \sum_{t=0}^{+\infty} \delta^t = \frac{EQ}{N(N + 1)(1 - \delta)} \quad (20)$$

Second, we compute firm’s expected profit when it colludes with other firms to bid the monopoly price. If the winning firm cannot or is not willing to compensate the other losing firms for not bidding (perhaps because of concern about detection), the best collusive mechanism involves rotating the winning bid among the cartel members so that the winner changes in each round (see Athey and Bagwell 2001).

To ease on notation we also denote by $1 - p \geq 0$ the probability that the winning firm is discovered as a cartel member (i.e., $1 - p \geq 0$ is a generic notation for a firm being found guilty of a crime) and debarred permanently from this market. From the firm’s point of view it does not matter whether all the cartel members are debarred or not. The only relevant payoff for the firm is its own. The expected profit of a firm $i = 1, \ldots, N$ in the cartel is:

$$\Pi^{col}(N) = \frac{EQ}{2N} \sum_{t=0}^{+\infty} (\delta p)^t = \frac{EQ}{2N(1 - \delta p)} \quad (21)$$

Comparing (20) and (21), being a member of the collusive cartel is profitable for firm $i = 1, \ldots, N$ if and only if $\Pi^{col}(N) > \Pi(N)$, which is equivalent to:

$$N > \frac{2(1 - p\delta)}{1 - \delta} - 1. \quad (22)$$

Moreover the cartel is stable if deviating at any period $t \geq 0$ from the collusive equilibrium is not profitable. We assume that the cartel uses a grim trigger strategy. This strategy works as follows. Firm $i = 1, \ldots, N$ starts by choosing the action that maximizes cartel profits. Firm $i = 1, \ldots, N$ keeps on choosing this action as long as all firms have done so in all previous periods. This corresponds to a cooperation phase. If one firm deviates, deviation “triggers” the start of the punishment phase. Firms
choose the action that corresponds to the competitive equilibrium of the static game forever. The firms do not discover their cost unless they prepare a real bid. In a collusive equilibrium, the firms that are not chosen to win do not pay the cost of discovering their true cost for this market. They do not submit a bid.

In this context a “losing” firm under the veil of ignorance - in the sense that it does not know the exact value of its marginal cost - will be tempted to deviate from the collusive equilibrium at date \( t \geq 0 \) for an expected profit \( \frac{E_Q}{2} \) at period \( t \) and \( \frac{E_Q}{N(N+1)} \) forever after that. We deduce that deviation is ex-ante unprofitable if:

\[
\frac{E_Q}{2} - \frac{E_Q}{N(N+1)} + \frac{E_Q}{N(N+1)(1-\delta)} \leq \frac{E_Q}{2N(1-\delta p)}.
\] (23)

Equation (23) is equivalent to:

\[
p > \frac{1}{\delta} \frac{2\delta + (N-1)(N+1)(1-\delta)}{2\delta + N(N+1)(1-\delta)}
\] (24)

Depending on the value of \( \delta \), the right hand side (RHS) is not always lower than 1, in which case there is no way for the cartel to sustain collusion. In particular, if the firms are very impatient collusion is unstable and the firms will compete for the market. A necessary condition for collusion to be a threat is thus that in (24) the RHS < 1, which is equivalent to

\[
\delta > \frac{(N-1)(N+1)}{N(N+1) - 2}.
\] (25)

In other words, firms must be patient for a collusive equilibrium to emerge. Condition (25) is a necessary condition for collusion to be stable, but it is not sufficient. In addition, condition (24) must hold.

To illustrate how these conditions come to effect, let us assume that \( N = 5 \). We deduce that condition (24) is equivalent to \( p > \frac{1}{\delta} \frac{4+12(1-\delta)}{2\delta + N(N+1)(1-\delta)} \) and condition (25) is equivalent to \( \delta > \frac{6}{7} \approx 0.857 \). Let assume that \( \delta = 0.9 \). It implies that \( p > \frac{36}{35} \approx 0.972 \). In other words if \( N = 5 \) the firms have to be patient and the probability of detection low (i.e., lower than 2.7 percent) for collusion to emerge and be stable.

We deduce the next result.

**Proposition 4** Debarment will deter collusion if and only if the probability of cartel detection \( d \) is so that:

\[
d \geq 1 - \frac{1}{\delta} \frac{2\delta + (N-1)(N+1)(1-\delta)}{2\delta + N(N+1)(1-\delta)}
\] (26)

If \( \delta \) is small the RHS is negative and (26) always holds. If \( \delta \) is large enough so that condition (25) holds, then the RHS is strictly positive and the probability of detection must be large enough to deter collusion.

It is worth noting that if the probability of detection is positive but lower than the threshold in (26)
then debarment entails a competitive cost without generating any benefit: Debarment alters the set of bidders in future auctions. This is especially true if all the firms involved in the collusive conspiracy are debarred upon discovery. In this case debarment is a very poor instrument to fight collusion, and the principal ends up with nobody to serve its public markets. A better mechanism would be to debar the firm that has benefited from the collusive agreement and let the other cartel members compete for future public tenders. This mechanism has exactly the same disincentive effect as the debarment of all the firms but will not make procurement impossible in the future. From a legal point of view this mechanism might be difficult to implement, although leniency programs for cartel members that report their offenses to the authorities suggest a certain policy space for solutions that deviate from principles of equal treatment. In cartel cases an important policy issue is therefore whether all firms in a cartel are debarred, or if certain members of the cartel, ring leaders for instance, are sanctioned more severely. If the debarment regimes are maintained as they now typically stand, the distortive consequences associated with a higher risk of collusion can be mitigated by the modification suggested above, that is, by excluding only one of the firms in cartel cases, rather than all the firms involved.

Second, debarment will affect existing cartels in the sense that it will undermine leniency granted by competition authorities (CAs). In most jurisdictions CAs have leniency programs that may reduce or eliminate fines for infringement of competition rules. Typically such immunity may be granted if the firms confess and cooperate with the CAs in prosecuting the other members of the cartel. Because CAs cannot grant leniency for debarment, the danger of debarment will make it less likely that firms will apply for leniency. In this sense, debarment of firms for their involvement in cartel collaboration will tend to undermine the efficiency of the leniency programs established by CAs. Hence, the total effects of debarment on cartel formation and the possibility of cracking cartels (exits) with leniency inducements, are far from trivial.

As discussed in section 2 there is variation across countries and multinational development banks in their design of debarment mechanisms. To the extent that cartel collaboration is listed among the crimes for which suppliers can be debarred, the common rule is to debar all suppliers involved. What this analysis shows is that the debarment mechanism will not work against collusion if this is the rule. With a modification, however - specifically, with debarment reserved for the ringleader or the specific beneficiary in the case when collusion was detected, the debarment instrument can in fact work as a tool that reduces suppliers’ propensity to be involved in collusion. Current rules under some jurisdictions, that stipulate debarment of all the suppliers involved in the crime, makes no sense according to our analysis, and if choosing between such a regime and a regime that debars suppliers upon corruption only,44 the latter is

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44 This analysis focuses on the cartel collaboration and corruption, yet fraud is another relevant crime. Upon this analysis, the impact of debarment on crimes conducted by an individual supplier alone is straightforward, and therefore not included in the analysis.
preferred.

4.5 Allowing entry

So far we have considered that the number of firms that can serve the market is at most \( N \), so that with debarment in place, and corruption and/or collusion going on, the number of firms decreases over time. In our analysis there is no new entry to replace the debarred firms. This assumption is consistent with public purchases being marginal in comparison to the volume of private purchases. If public markets represent a small fraction of the business of the sector, \( N \) is not determined by the public sector activity, and is therefore exogenous to it. In other words, if \( N \) is determined by the private sector activity, debarment will have no impact on the number of potential suppliers in the sector. The anti-competitive effect of debarment on the public purchases will be as analyzed in the paper.

Another polar case is when the public purchases are the main source of business of the firms. In this case debarment will imply the firm bankruptcy, which leaves room for presumably some new entry. If each time a firm is debarred a new one is created to replace it, then debarment will have no impact on \( N \), which means it will have no impact on corruption, unless the steady state number of firms with free entry is low enough (i.e., unless \( N \leq N_\infty \) see Proposition 3).

For intermediate cases where some entries of new firms occur to replace a fraction of the firms exiting, \( N_t \) will be the result of this mixture of exit and new entry. The logic of the model will still hold, but with \( N_t \) replaced by the actualized value (i.e., it will be larger than in the case of pure exit). Since it would decrease at a slower rate.

5 Discussion

Public procurement systems contain rules intended to promote competition and value for money in government acquisition of goods and services. Suppliers are judged not only as suppliers of goods or services, but also on how well they comply with the overall legal framework and whether they can be found trustworthy. The option to debar allows discretion under circumstances where the acquisition would otherwise be strictly steered toward the best price-quality combination.

Debarring suppliers from auctions sends a strong signal to the private sector about demand for integrity in government-financed projects. This is especially important in countries where government institutions are unable to prevent procurement-related crime. However, the causes of corruption, and other forms of crime that call for disqualification of some suppliers are not to be found in the private sector alone. One of our concerns with the observed debarment practices is the one-sided reaction against suppliers. In
many cases, few attempts have been made to address corruption on the side of the procurement agents. Under such circumstances, the debarment rules can easily come to define corruption as a problem that resides outside the procurement agencies’ sphere of control.

Clearly, corruption will not take place if governments and their public procurement agents are all honest, since under such conditions a bribe will be declined and there will be no need for debarment of suppliers as a means of securing integrity. When procurement agents are dishonest, on the other hand, the exclusion of some suppliers will not be sufficient to deal with the problem. For international development partners that see the shortcomings of their good governance recommendations, debarment makes sense as a strategy for disciplining international firms, but a one-sided strategy will not solve the problems in public procurement, especially when politically connected local firms are involved.

For these reasons, debarment of suppliers can never be a complete anticorruption solution. To some extent, however, it is a relevant tool for governments and international organizations that do not know whether they can trust their procurement agents. Such asymmetric information is generally a problem for governments in all categories of countries, and it is therefore an assumption behind this analysis, even if debarment rules seem to have been introduced in many countries with a very high confidence in procurement agents’ honesty.

Procurement agents are usually the ones who organize the auction and control whether pre-qualification criteria for a tender are met. In practice, irrespective of what public procurement procedures are specified and what technical integrity barriers have been put in place, the agents can let informal factors influence the allocation of contracts, deciding whether an acquisition should be determined by competitive bidding or sole-source negotiation. This reality is the point of departure for our analysis of debarment.

The analysis shows that debarment may deter suppliers from offering bribes as long as they place a sufficiently high value on the profits from future public procurement contracts. The problem with debarment as an integrity-promoting strategy, when it works (that is, when there is a de facto probability of being caught), is the effect on the number of firms in the market. When there are many competitors, the cost of excluding a competitor is low since each supplier can be replaced. For each corrupt acquisition, however, the price is set as if the market were a monopoly. As the number of firms decreases, debarment becomes an effective tool to deter corruption. With few suppliers in the market, however, cartel collaboration becomes a new threat. If collusion occurs and is the preferred strategy, monopoly prices will again impose costs on society. Debarment of dishonest suppliers will not be an efficient strategy in these cases

45 The World Bank Integrity Vice Presidency’s annual reports, including the one for fiscal 2014, include details and updates on World Bank investigators’ attempts to spur investigations in public procurement corruption at the national level. Even when the World Bank shares the facts from investigations that have led to World Bank debarment of suppliers, there are disappointingly few criminal justice responses at the national level. See World Bank (2014). See also Søreide et al. (2016) for debate.
because it can easily result in exclusion of all remaining suppliers.\textsuperscript{46} To limit the anti-competitive effect a debarment regime should be combined with initiatives to bring back excluded suppliers so that they can contribute to competition as soon as they regain the trust of procurement agencies.\textsuperscript{47} The decision as to whether or not a supplier is found trustworthy – for example, after some reorganization effort and compliance reform – should not be left up to a procurement agent. At present, however, this is a frequent practice, as if those who developed the debarment rules totally ignored the fact that corruption in procurement has two sides.

For these reasons, at the exclusion of international development banks and other international organizations that do not have other tools, it is difficult to defend a debarment strategy that works as intended. And clearly, it does not make much sense to introduce an inconsistent or dysfunctional debarment strategy unless it is merely a window-dressing initiative intended to impress voters. Debarment allows governments to be seen to act against damaging practices. As described in this analysis, the effect on procurement is positive only under very specific circumstances. It is a problem if the “seen to act” aspect of the strategy implies reduced attention to more efficient solutions. Despite the sensitivities associated with addressing corruption and fraud in politics and state administration, debarment strategies should never divert attention from the importance of strengthening government systems and enhancing competition in markets. There are other initiatives against corruption and crime that are more important for securing integrity in public procurement. In particular, pro-competition initiatives will usually reduce opportunities for corruption (for example, if combined with solid outcome control and/or price control). The most serious corruption problem, involving capture of political decision-makers, calls for legal harmonization and an expansion of the market that is regulated by the rules (Auriol 2006). Foreign bribery legislation and ambitions about global debarment are attempts of moving in such a direction. Looking more closely at the mechanisms, however, we find no efficient anticorruption solution in any of these strategies taken independently.\textsuperscript{48}

A further argument for international legislation is associated with the risk of collusion. While most governments seek to control cartel collaboration in their own markets, there is generally a different law enforcement attitude when it comes to the export of cartels. Martyniszyn (2012) points out that

\begin{footnotesize}
\textsuperscript{46} As a consequence of the analysis, we find that the maximum size of the bribe requested by a corrupt procurement agent increases with the number of competitors. Intuitively, each supplier has more to gain from sole-source procurement when there are many competitors and therefore will display a higher willingness to pay. In practice, however, we often associate corruption with few competitors, and logically, oligopoly should imply higher surplus and therefore also bribes, compared to more intense competition. The different effects on the size of the bribe will depend on what decision is being negotiated. This analysis focuses on a procurement agent’s choice between competition and sole-source procurement. A decision to keep high barriers to market entry is a different decision, which may imply positive correlation between profits and bribes – and involve different decision-making levels.

\textsuperscript{47} See Hjelmeng and Søreide (2014) and Majtan (2013) for debate about criteria for returning to the market.

\textsuperscript{48} Foreign bribery legislation is another set of rules that aim at preventing suppliers from offering bribes. The tool is targeted at the suppliers and will not reach government representatives. Internationally, there is very asymmetric enforcement of these rules and this fact distorts competition (Bjorvatn and Søreide 2013).
\end{footnotesize}
many governments have a strong inclination to ignore cartel collaboration among firms – provided the consequences are kept abroad. In light of this observation and the analysis presented in this paper, we should see clearer anticorruption effects from international competition-enforcement initiatives than from universal debarment of unreliable suppliers.

6 References

References


[34] Søreide, 2005


[38] Treisman, D. 2007. What have we learned about the causes of corruption from ten years of cross-national empirical research?. *Annu. Rev. Polit. Sci.*, 10, 211-244.
7 Appendix

7.1 Expected welfare with competitive bidding

When the public purchaser chooses an open procedure he implement a second price auction (see Myerson (1981)). In this procedure each firm submits independently a price above which it accepts to serve the market. The contract goes to the firm with the lowest bid, but the price it gets in exchange for the production is the second-lowest bid. With this form of auction it is a dominant strategy for each producer to announce its true marginal cost. Let \( f_{[2]}^N(\beta) \) denote the density function of the second lowest draw of \((\beta_1, \ldots, \beta_N)\): \( \beta_{[1]} \leq \beta_{[2]} \leq \ldots \leq \beta_{[N]} \). The density function of the second lowest draw of \( N \) independently and uniformly distributed variables is \( f_{[2]}^N(\beta) = N(N-1)(1-F(\beta))^{N-2}F(\beta)f(\beta) = N(N-1)(1-\beta)^{N-2} \). The expected cost of the purchase with a second price auction is \( Q_t \int_0^1 \beta f_{[2]}^N(\beta)d\beta = Q_t \int_0^1 \beta^2 N(N-1)(1-\beta)^{N-2}d\beta \). Integrating the expected cost by part yields \( Q_t \int_0^1 \beta f_{[2]}^N(\beta)d\beta = Q_t \int_0^1 2\beta N(1-\beta)^{N-1}d\beta \). Since \( f_{min}^N(\beta) = N(1-\beta)^{N-1} \) is the density function of \( \beta_{[1]} = \min(\beta^1, \ldots, \beta^N) \) the minimum of \( N \) independent variable of type \( \beta^i \), and \( F_{min}^N(\beta) = 1 - (1-\beta)^N \) the cumulative distribution function, we deduce that expected welfare when a competitive bidding procedure is implemented is:

\[
W(N) = S(Q_t) - Q_t \int_0^1 2\beta f_{min}^N(\beta)d\beta = S(Q_t) - \frac{2Q_t}{N+1}
\]
QED

7.2 The forever-honest strategy is subgame perfect

We need to show that the firm - starting from a baseline of honest behavior - does not want to deviate for \( T \geq 1 \) periods and take the corrupt deal, before returning to the honest behavior. If such a deviation
was profitable then the forever-honest strategy would not be subgame perfect. The payoff of a deviation of \( T \geq 1 \) periods at any time \( \tau \geq 0 \) from the honest strategy to the corrupt strategy is

\[
\sum_{t=0}^{T} \left\{ \frac{(1-b)(1-q)}{2} + \frac{E_{x,y}Q}{2N} \right\} \left[ (1-\nu(1-p))^t \delta^t + (1-\nu(1-p))^{T+1} \delta^{T+1} \sum_{t=0}^{\infty} \left\{ \frac{\nu E_{x,y}Q}{N(N+1)} + \frac{E_{x,y}Q}{2N} \right\} \delta^t \right] = \left\{ \frac{(1-b)(1-q)}{2} + \frac{E_{x,y}Q}{2N} \right\} \left[ \frac{1-(1-\nu(1-p))\delta^{T+1}}{1-(1-\nu(1-p))\delta} + \frac{(1-\nu(1-p))^{T+1}\delta^{T+1}}{1-\delta} \right] \left\{ \frac{\nu E_{x,y}Q}{N(N+1)} + \frac{E_{x,y}Q}{2N} \right\}.
\]

A firm will never find it profitable to deviate from honest behavior and be corrupt for any \( T \geq 1 \) periods if

\[
\left\{ \frac{(1-b)(1-q)}{2} + \frac{E_{x,y}Q}{2N} \right\} \left[ \frac{1-(1-\nu(1-p))\delta^{T+1}}{1-(1-\nu(1-p))\delta} + \frac{(1-\nu(1-p))^{T+1}\delta^{T+1}}{1-\delta} \right] \left\{ \frac{\nu E_{x,y}Q}{N(N+1)} + \frac{E_{x,y}Q}{2N} \right\} \leq \frac{1}{1-\delta} \left\{ \frac{\nu E_{x,y}Q}{N(N+1)} + \frac{E_{x,y}Q}{2N} \right\}
\]

One can easily check that condition (27) is equivalent to condition (12). QED

### 7.3 Proof of Proposition 2

Firms might be willing to enter into a corrupt deal if the bribe demanded by the public official is low enough (i.e., if \( b < \bar{b} \)). Debarment will deter corruption if there is no positive bribe rate \( b \) that can be lower than \( \bar{b} \) defined in condition (13). That is, if \( \bar{b} \leq 0 \). The critical value of \( \delta \) so that \( \bar{b} = 0 \) is (14). We deduce the result. QED