

“Leakage” in International Regulatory Regimes Did the OECD Anti-Bribery Convention Increase Bribery?

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Abstract

Why are some regulatory regimes successful while others fail? We examine one obstacle to successful regulation — “regulatory leakage,” in the context of the OECD Anti-Bribery Convention (ABC). Leakage occurs when regulated behavior decreases for actors under jurisdiction, but increases among those outside of the regime’s purview. Examples include the leakage of activities making extensive use of fossil fuels from countries with strict carbon emissions limits to those with more lax standards, the diversion of MNC activity away from strict regulatory environments to those with lax labor or environmental protections, or the diversion of trade to sanctioned countries from participants in a sanctions regime to other suppliers. Building on previous empirical findings, we analyze a formal model that demonstrates how the OECD ABC may simultaneously reduce bribery among firms from member countries while increasing bribery by firms from non-OECD ABC member countries. The result of such patterns can a net positive, negative, or nil change in overall regulated behavior. Extensions to the model show (a) the degree to which bribery increases among non-subject firms is a function of the strength of monitoring and enforcement for subject firms, and (b) opportunities for subject firms to partner with non-subject firms “outsource” bribing behavior can further undermine regulatory efforts. We draw on these insights to examine new empirical evidence of MNC activity in Vietnam. As an emerging market with firms from a diverse set of host countries — some subject and some non-subject to the OECD Convention — Vietnam is an apt laboratory. We find support for the notion that enforcement can exacerbate the rate of leakage to non-subject firms, but less support for the idea that firms can evade the ABC by outsourcing bribery.

Introduction

Why makes regulatory regimes successful? International relations research has identified many challenges to successful regime activity, such as collective action, monitoring, or enforcement problems. In this paper we focus on one specific obstacle to overall regime success that highlights a something of a paradox: when regimes successfully curtail a prescribed behavior among some actors, it may incentivize other actors to increase that behavior. Drawing parallels to work on sanctions, environmental policy, and foreign direct investment, we label this obstacle “regulatory leakage.”

Efforts to regulate undesirable behavior or control market externalities often suffer from some form of “leakage.” When the undesirable behavior is well regulated and enforcement credible in one jurisdiction, actors may simply move to less well regulated jurisdictions where the consequences are less severe or absent. Sometimes this is also referred to as forum shopping. The globalization of production and the voluntary nature of treaty law make this a central problem in multilateral governance, as regulations are frequently adopted unequally across countries. Regulatory leakage can also hinder domestic efforts to curtail negative externalities, as actors simply relocated to jurisdictions with more lax regulation. These patterns have been observed in the regulation of carbon emissions,¹ multinational corporations’ evasion of environmental regulations² or labor protections,³ and the maintenance of sanction regimes,⁴ among other issue areas.

This particular study of regulatory leakage stems from an investigation of empirical patterns surrounding the OECD Anti-Bribery Convention (ABC). Using a list experiment in Vietnam, an emerging market host country for FDI from firms of heterogeneous nationalities, Jensen and Malesky (2017) identified a curious empirical regularity regarding bribery before and after the inception of the OECD ABC. After the inception of the Convention,

¹E.g. Eichner and Pethig (2011), Babiker (2005)

²E.g. Eskeland and Harrison (2003), Dijkstra et al. (2011), Levinson (1996).

³E.g. Ayoub (1999); Moseley and Uno (2007); Moseley (2010)

⁴E.g. Early (2009), Early and Spice (2015), Tostensen and Bull (2002), Drezner (2000).

bribery decreased (as intended) among firms from countries subject to the ABC. However, bribery appeared to *increase* among non-subject firms after the ABC came online. This increase may, in fact, have completely offset the reduction among ABC-subject firms. The ABC was therefore effective, but only for firms from countries voluntarily participating in the regulatory endeavor. Like the examples of leakage cited above, it appears that an unintended consequence of the ABC is that bribery was “pushed” onto a different set of firms. This consequence of the OECD ABC is surprising. After all, why should firms that do not fall under the jurisdiction of the treaty be affected at all by its inception? We argue that the pattern can be explained as a form of regulatory leakage, and thus bears some commonality with regulation in many other issue areas.

Specifically, we develop a game-theoretic model of bribery behavior that can account for this observed pattern. The conclusions also speak to larger issues of regulatory leakage in multilateral regimes. In the model, n firms simultaneously decide whether to bribe in order to gain access to a potentially lucrative market. Although the market is competitive amongst firms that enter, entry is restricted, which generates rents for market entrants. These rents dissipate as more firms enter. Thus, the benefits to entry are a function of the number of other firms expected to enter. However, firms possess private information about their own propensity to pay entry bribes, owing perhaps to different budget constraints, corporate culture, or other unobservables that drive bribing behavior. This means that individual firms’ entry decisions are conditional on their beliefs about the distribution of other firms’ types, as well as their own costs for entry.

We further show that if a subset of firms is subject to an anti-bribery convention (or other form of regulation) that brings with it some probability of being caught and sanctioned (e.g., in the form of a fine), the entry decisions of the two groups diverge. Subject firms will be deterred as the probability of being caught or the severity of the sanction increases. This deterrence effect is consistent with the findings of Jensen and Malesky (2018). But because market rents are a function of the expected number of firms entering, in equilibrium non-

subject firms will enter at a higher rate. Indeed, this rate of entry is increasing as the number of subject firms goes up and as the strength of monitoring and enforcement of the regime increases. This points to an unintended consequence of treaties like the OECD-ABD. Although conventions with teeth—in this case, extraterritorial enforcement—can successfully deter bribery, this comes with a tradeoff in competitive markets, where the deterrent effect on subject firms can translate into a permissive effect for non-subject firms. The overall welfare effects, in terms of the aggregate change in bribery, may be positive, negative, or neutral. Our theoretical analysis therefore fills a gap by providing an analysis of these countervailing effects.

We also study an extension to the model where subject firms can contract with a non-subject firm as a form of regulatory evasion. We explore how the decision to “sub-contract” bribery depends on the level of monitoring and enforcement in a firms’ home country and the required cost-sharing to bring in a partner firm for the purpose of evading the regime. When the firms face a strong possibility of costly enforcement at home, they are more likely to engage in this form of regulatory evasion, especially if it requires only a small transfer to subcontracted firms.

In the next three sections, we discuss existing literature on leakage in multilateral governance, provide background on the OECD ABC, and explain the empirical finding from Jensen and Malesky (2017). We build on this discussion to motivate and introduce the formal model. We then examine the new empirical patterns predicted by the formal model. Specifically, rates of bribery depend on levels of enforcement across the countries participating in the ABC. Consistent with the theoretical model, the data show that the introduction of the ABC reduced bribery amongst countries with strong enforcement regime, but slightly increased bribery by firms from weak enforcement jurisdictions. We then explore newly gathered survey data on subcontracting with foreign firms to evade ABC regulation. Consistent with theory, we find this practice most pronounced amongst firms from strong enforcement jurisdictions. We close by discussing the larger implications of these results for

anti-corruption efforts and regulatory regimes more generally.

Regulatory Leakage

We define regulatory leakage as the tendency of an proscribed behavior to move from an area where it is highly regulated, or from agents who are subject to more stringent regulation, to less well-regulated areas or agents. The concept is familiar to many and is present across many issue areas. For instance, local police understand that demand for illicit activities can be hard to suppress, which means that such activities often simply relocate when police presence is increased in a particular geographic area.⁵ But the general phenomenon is possible in almost any arena in which there is differential enforcement or jurisdiction-specific rules.

Yet despite the possibility of leakage (sometimes called “spillover”) across multiple issue areas, the phenomena has received more attention in economics and climate policy research than in political science or international relations. For instance, Babiker (2005) analyzes a formal model of firm competition against the backdrop of the Kyoto Protocol, concluding that pollution reduction targets may result in considerable relocation of firms to environments with less stringent restrictions.⁶ Firms in carbon intensive industries with ready alternatives may avoid curbing the production of carbon emissions by simply moving elsewhere. Likewise, anti-globalization activists have long been concerned about the possibility of MNCs evading environmental regulations or strict labor laws, possibly even driving governments to a regulatory “race-to-the-bottom,” although empirical research in these issue areas generates mixed results.⁷ Here, firm mobility and differential levels of regulation facilitates “jurisdiction shopping,” where the aggregate result may be very little reduction in the overall level proscribed activity, merely a relocation of that activity.

⁵See Ratcliffe (2005), Gabor (1981), Collins and Judge (2011).

⁶See also Kukik and Gerlagh (2003), Paltsev (2001), Aichele and Felbermayr (2015).

⁷Mosely (2010), Moseley and Uno (2007), Chung (2009), Eskeland and Harrison (2003); Hallerberg and Basinger (2004).

The literature on economic sanctions identifies a similar phenomenon, sometimes known and “sanctions-busting.” Sanctions regimes rely on individual countries monitoring and enforcing their own firms, and potentially each other. Yet there is often differential effort devoted to monitoring and enforcement across countries. This means that sanction targets may simply seek alternative sources of illicit materials. Illicit trade is not eliminated, just redirected. Here again the culprit is differential monitoring and enforcement regimes, which might allow sanction targets to circumvent prohibitions against trade in certain items by seeking out alternative suppliers. In this case, the problem is not a function of firm mobility, and in fact a reduction in activity from firms in well-enforced areas works to the benefit of those in more lax jurisdictions. Firms from sanction-busting states seize on profit-making opportunities generated by reduced activity from sanction-abiding states.

Our central point is that the regulatory logic is similar across these, and other, issue areas. Differential enforcement across jurisdictions allows actors seeking a competitive advantage to adapt their behavior either in response to new opportunities or to evade enforcement. As we detail below, our theory and evidence suggest a similar dynamic occurring after the inception of the OECD ABC Convention. As detailed below, the Convention uses an “extraterritoriality” approach; countries must criminalize bribery in their domestic legal codes and hold their own firms accountable for illicit behavior. In practice, the effort countries exert to monitor and punish the bribery of their firms varies. [Perhaps provide some descriptives on enforcement here?]. And since the Convention is an international treaty, countries join voluntarily, leaving firms from non-participating countries outside the jurisdiction of the treaty. These two features — differential levels of enforcement across member countries and differential levels of enforcement across member and non-member countries — creates the potential for regulatory leakage. In the next section we provide some background on this treaty, including information on the home country enforcement strategy it employs.

Background on the OECD Convention

In 1988 the United States amended the 1977 U.S. Foreign Corrupt Practices Act (US-FCPA). This amendment of one of the already strongest anti-corruption acts formally required Congress to negotiate with other governments to coordinate anti-bribery efforts (George et al. 2000, 495) as a means of leveling the playing field between US firms that were limited in their potential bribery behavior and firms from other countries that have few or no laws preventing their firms from bribing abroad (Pacini et al. 2002; Schmidt 2009; Tyler 2011). Thus the US, seemingly taking unilateral action on policing bribery, was actually the driving force behind a broad OECD initiative combating business bribery.

In 1999, representatives from a group of advanced industrialized economies negotiated the world's most ambitious global agreement to combat business corruption. The ABC, eventually signed and ratified by all OECD nations plus an additional six non-OECD countries, requires signatory states to pass domestic anti-bribery legislation that criminalized bribery by their own firms in other countries. In so doing, signatories implemented the concept of extraterritoriality, which tasks countries with policing the behavior of their own national firms abroad. Business executives from Australia, for example, are legally forbidden from paying bribes to government officials in any country in the world. With 41 signatories as of 2016, the agreement is seen as a stunning legal achievement, institutionalizing the belief that both limited capacity to enforce anti-bribery laws (Kaczmarek and Newman 2011) and the incentives of government officials that may be the recipient of bribes can be overcome with home-country policing of foreign investment (Stephan 2012; Tyler 2011; Spahn 2012; Spahn 2013; Hatchard 2013). While some countries such as the United States had long used extraterritoriality in anti-bribery legislation, namely through the landmark US Foreign Corrupt Practices Act (FCPA), combating bribery has been seen as a collective action problem requiring coordination across countries (Duvanova 2007; Magnusson 2013). By making this agreement binding for all firms from OECD countries as well as additional signatories, the convention produced a level playing field for firms from signatory countries.

For some firms that potential for reducing global bribery would dramatically reduce the costs of doing business abroad. Bribery can be seen as a tax on business that is both illegal and uncertain (Mauro 1995; Wei 2000; Habib and Zurawicki 2002; and Cuervo-Cazurrá 2008). The costs of bribery are magnified by both the high costs of hiding the illegal activity (Schleifer and Vishney 1993) and by the unpredictability of bribery due to political changes (Samphantharak and Malesky. 2008). For other firms, the net impact of this agreement is more mixed. Firms often bribe to win government contracts or obtain land and licenses, trading bribery payments for access to rents (Bliss and Di Tella 1997; Ades and Di Tella 1999; Hellman et al. 2000), and the impact of this convention on their business is partially a function of how effective these bribes are in winning contracts and the effectiveness of bribery by their competitors.

How effective is the OECD-ABC in combating corruption? In previous research, Jensen and Malesky (2018) examine the case of business bribery in Vietnam, a country host to foreign investment from a diverse set of home countries, including both OECD-ABC signatories and non-signatories. On the surface, the findings from this study point to the effectiveness of the convention in limiting bribery. Simply signing the OECD-ABC has no impact on host firms, but once countries became subject to peer-review of anti-bribery enforcement efforts that began with Phase 3 of the convention in 2009, firms from OECD-ABC signatory countries dramatically reduced their bribery in Vietnam. An anti-bribery convention armed with the teeth of peer-review had a substantial impact on reducing bribery in Vietnam, pointing to a seeming success of international law.

This previous work utilized a technique that shields respondents from incriminating themselves or their firm over bribery (see also Malesky et al 2015). Unlike perception-based surveys that can be subject to bias (Treisman 2007; Olken 2009), corruption is measured based on firm experiences during business registration and the process of obtaining a government procurement contract. Using an Unmatched Count Technique (UCT), often called a “list experiment,” Jensen and Malesky (2016) find the OECD-ABC, after the peer-review

phase of the convention (Phase 3), dramatically reduced bribery for signatory country firms. Prior to the OECD-ABC signatories bribed at equally high rates. Over 20% of foreign firms paid bribes during registration and over 40% of firms paid bribes during government procurement bidding.

These results suggest a major impact of this convention on bribery behavior by signatories. But the findings also uncovered a new puzzle unnoticed by previous research. The OECD-ABC led to a reduction in bribery relative to non-convention signatories. For example, South Korean firms (OECD-ABC signatories) bribe at far lower rates than Taiwanese firms (OECD-ABC non-signatories) after the convention. But this relationship is partially driven by the *increased* bribery behavior of non-signatory firms. South Korean firms reduced their bribery after the peer review process in the OECD-ABC, while Taiwanese firms increased their bribery. OECD signatories had a dramatic decrease in bribery behavior as we expected. Bribery decreased from a remarkable 23.1% of firms to 11.5% of firms, providing clear evidence for the effectiveness of the convention for signatory firms. Unfortunately, this positive findings is coupled with a disturbing pattern among the non-OECD firms. Non-signatories more than doubled their propensity to bribe, from an already high 18.6% to a shocking 40.7% of firms.

It appears that the OECD-ABC achieved its intention of decreasing bribery amongst subject firms, while perversely increasing bribery by non-subject firms—potentially offsetting completely its positive effects. Similar to the examples discussed in the previous section, it appears as if much, if not most of the bribery formerly accounted by firms subject to the treaty was “shifted” to non-subject firms after the treaty came into force. In the following section, we introduce and analyze a formal model of market entry requiring bribery. We examine the entry decisions of firms before and after the OECD convention comes into force. The latter period separates firms into subject and non-subject firms, which have different marginal rates of entry based on the likelihood of being caught bribing and the severity of the punishment. Comparative statics on these parameters — which we refer to as monitor-

ing quality and enforcement costs — show that as the quality of monitoring and enforcement goes up for subject firms, more non-subject firms will bribe. We also present an extension in which the subject firms can choose to evade enforcement by sub-contracting with non-subject firm. We then examine these new empirical implications with data from a new round of the Vietnam Provincial Competitiveness Index (PCI) survey which of firm managers.

Model of “Market for Bribery”

In this section we develop a simple model of market entry among n firms that vary only in their marginal cost or marginal propensity for bribing. This firm-level propensity can be thought of as alternatively as the degree of “budgetary slack,” which can be thought of as the degree to which firm possesses resources that can be devoted to bribery, or how prone individual firms are to bribe, perhaps due to features of organizational culture or the firm’s history in a particular investment environment. We conceptualize firms in this way to capture several factors that might affect an individual firm’s decision to bribe. First, firms vary in the degree to which they possess disposable income for use on bribes. Second, firms rarely expend all their disposable income on bribery, and there is no simple correlation between firm size and propensity to bribe, likely because firms have unique propensities to bribe based on various facets of their cost structure, corporate culture, and other unobservables. We therefore conceptualize this propensity as a reduced form parameter, capturing the objective cost of a bribe relative to the firms’ underlying propensity to bribe. We refer to this as the marginal cost of bribing. This propensity (a firm’s type) is private information, and firms simultaneously choose whether to bribe for market entry, unaware of which other firms are making bribes. Yet because rents dissipate in markets with barriers to entry as the number of entrants increases, we conceptualize the value of entering the market as a function of the number of entrants.

We then analyze several extensions of this basic model. In the first, we allow k firms to be subject to an anti-bribery treaty, like the OECD anti-bribery convention. We model being

subject to the treaty as making these k firms vulnerable to some chance of being caught fined by their home countries (these are the firms from OECD signatory countries). We allow the probability of detection (i.e. quality of monitoring), as well as severity of the fine (i.e. enforcement strength) to vary. We examine how the bribing behavior of those k firms as well as the remaining $n - k$ firms changes in response to these parameters. We then present an extension in which firms that are subject to the treaty have a third option, sub-contracting with a non-subject firm that can pay an entry bribe. Doing so avoids detection and potential fines, but entails some sharing of profits with the non-subject firm. Thus, the decision of whether to evade the treaty by effectively “out-sourcing” bribing activity depends on the tradeoff between reducing the chance of detection and sanction versus the degree of necessary profit-sharing with a non-subject firm or subsidiary.

Baseline Model

Actors and Sequence

We model the interaction between n firms that vary only in their marginal cost of bribing, x_i . The sequence of the game is as follows:

1. Nature draws firm types, defined as their marginal cost of making a bribe, from a distribution with support $x_i \in [0, \bar{x}]$.
2. Firms choose whether to pay a bribe, x_i
3. Entry contracts obtain and payoffs accrue.

Payoffs

Firms pursue market entry to capture rents. But rents decrease as more firms enter. Thus, we model the rents from entry as $\frac{1}{f^*}$, where f^* is the number of firms entering the market

in equilibrium. The payoff of entry is

$$EU_i(\text{entry}) = \frac{1}{1+f^*} - x_i,$$

where f^* is the equilibrium number of *other* firms entering and x_i is the marginal cost of the bribe to firm i . Firms receive 0 for staying out.

Information Structure

Individual firms' budgetary "slack," or the marginal cost or propensity of making a bribe, is private information. Each firm knows its own type but not that of others. We adopt naive priors and assume that firms' prior beliefs over the budgetary slack of their competitors are distributed according to the uniform distribution, $U[0, \bar{x}]$.

Equilibrium

Because firms make simultaneous entry decisions but possess private information about their own marginal costs, the appropriate solution concept is Bayesian Nash equilibrium. The Bayesian Nash equilibrium defines best responses and beliefs for each type. We can identify the equilibrium through several steps.

Proposition 1. *There exists a Bayesian Nash equilibrium in which firms enter iff $x_i < \hat{x}_i$. All other types choose not to enter.*

To understand firms' decision in equilibrium, consider an individual firm's entry decision. A firm will enter when

$$\frac{1}{1+f^*} - x_i \geq 0,$$

or, rearranging in terms of the firm's marginal cost of bribing, if

$$x_i \leq \frac{1}{1+f^*}.$$

This entry rule lends itself to a straightforward interpretation: firms will choose entry when their marginal cost of bribing is offset by the rents they can capture in the market.

Recall that f^* is the number of other firms entering in equilibrium, over which firm i forms an expectation based on prior beliefs about the distribution of marginal costs amongst the population of competitor firms. Therefore, f^* is also the probability of $n - 1$ other firms entering the market (depending on $n - 1$ other firms' types). For any single firm, the probability that the above inequality holds is equal to $\frac{1}{\bar{x}(1+f^*)}$, which is simply the probability that $x_i < \hat{x}_i$. The probability for $n - 1$ firms is $(n - 1)\left(\frac{1}{\bar{x}(1+f^*)}\right)$. Solving for f^* yields

$$f^* = \frac{1}{2} \left(\frac{\sqrt{4n + \bar{x}} - 4}{\sqrt{\bar{x}}} - 1 \right).$$

Substituting this into i 's entry rule, the type that is indifferent between entering or not is

$$x_i = \frac{2\sqrt{\bar{x}}}{\sqrt{\bar{x}} + \sqrt{\bar{x} + 4n} - 4} \equiv \hat{x}_i.$$

Firms make their entry decision by comparing their marginal cost of entry to their likely profits, which are determined by the number of competitors for rents in the market. This number is unknown because other firms' marginal cost of entry, or budgetary slack, is private information. In the absence of knowledge about precisely which other firms will find it profitable to enter, the firm compares its own cost to an expectation formed by the total number of other possible competitors and the upper bounds on the distribution of firm "types" or marginal costs or "budgetary slack."

We can then state the equilibrium entry rate as a proportion of the number of firms who's marginal cost of bribery falls under \hat{x} relative to the upper bound on firms' expectations about the distribution of those costs:

$$n \frac{\hat{x}_i}{\bar{x}} = \frac{2n}{\bar{x} + \sqrt{\bar{x}}\sqrt{\bar{x} + 4n} - 4}.$$

Again, this is a function of the number of other firms and the distribution of resource constraints. Generally speaking, as the upper bound of that distribution goes up, the entry rate goes down, because firms will expect to be facing more competitors, diminishing rents.

Equilibrium with anti-bribery convention

Now we introduce the anti-bribery convention by adding two parameters to the model that, in effect, introduce a second type of firm: those from OECD signatory countries. We conceive of the convention as introducing the possibility of being caught and sanctioned for bribing for those firms from signatory countries. But monitoring and enforcement is not perfect for any treaty, so the probability of being observed making a bribe by the relevant authorities is q , and the cost is s , which is analogous to a briber or penalty. The expected cost is simply $q * s$, which is subtracted from the expected utility of bribing for firms from OECD signatory countries as follows:

$$EU_i(\text{entry}) = \frac{1}{f^*} - x_i - qs$$

Next, suppose we have k firms from OECD convention signatory countries. The “entry rule” for the $n - k$ firms from non-OECD convention signatory countries is simply the baseline entry rule established above, or

$$x_i \leq \frac{1}{1 + f^*}.$$

However, the utility comparison for the k firms from OECD signatory countries is now

$$\frac{1}{f^*} - x_i - qs \geq 0.$$

Rearranging in terms of x_i yields

$$x_i \leq \frac{1}{f^*} - qs.$$

The “entry rule” for the k firms from signatory countries also has a straightforward interpretation: as rents to be had go up, and as the probability of being caught and sanctioned goes down, a firm is more likely to enter the market.

At the Bayesian Nash equilibrium, entry decisions are made by two groups: k firms subject to the anti-bribery convention, for which each pays qs additional costs of entry, and $n - k$ firms not bound by it.

Proposition 2. *There exists a Bayesian Nash equilibrium in which subject firms enter iff $x_i < x_s$ and non-subject firms enter iff $x_i < x_o$. All other types choose not to enter.*

A Bayesian Nash equilibrium defines types x_s and x_o as those types indifferent over entry and no entry, where t^* and f^* are the expected number of entrants from the subject and non-subject groups, respectively. A non-subject firm enters if

$$\frac{1}{1+f^*+t^*} - x_i \geq 0,$$

which yields

$$x_o = \frac{1}{1+f^*+t^*}.$$

And a subject firm enters if

$$\frac{1}{1+f^*+t^*} - x_i - qs \geq 0,$$

which yields an indifferent type

$$x_s = \frac{1}{1+f^*+t^*} - qs.$$

Solving this system of equalities requires that we define f^* and t^* . First, f^* is a function of $n - k - 1$ other firms' types. If types are drawn independently from the uniform distribution $x_i \sim U[0, \bar{x}]$, then the probability that any one firm joins is the probability that $x_i \leq \frac{1}{1+f^*+t^*}$, which is $\frac{1}{1+f^*+t^*}$. In turn, the expectation that $n - 1$ firms join is

$$f^* = (n - k - 1) \left(\frac{1}{\bar{x}(1+f^*+t^*)} \right),$$

and the expectation that $k - 1$ firms would join is

$$t^* = \frac{k-1}{\bar{x}} \left(\frac{1}{1+f^*+t^*} - qs \right).$$

Solving for f^* and t^* yields

$$f^* = \frac{(1+k-n)(qs(k-1) - \bar{x} + \sqrt{(k-1)^2 q^2 s^2 + \bar{x}(4n-8-2qs(k-1) + \bar{x}))})}{2\bar{x}(n-2)}$$

and

$$t^* = \frac{(k-1)(qs(3+k-2n) - \bar{x} + \sqrt{(k-1)^2q^2s^2 + \bar{x}(4n-8-2qs(k-1) + \bar{x})})}{2\bar{x}(n-1)}.$$

Both types still enter when n is not too large, or when

$$n < 1 + k + \frac{\bar{x}(1-qs)}{q^2s^2},$$

but when n is too large, the available benefits aren't enough to convince the subject firms to bribe at all. With these components in place we can define the types that are indifferent over entry and non-entry, such that

$$x_o = \frac{2x}{q(s-ks) + \bar{x} + \sqrt{(k-1)^2q^2s^2 + \bar{x}(4n-8-2qs(k-1) + \bar{x})}}$$

and

$$x_s = \frac{qs(3+k-2n) - \bar{x} + \sqrt{(k-1)^2q^2s^2 + \bar{x}(4n-8-2(k-1)qs + \bar{x})}}{2(n-2)}.$$

These types are indifferent over entry; types below the relevant cut-point enter, while types above do not.

We can use these cut-points to analyze the rates of entry that motivated the model. First, we show that as the number of subject firms k increases, the maximal type of non-subject firm that bribes (x_o) also increases. Therefore, as more firms are deterred from entry by the threat of being caught and punished for bribery, the more likely is any given non-subject firm to pay a bribe to enter the market.

Proposition 3. *Non-subject firms are more likely to enter as the number of subject firms increases.*

To prove this proposition, take $\frac{\partial x_o}{\partial k}$, which is positive for the entire range of parameter values (see Appendix).

We can also make a cross-equilibrium comparison by noting how the entry rate of non-subject firms varies across the model with no subject firms and the model with firms subject to the convention. Specifically,

Proposition 4. *In equilibrium, as q or s , or both, go to 0, the entry rate of non-subject firms converges to the entry rate of firms in the model with no OECD convention.*

To prove, set q or s to 0 in x_0 , and compare f^* across the two equilibria identified above (see Appendix).

Subcontracting to Non-subject firms

The above analysis demonstrates that when firms become subject to the convention, and face a non-zero potential enforcement cost, their incentives to enter a market are diminished at the margin. At the same time, this may make market entry more lucrative for non-subject firms. Thus far, we've modeled firms as facing only two choices: enter or remain outside of a market. But subject firms may face a third option. Namely, they may subcontract with consultants, usually domestic firms, who assume responsibility licensing and entry requirements, including any necessary bribery payments. These firms are not direct competitors, but rather service providers who facilitate entry by foreign firms. But importantly, they can directly pay any entry bribes and thus inoculate foreign, subject firms from behavior considered illicit in their home jurisdiction. This third option — sub-contracting for bribery — provides legal cover for subject firms, but at the cost of additional fees paid to the sub-contracted firm. This maneuver would be a reasonable adaptation in the face of such a regime. How does the possibility of bribery sub-contracting affect rates of bribery?

Consider an extension to the above model in which subject firms face three options. Subject firms may stay out of the market and receive a payoff of 0, enter the market and receive an expected payoff of $\frac{1}{1+f^*} - x_i - qs$, or enter the market through sub-contracting with a non-subject firm. We model the cost to the subject firm of contracting with a non-subject consulting firm as simply increasing the marginal cost of entry by some factor that represents the costliness of outsourcing with a non-subject firm. Let z be the rate at which the marginal cost of entry is increased when subcontracting for entry, whereby subject firms continue to pay the cost of bribing but due so through its subsidiary or partner, so that the

payoff to entry through sub-contracting is $\frac{1}{1+f^*} - z * x_i$, where $z > 1$. We assume that an adequate pool of potential subcontracting firms exists to meet the demand of subject firms.

The Bayesian Nash equilibria to this game resembles those constructed above. Here, we identify three types of firms of subject firms: those who will never enter, those who will enter only through sub-contracting, and those who enter normally and run the risk of being identified and sanctioned. There exist two Bayesian Nash Equilibria, one in which subcontracting is relatively cheap compared to the possibility of being caught and sanctioned and one in which its relatively costly. We show each in turn.

Proposition 5. *There exists a Bayesian Nash equilibrium in which subject firms enter without subcontracting if $x_i < x_b$, with subcontracting if $x_B \leq x_i < x_s$, and non-subject firms enter iff $x_i < x_o$. All other types choose no entry.*

A Bayesian Nash equilibrium defines types x_S and x_o as those types indifferent over entry and no entry, where t^* and f^* are the expected number of entrants from the subject and non-subject groups, respectively. A non-subject firm enters when

$$\frac{1}{1 + f^* + t^*} - x_i \geq 0$$

This implies that the cutpoint for indifference between entry and no entry for the non-subject firms is

$$x_o = \frac{1}{1 + f^* + t^*}$$

The number of subject firm entrants is comprised of two groups, in equilibrium — those that enter on their own and those that enter through subcontracting. Let $t^* = v^* + w^*$ where v^* is the number of subcontracting firms and w^* is the number of non-subcontracting firms. A subject firm enters without subcontracting when

$$\frac{1}{1+f^*+t^*} - x_i - qs \geq 0$$

This, in turn, implies

$$x_s = \frac{1}{1+f^*+t^*} - qs$$

A subject firm enters with subcontracting when

$$\frac{1}{1+f^*+t^*} - zx_i \geq \frac{1}{1+f^*+t^*} - x_i - qs$$

Let the indifferent type between subcontracting and entering alone be x_B , such that

$$x_B = \frac{qs}{z-1}$$

Note that this cutpoint reflects the ratio of cost of the two types of entry — the potential of being observed bribing (s) and the cost of being observed (q) and the rate at which the cost of entry increases when subcontracting (z).

Like the equilibrium of the baseline game, f^* is a function of the $n-k-1$ other firms' types. Since types are drawn independently from the uniform distribution $x_i \sim U[x, \bar{x}]$, the probability that a non-subject firm enters is the probability that $x_i \leq \frac{1}{1+f^*+t^*}$, which is simply $\frac{1}{\bar{x}(1+f^*+t^*)}$. The expectation that $n-1$ non-subject firms join is then

$$f^* = (n-k-1) \frac{1}{\bar{x}(1+f^*+t^*)}$$

and the expectation that $k-1$ subject firms join, following the same procedures, are

$$w^* = \frac{k-1}{\bar{x}} \left(\frac{1}{1+f^*+t^*} - qs \right)$$

and

$$v^* = \frac{k-1}{\bar{x}} \left(\frac{qs}{z-1} \right)$$

These equilibrium entry rates, form a system of equations which can be solved to identify f^* , w^* , and v^* (see Appendix for full entry rates).

The second Bayesian Nash equilibrium exists when the cost of subcontracting is relatively expensive.

Proposition 6. *There exists a Bayesian Nash equilibrium in which subject firms enter without subcontracting if $x_i < x_b$, with subcontracting if $x_s \leq x_i < x_B$, and non-subject firms enter iff $x_i < x_o$. All other types choose no entry.*

In the interest of brevity, a full proof of this proposition can be found in the Appendix.

Implications

Proposition 3 establishes that as the number of firms subject to the OECD convention increases, the rate of bribery and entry for non-subject firms increases. This proposition predicts a perverse effect of a bribery convention that is applied only to some possible market entrants. If these subject firms are deterred, even at the margin, by the expected cost of being caught bribing and sanctioned, some firms who would otherwise bribe and enter the market in a world with no convention will instead opt to stay out. This means analysts

should observe less bribery emanating from firms who are subject to the convention, which is, after all, what the convention hopes to accomplish. But because rents in markets with barriers for entry are decreasing in the number of entrants, the reduction in bribery from subject firms will create additional profit incentives for non-subject firms. Thus, bribery will go down amongst subject firms but up amongst non-subject firms.

Proposition 4 shows that the degree to which these dual impacts of the convention obtain is a function of the quality of monitoring, represented by the probability of being caught bribing, q , and the severity of enforcement, represented by the sanction if caught bribing, s . Recall that the main effect of the convention is to generate some expected costs of bribery, represented by qs . As either or both of these parameters go to zero, the entry decision for subject firms converges to that of the non-subject firms. At the same time, the decision rule of the non-subject firms converges to that in the equilibrium with no convention. Put differently, increased monitoring and enforcement will indeed deter more subject firms, but because entry deterrence for these firms increases rents available for the non-subject firms, it will perversely increase bribery amongst non-subject firms.

These two propositions point to interesting overall welfare effects of any anti-bribery convention. On the one hand, if q and s are greater than 0, meaning there is some positive probability of being observed bribing and sanctioned, the convention will work as intended and reduce bribery *for subject firms*. On the other hand, this will tend to increase bribery for non-subject firms, and this tendency will be magnified as more firms become subject to the convention and as the quality of monitoring and severity of enforcement go up. Thus, the overall effect of the convention on bribery rates may be null, or even positive, depending on conditions. This logic should be cause for concern if the goal of the Convention is to create general disincentives for bribery. If the convention applies unequally to firms from different countries, it may just have the effect of generating competitive barriers for firms from member countries.

Propositions 5 and 6 show that once the baseline model is extended to include the pos-

sibility of subcontracting out bribing, entry decisions will be contingent on the marginal costliness of subcontracting relative to the strength of monitoring and cost of enforcement. The degree to which firms pursue this evasive adaptation will depend on expectations about the strength of monitoring and enforcement for themselves, but also indirectly for other firms. That is, firms' expectations about the number of competitors they'll face upon entry are based on the aggregation of other firms entry rules, which are themselves shaped by their marginal cost of entry relative to the strength of enforcement and monitoring. The relative cost of subcontracting may be based on a number factors, but Propositions 5 and 6 show that whether subcontracting is attractive or not cannot be considered in isolation, but rather relative to the attractiveness of entry without subcontracting, which entails some risk of being caught and sanctioned. This means that, perhaps perversely, increasing the strength of monitoring and enforcement will tend to increase the evasive adaptation of subcontracting, thus further undermining the regime.

Empirical Results

We began this paper with an empirical puzzle from previous work, showing that the OECD-ABC led to an increase in bribery by non-signatory countries. We developed a theoretical model to explain this pattern and show that the OECD-ABC has this counter-intuitive effect due to the very effectiveness of the regime. By driving out firms that are from signatory countries, markets become less competitive and the available rents increase the returns to bribery. Thus, firms make decisions about how much to bribe based on the relative risk of the activity versus the expected benefits - the higher expected rents, the greater the probability of bribery - (Proposition 1). And after the OECD-ABC, firms from non-signatory countries have a greater incentive to bribe due to the decreased competitiveness and greater rents in these markets (Proposition 2) .

Our theoretical model was developed after this original empirical work. Previous work showed that the OECD-ABC leads foreign actors to curtail their behavior in suspect en-

vironments, including reducing foreign direct investment and exports into highly corrupt countries. In this section we conduct additional empirical tests regarding the entry decisions and bribery decisions of firms. We begin with some simple descriptive analysis of patterns of foreign investment in Vietnam using the PCI data to explore Proposition 3. Do we see a decrease in entry of OECD-Convention signatories after 2009, when signatories were subject to peer review (Phase 3 of the Convention)?

The Vietnam Provincial Competitiveness Index (PCI) survey surveyed firm managers in eight waves from 2010-2017.⁸ This annual survey of 1,500 investors in Vietnam provides a nationally representative of foreign investment in Vietnam. We constructed a dataset of repeated cross-sections of firms for each wave. Further, to test our sub-contracting extension, we were able to insert new questions into the 2017 survey with the permission of the Vietnam Chamber of Commerce (VCCI), which administers the survey, and US-AID, which funds it. The top investors in Vietnam include a mix of OECD-ABC signatories (Vietnam's second largest investors of Japan and South Korea are both signatories) as well as non-signatories (top investor Taiwan as well as the fourth and fifth largest investors of China and Singapore). In total, investors from countries that are signatories of the OECD-ABC made up 42% of the foreign firms in the sample.

Figures 1 and 2 present raw data on the percentage of foreign firms entering Vietnam, measured as a percentage of total projects or a percentage of total dollars of foreign investment (GSO 2019). Note that the spike in 2009 in Figure 2 is largely due to a decline in FDI due to the financial crisis and not an increase in OECD-ABC enforcers entering into Vietnam. When we break down these investments into OECD-ABC enforcement categories of enforcers and non-enforcers of the convention, we do see some differences in the patterns of investment.

We code OECD-ABC firms by their level of enforcement that Transparency International deem to be active enforcers. They use a four-point coding scheme though the assessment has

⁸See <http://www.pcivietnam.org/> for methodological details.

changed methodologically over time. To simplify, we use a two point aggregation. Countries are non-enforcers if they did not conduct an investigation or exact a punishment and enforcers if any overseas bribers were investigated or punished in the previous year.

Investments from non-enforcer countries increase from 2009 while investments from enforcer countries actually slightly decline after 2009 in Figure 1. Figure 2, measured as a percentage of dollars of investment, tells a similar story but with more annual variance. Investment from non-enforcer countries grow in the period since 2009 while enforcer country investments see small declines. These patterns are consistent with propositions 3 and 4. Proposition 3 states that as the number of subject firms increases, the number of non-subject firms entering the market increases, while Proposition 4 ties this pattern to the strength of enforcement of subject firms. Figures 1 and 2 show that investment from non-enforcing countries increased after the inception of the OECD-ABC. The pattern for firms from non-signatories is less clear, showing a decrease in Figure 1, when measured as a percent total FDI projects, but an increase in Figure 2, when measured as percentage of all dollars. This could mean that firms from non-signatory countries invested more money in a fewer number of projects than other types of firms over this time period.

We next turn to Proposition 5, where we theorize that some OECD-ABC signatories can subcontract bribery to other parties, avoiding paying direct bribes. We note that this subcontracting is costly for firms and thus not all OECD-ABC signatories will choose this option.

We tested this Proposition by fielding an additional question on the 2018 PCI-Survey. We specifically asked managers the following question: “To avoid culpability for paying informal charges, have you ever (Check all that apply).

1. Hired a law firm or business facilitator to complete the business procedure
2. Sub-contracted to another foreign firm to complete the business procedure
3. Sub-contracted to a Vietnamese firm to complete the procedure

Figure 1: Percentage of Total FDI Projects by Home Country Enforcement, 2005-2015

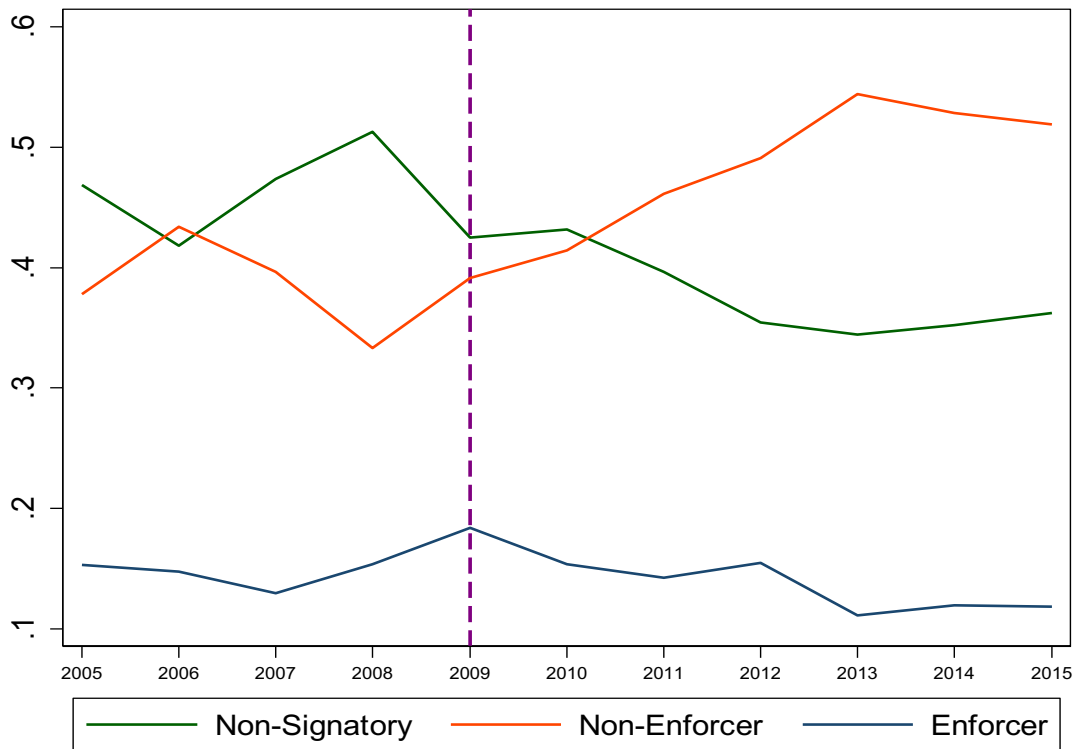


Figure 2: Percentage of Dollars of Investment by Home Country Enforcement, 2005-2015

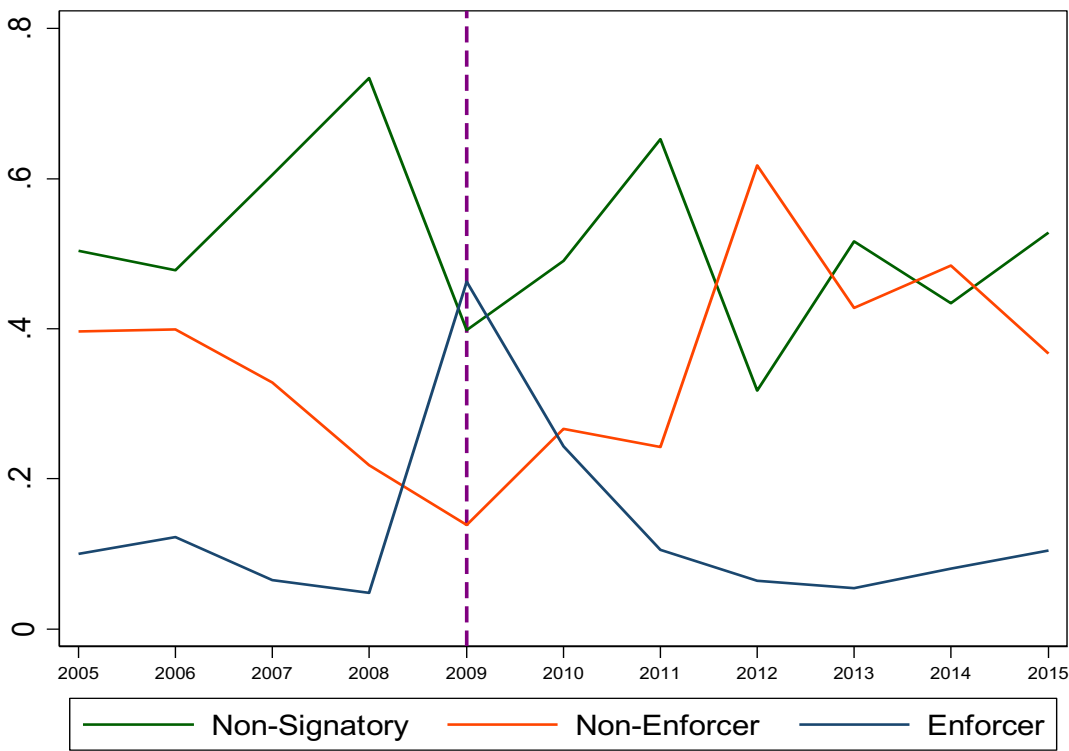
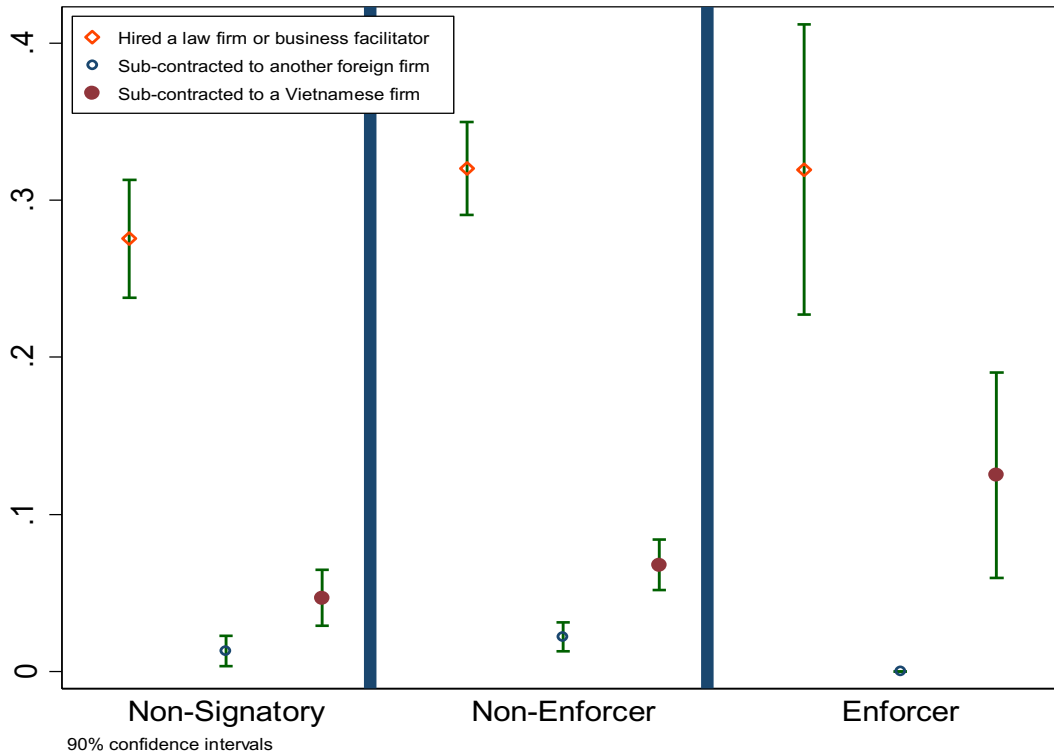


Figure 3: Subcontracting with Consultants



4. None of the above

We present this data in Figure 3.

First, we find that businesses across all three categories of home countries hire lawyers and consultants on average 30% of the time. Firms subject to these different domestic bribery laws are also equally unlikely to hire foreign firms for the purposes of avoiding direct bribers. Where we find that most striking results are in the comparison of firms from signatory countries, which are more likely to hire domestic firms to minimize bribery than other firms. Firms from enforcing countries hire domestic sub-contractors to avoid bribery 12.5% of the time, compared to only 4.7% and 6.9% for non-signatories and non-enforcers respectively. The difference between enforcers and signatories is significant at the .05 level, while the difference between enforcers and non-enforcers is just shy of statistical signifi-

Table 1: Likelihood of Subcontracting by Enforcer Type

DV = Hired Vietnamese Subcontractor to Avoid Bribes	Baseline	FE	Controls
Non-Enforcer	0.021 (0.016)	0.020 (0.018)	0.018 (0.019)
Enforcer	0.078* (0.043)	0.079* (0.044)	0.077* (0.045)
MNC			0.021* (0.011)
Registration Year			-0.001 (0.001)
Size at Origin			0.005 (0.004)
Constant	0.047** (0.013)	0.047** (0.014)	2.173 (2.626)
Sector FE	No	Yes	Yes
Observations	1,135	1,131	926
R-Squared	0.006	0.019	0.029
rmse	0.245	0.246	0.255

Robust standard errors, clustered by home country, in parentheses

*** p <0.01, ** p <0.05, *p <0.10

cance.

We more formally test this in Table 1 with logit regressions for all firms in the 2018 PCI data. Our dependent variable is coded as 1 if the firm hired a Vietnamese firm to avoid bribery and 0 otherwise. Model 1 includes only dummy variables for firms from countries that are signatories and strong enforces and firms from countries that are weak enforcers. Model 2 includes sector fixed effects and Model 3 include sector fixed effects plus control variables if the firm is a subsidiary of multinational corporation, the year of registration, and the size of the firm upon initial entry. All three models point to similar results: OECD-ABC enforcers are more likely to sub-contract to domestic firms to avoid bribery.

We are careful in the interpretation of these results for two reasons. First, our models explain a relatively small amount of variance in subcontracting decisions. Second, as we have noted in previous work, these direct questions can lead to under reporting of bribery, in particular for countries subject to the OECD-ABC convention. Thus, our findings are likely

to underreport the use of domestic firms to avoid bribery, in particular for firms coming from OECD-ABC enforcers.

Our final set of empirical tests aren't tied to our theoretical model, but test alternative explanations for the observed behavior of non-signatories.. Conventions like the OECD-ABC can reduce bribery by reducing the willingness firms to offer bribes. Alternatively, government officials, knowing that OECD-ABC firms are limited in their ability to pay bribes are less likely to demand bribes from them, and instead will concentrate their bribe extraction efforts on firms that are less constrained. In the 2018 PCI, we included a number of questions on the supply and demand of bribery by focusing on who initiates the bribe.

In Figure 4 we present data for all firms admitting they paid an informal charge asked them who initiated the bribe. In all three groups of firms we find that bribers are expected and neither party is likely to initiate the activity. There is little difference in initiation across groups.

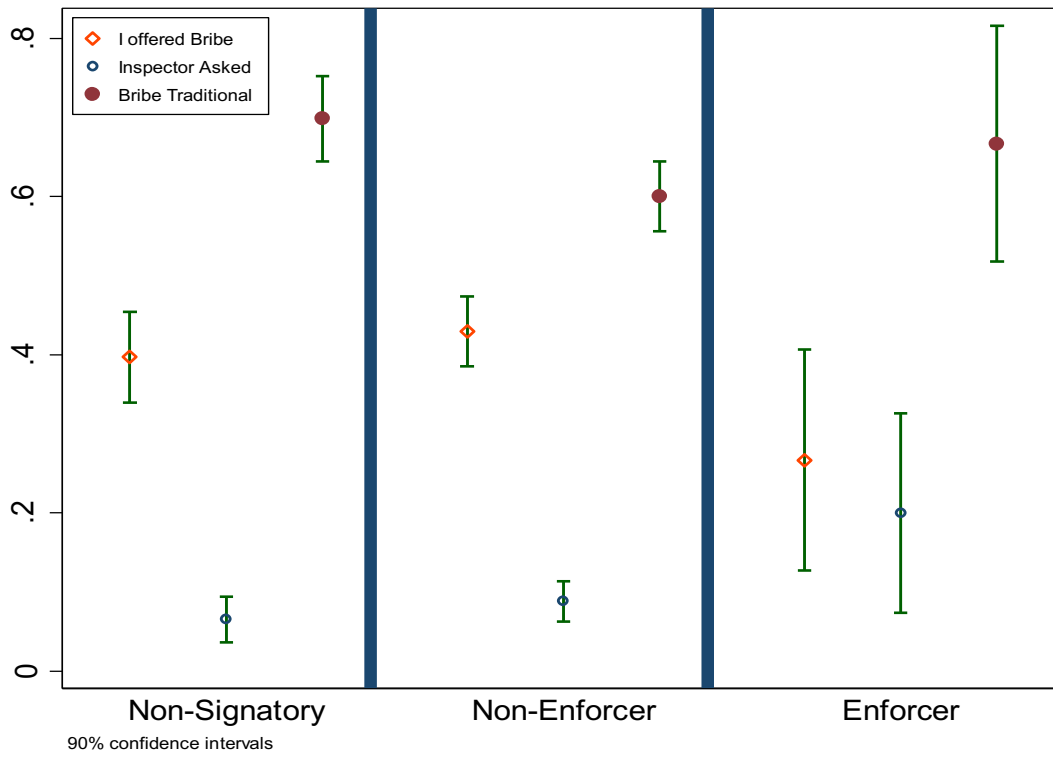
In the appendix we include two additional tests on bribery initiation, including bribery for procurement and bribery to overcome issues with land accusation. For all of these tests of bribery initiation, we find no clear patterns of changes in bribery initiation. Thus, we can rule out the two alternative theories. They do not appear to offer much explanatory power.

Discussion

These new empirical tests lead to further concerns about the effectiveness of the OECD-ABC. Not only does this convention provide additional benefits to firms that are not subject to the convention, we also find evidence that firms from strong enforcer countries are willing to subcontract with domestic firms to avoid paying bribes directly.

While our analysis cannot precisely estimate the net effect of the OECD-ABC, our results provide evidence that countervailing effects by non-signatories may undermine the its benefits in host countries.. As we show in our model, the more firms that are driven out

Figure 4: Bribe Initiation



of the market by strong anti-bribery, the more there are advantages for firms that aren't subject to these laws or can creatively avoid bribery to enter Vietnam.

We also show that the OECD-ABC hasn't changed the pattern of initiation of bribes in Vietnam, although this is largely do to the fact that neither firms nor government official directly offer or ask for bribes. The norm is understood by both parties.

Conclusion

This paper was motivated by the previous empirical finding that the OECD ABC, while reducing bribery by firms from member countries of the convention, seemed to increase bribery by firms from non-member countries. This result begged explanation. After all, why should firms that do not fall under the jurisdiction of a treaty be affected at all? In this paper, we provide an answer rooted in the general logic of regulatory leakage, or the tendency of regulated behavior to shift to less well regulated jurisdictions. In particular, we analyzed a formal model of a market where bribery is necessary for entry and the rents to market activity are a function of the number of competitors in the market. In such a context, factors that increase the marginal cost of entry for a group of actors— even in expectation — can incentivize increased likelihood of entry for other actors. We suggest the OECD ABC may have done just this. By creating an effective form of peer-review enforcement it raised the costs of “paying to play” for firms under that enforcement regime. Yet this increased the opportunity of acquiring rents for firms who were not subject to a similar enforcement regime, incentivizing them to pay to play more often.

Our theoretical model thus provides an empirical implication for the previously unexplained finding that the OECD-ABC increased bribery among non-subject firms. But the model also produced additional observable implications about how differential enforcement across member states might affect these patterns and, in an extension, we analyzed how subject firms might be able to evade enforcement by subcontracting with firms who do not

fall under the Convention's jurisdiction. We examined these additional implications by looking at how patterns of FDI changed pre and post-OECD ABC for firms from low enforcement and high enforcement home countries. The evidence suggests that the OECD's bribery deterrent mattered most for firms from high enforcement environments and that such enforcement may have even encouraged increased participation by firms from low enforcement environments.

We also analyzed results from a new question fielded in the Vietnam PCI and found that firms from these high enforcement jurisdictions are most likely to engage in behavior likely designed to evade the Convention – namely, by subcontracting with non-subject firms who can engage in illicit behavior on behalf of the subject firms. This result further emphasizes a general point about leakage: the creative agency of actors can lead to regulatory evasion.

Do our results mean that the OECD ABC is a failure? Far from it. Previous work convincingly demonstrates that the Convention works to deter corruption for firms subject to its jurisdiction. Our work simply provides a caveat to this finding that there are limits to the aggregate effect a treaty like the OECD can have on illicit activity. Those limits exist because of differential enforcement across jurisdictions, which allows that illicit activity to “leak” across jurisdictional boundaries. The solution implied is that the OECD ABC's jurisdiction should be expanded to cover new areas, when and where possible. Current member countries have an interest in seeing this happen, as do their firms, who may face a competitive disadvantage when forced to play by the rules in a dirty game.

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Appendix

Proof of Proposition 3. To prove this proposition, take the first partial derivative of x_o with respect to k ,

$$\left(\frac{2qs\bar{x}}{\sqrt{\bar{x}(\bar{x} - 2(k-1)qs + 4n - 8) + (k-1)^2q^2s^2}} \right) \times \left(\frac{2qs\bar{x}}{\sqrt{\bar{x}(\bar{x} - 2(k-1)qs + 4n - 8) + (k-1)^2q^2s^2} + \bar{x} + q(s - ks)} \right),$$

which is sure to be positive for $\bar{x} > 0$, $k > 2$, $0 < q < 1$, $s > 0$, $n > k$. □

Proof of Proposition 4. To prove this proposition, note that $x_O - x_S = qs$. As either q or s , or both, goes to zero, $x_O - x_S$ approaches zero. □