The Impact of the Foreign Corrupt Practices Act on Competitiveness, Bribery, and Investment

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Abstract

The Foreign Corrupt Practices Act (FCPA) prohibits U.S.-related firms from making bribes abroad. We analyze the FCPA's effects in a model of competition between a U.S. and foreign firm for contracts in a host country. If the FCPA only applies to the U.S. firm, it reduces that firm's competitiveness and either increases bribery by the foreign firm or reduces overall investment. If the FCPA also applies to foreign firms, it reduces bribery, and in host countries with high corruption levels, it increases investment. Our analysis of recent cases indeed shows that the FCPA is often enforced against foreign firms, and its enforcement is typically limited to activity in host countries with high corruption levels.

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Keywords: Corruption, Bribery, Competitiveness, Investment, Absolute Advantage, International Cooperation

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"It's a horrible law and should be changed (...) It puts us at a huge disadvantage." –Donald Trump speaking on the U.S. Foreign Corrupt Practices Act (CNBC, May 15, 2012)[1]

1 Introduction

Corruption has been shown to reduce economic growth, investment activity, and international trade (for a survey of empirical evidence, see Dreher and Herzfeld, 2005). In an effort to reduce corruption, the U.S. government has levied billions of dollars in penalties over the last several years for violations of the Foreign Corrupt Practices Act ("FCPA") of 1977, a broad U.S. law that criminalizes the payment of bribes by U.S. citizens and corporations to government officials anywhere in the world. FCPA enforcement actions have been taken against many of the world's largest and most well-known companies, including IBM, General Electric, Ralph Lauren, Pfizer, and Chevron.[2]

In this paper, we address the following questions: how does the FCPA affect the competitiveness, bribery activity, and investments of U.S. firms, and how do the answers depend on whom the U.S. firms are competing against and in which countries they are competing? To answer these questions, we use a contest model of competition between a U.S. multinational firm and a competitor for a government contract in a host country. Firms can increase their chances of winning the contract through two activities, productive investment and bribery. The relative weight that the contest official places on bribery is a proxy for the extent of corruption in the host country.

In this context, we ask: When does the FCPA disadvantage U.S. firms? Does the FCPA achieve its goal of reducing bribery? Does it have an impact on productive investments made by the U.S. firm and its competitor? The answers depend critically on whether the competing firm has U.S. ties. When the competing firm has no ties to the U.S., the FCPA only applies to the U.S.

[1] http://video.cnbc.com/gallery/?video=3000089630 (Minute 14)
[2] https://www.sec.gov/spotlight/fcpa/fcpa-cases.shtml

firm.[3] In this case, the FCPA always puts the U.S. firm at a disadvantage, reducing its probability of winning the contract. The FCPA reduces bribery by the U.S. firm. However, it increases bribery by the competing firm if the U.S. firm is the favorite to win the contest, and it reduces productive investment by both firms if the U.S. firm is not the favorite to win. It increases total bribery effort if the U.S. firm is sufficiently dominant in the productive activity and the level of corruption in the host country is sufficiently high. In sum, with enforcement limited to U.S. firms, the FCPA not only harms the competitiveness of U.S. firms, but may also fail in achieving its primary objective of reducing bribery or will have the negative externality of reducing productive investment.

On the other hand, when the competing firm has ties to the U.S. (see footnote 3), the FCPA applies to both firms. In this case, the FCPA favors the firm with the absolute disadvantage in bribery. It reduces both firms' bribery efforts. If one of the firms has the absolute advantage in both bribery and investment, then the FCPA balances the contest and increases both firms' investment efforts. If no firm has an absolute advantage in both bribery and investment, then the effect of the FCPA on investment efforts depends on the level of corruption in the host country. The FCPA increases both firms' investment efforts if the firm that has the absolute advantage in bribery is the favorite to win the contest, which is the case when the level of corruption in the host country is high. On the other hand, the FCPA reduces both firms' investment efforts if the firm with the absolute disadvantage in bribery is the favorite to win, which is the case if the corruption level in the host country is low. In sum, with symmetric enforcement limited to activity in host countries with high corruption levels, the FCPA does not a priori harm the competitiveness of U.S. firms and both reduces bribery and increases productive investment.

Broadly, the model suggests that the FCPA can reduce bribery and increase

[3] In addition to applying to all U.S. companies, the FCPA applies to non-U.S. companies that have a U.S. subsidiary or do business in the U.S., issue stock in the U.S., or trade their home country's stock through American Deposit Receipts that require filing with the U.S. Securities and Exchange Commission.
https://www.lexisnexis.com/risk/intl/en/resources/whitepaper/FCPA-Enforcement.pdf
https://www.law360.com/articles/674583/how-fcpa-applies-to-foreign-private-companies

investment while maintaining U.S. competitiveness if it is met with cooperation from other countries in anti-bribery efforts, so competitors are equally subject to penalties for engaging in bribery. Several countries have indeed enhanced their anti-corruption laws in the wake of increased enforcement by the U.S. under the FCPA (see, e.g., the U.K. Bribery Act of 2010 and the Brazil Clean Company Act of 2014[4]). Moreover, analyzing recent FCPA cases, we find a significant increase in cases with blockbuster fines mounted against foreign multinational companies with cooperation from foreign governments. In fact, total fines in FCPA cases against foreign multinationals exceeded total fines in FCPA cases against U.S. multinationals by approximately $2 billion in 2016.

The paper is organized as follows. Section 2 discusses our paper's contributions in relation to existing literature. Section 3 develops and solves the theoretical model. Section 4 analyzes the effects of the FCPA in the case where it only applies to U.S. firms. Section 5 analyzes the case where the FCPA applies to U.S. and foreign firms. Section 6 analyzes recent FCPA cases to determine whether the FCPA has been enforced mainly against U.S. firms and if its enforcement has targeted mainly activity in host countries with high corruption levels mainly in practice. Section 7 concludes.

2 Related Literature

Our paper contributes to the economics literature on corruption. From the outset, corruption and bribery have been considered forms of rent-seeking in the economics literature (Krueger, 1974; Posner, 1975; Tullock, 1980; Baye et al., 1993; Lambsdorff, 2002). We model bribery in an extension of the standard TulIock contest model that allows for players to engage in more than one activity, and we distinguish bribery from other activities in that it is illegal and potentially subject to fines. In our model, bribery is potentially harmful in that it can unbalance contests in favor of firms that are better at bribery and

[4] http://www.business-anti-corruption.com/anti-corruption-legislation/brazil
http://www.business-anti-corruption.com/anti-corruption-legislation/uk-bribery-act

thereby reduce productive investment. Our paper also contributes more specifically to the law and economics literature on bribery. For an excellent review, see Rose-Ackerman (2010). Polinsky and Shavell (2001) and Garoupa and Klerman (2004; 2010) analyze optimal law enforcement given the central problem that public enforcement creates incentives for bribery and thus undermines deterrence. Basu et al. (2014) find that it may be optimal to punish bribers and bribees asymmetrically to reduce collusion and preserve the incentives of agents to report bribery. They model the choices of a representative firm, and focus on the bribe choice. We model the interplay between competing firms and consider both the choices of productive investment and bribery.

To our knowledge, our paper is the first to provide a formal theoretical analysis of the effects of the FCPA on the competitiveness and bribery and investment activities of U.S. and foreign firms. Several papers have empirically analyzed the effects of the FCPA on U.S. business activity. Overall, the results are mixed. Hines (1995) finds a reduction in business activity by U.S. firms in bribery-prone countries following the 1977 enactment of the FCPA, arguing that the FCPA weakened the competitiveness of U.S. firms without reducing the importance of bribery in these countries. Wei (2000) finds that U.S. investors did not invest less in corrupt countries than did investors from other OECD countries following the FCPA enactment. Cuervo-Cazurra (2008) finds that U.S. investors did ultimately invest less in corrupt countries but only once the OECD Anti-bribery Convention was also enacted in 1997. Lippitt (2013) finds no significant relationship between U.S. foreign direct investment growth and prosecuted FCPA violations, while Graham and Caleb (2016) find a reduction in the number of acquisitions by U.S. firms of targets headquartered in foreign countries following FCPA enforcement actions. Our theoretical analysis shows that the effects of the FCPA on competitiveness and investment by U.S. firms depend critically on whom the U.S. firms are competing against as well as the levels of corruption in the host countries.

3 The Model

Consider two firms competing for a contract allocated by a government official in a host country. The value of the contract to each firm is normalized to one. Firm 1 is the U.S. firm, and firm 2 is a foreign firm that may or may not have ties with the U.S. The firms can influence the outcome of the contest by engaging in productive investment and in bribery. Denote by $x_i \in \mathbb{R}_+$ and $y_i \in \mathbb{R}_+$ efforts of player $i \in \{1,2\}$ in productive investment and in bribery, respectively. Both activities increase a firm's chances of winning the contest. We assume that firm i's probability of winning (called *contest success function* or *CSF*) has the logit representation $p_i(x_1,x_2,y_1,y_2) = f(x_i,y_i)/(f(x_1,y_1)+f(x_2,y_2))$ with an *influence production function* of Cobb-Douglas type $f(x_i,y_i) = x_i^{1-\beta}y_i^{\beta}$, where $\beta \in (0,1)$ is the (relative) weight placed on bribery by the contest official and is a measure of the level of corruption in the host country.[5]

The marginal cost of productive investment for firm i is $c_i > 0$. The marginal cost of bribery is increasing in fines on firms that are subject to the FCPA. We analyze two regimes, one where the FCPA applies only to the firm 1 (U.S. firm) and one where the FCPA applies to both firms. In the first regime, the marginal cost of bribery is $d_1(t) = d_1 + t$ for firm 1 and $d_2(t) = d_2$ for firm 2. In the second regime, the marginal cost of bribery is $d_i(t) = d_i + t$ for both firms since they are both subject to fines under the FCPA in this regime.

Firm i's payoff in the contest is then:

$$\Pi_i(x_1,x_2,y_1,y_2) = \frac{x_i^{1-\beta}y_i^{\beta}}{x_1^{1-\beta}y_1^{\beta}+x_2^{1-\beta}y_2^{\beta}} - c_i x_i - d_i(t)\,y_i. \tag{1}$$

Firm 1 (the U.S. firm) has an *absolute advantage* in the productive activity if $c_1 < c_2$; an *absolute advantage* in bribery if $d_1(t) < d_2(t)$; and a *comparative advantage* in the productive activity if $c_1/c_2 < d_1(t)/d_2(t)$. Let $A = A(t) = \frac{d_1(t)/d_2(t)}{c_1/c_2}$ be the measure of firm 2's comparative advantage in bribery. We call $\Theta = \Theta(t) \equiv (c_1/c_2)^{1-\beta}(d_1(t)/d_2(t))^{\beta}$ firm 2's overall (relative) strength, and

[5] For an axiomatization of this type of CSF for multi-activity contests, see Arbatskaya and Mialon (2010), and for an application to dynamic multi-activity contests, see Arbatskaya and Mialon (2012). A related type of CSF for multi-activity contests was first developed by Epstein and Hefeker (2003).

we call $\Lambda = \Theta (1+\Theta)^{-2}$ the balance of power in the contest. Firm 1 is *stronger overall* if $\Theta < 1$ and is *weaker overall* if $\Theta > 1$.

We first characterize the equilibrium efforts of the contest $(x_1^*, x_2^*, y_1^*, y_2^*)$ and conditions for firm i to be the favorite to win the contest $(p_i^* > 1/2)$.[6]

Lemma 1.

(i) In the unique equilibrium $(x_1^*, x_2^*, y_1^*, y_2^*)$ of the contest, firms' efforts are $x_i^* = \frac{1-\beta}{c_i}\Lambda$ and $y_i^* = \frac{\beta}{d_i(t)}\Lambda$, where $\Lambda = \Theta (1+\Theta)^{-2}$ and $\Theta = \left(\frac{c_1}{c_2}\right)^{1-\beta}\left(\frac{d_1(t)}{d_2(t)}\right)^{\beta}$ for $t \geq 0$ and $i = 1, 2$. The U.S. firm's probability of winning is $p_1^* = (1+\Theta)^{-1}$.
(ii) A firm is the favorite to win the contest $(p_i^* > 1/2)$ when it has an absolute advantage in both activities, or only in productive investment and the corruption level is sufficiently low $(\beta < \widehat{\beta} \equiv -\log\left(\frac{c_1}{c_2}\right) / \log A(t))$, or only in bribery and the corruption level is sufficiently high $(\beta > \widehat{\beta})$.

According to Lemma 1(i), the equilibrium efforts depend on the balance of power in the contest, Λ, which in turn depends on the overall strength of the U.S. firm, Θ. The U.S. firm's probability of winning is $p_1^* = (1+\Theta)^{-1}$. It follows that if the U.S. firm is stronger overall $(\Theta < 1)$, then it is the favorite to win the contest $(p_1^* > 1/2)$, and if it is weaker overall $(\Theta > 1)$, then it is the underdog $(p_1^* < 1/2)$. Lemma 1(ii) states, quite intuitively, that for a firm to be the favorite, it must either have an absolute advantage in both activities, or only in one activity but with sufficient weight being placed on that activity in the influence production function.

4 When FCPA Only Applies to U.S. Firm

We first consider the case where firm 1 (the U.S. firm) is competing against a firm that is not subject to FCPA enforcement because it does not have U.S. ties. In this case, instead of costs d_1 and d_2 per unit of bribery effort, the firms have costs $d_1 + t$ and d_2. FCPA enforcement then only increases the cost of bribery for firm 1.

[6] Proofs of all results are in the Appendix.

Proposition 1. *Suppose there is a marginal increase in the cost of bribery only for the U.S. firm under the FCPA. Then, the U.S. firm is disadvantaged in that its probability of winning the contest decreases. The U.S. firm's bribery effort (y_1^*) decreases. When the U.S. firm is the favorite to win the contest ($\Theta < 1$), both firms' investment efforts and the bribery effort of firm 2 (x_1^*, x_2^*, and y_2^*) increase, and otherwise they decrease. Total bribery effort ($Y^* = y_1^* + y_2^*$) increases if $\beta > \widehat{\beta}$ and $\frac{c_1}{c_2} < \frac{\widehat{c_1}}{c_2}$, where*

$$\widehat{\beta} = \left(1 + \frac{d_1 + t}{d_2}\right)^{-1} \text{ and } \frac{\widehat{c_1}}{c_2} = \left(\frac{\beta\left(1 + \frac{d_1+t}{d_2}\right) - 1}{\beta\left(1 + \frac{d_1+t}{d_2}\right) + 1}\right)^{\frac{1}{1-\beta}} \left(\frac{d_1 + t}{d_2}\right)^{-\frac{\beta}{1-\beta}},$$

and otherwise, total bribery effort decreases.

When the FCPA only applies to the U.S. firm, it unambiguously reduces the U.S. firm's probability of winning the contest and the U.S. firm's bribery effort. Its effects on the non-U.S. firm's bribery effort and on both firms' investment efforts depend on whether or not the U.S. firm is the overall favorite in the contest *($\Theta < 1$)*. Intuitively, if the U.S. firm is the overall favorite in the contest, then increasing the U.S. firm's marginal cost of bribery through FCPA enforcement balances the contest, thereby increasing the non-U.S. firm's bribery effort and both firms' investment efforts. On the other hand, if the U.S. firm is not the overall favorite in the contest, then increasing the U.S. firm's marginal cost of bribery through FCPA enforcement unbalances the contest, thereby decreasing the non-U.S. firm's bribery effort and both firms' investment efforts. By part (ii) of Lemma 1, the U.S. firm is the favorite if it has an absolute advantage in both activities, or only in bribery but the corruption level in the host country (β) is sufficiently high, or only in productive investment but the corruption level is sufficiently low.

Thus, when the FCPA only applies to the U.S. firm, it either increases bribery by the foreign firm or reduces both firms' investment efforts. Moreover, Proposition 1 shows that it increases total bribery effort if the level of corruption in the host country is sufficiently high and the U.S. firm is sufficiently dominant

in the productive activity (c_1/c_2 is sufficiently low).

5 When FCPA Applies to Both Firms

We now consider the case where firm 1 (the U.S. firm) is competing against a firm that is also subject to FCPA enforcement because it has U.S. ties. In this case, instead of costs d_1 and d_2 per unit of effort, firms have costs $d_1 + t$ and $d_2 + t$. FCPA enforcement then increases both firms' cost of bribery by a common amount.

Proposition 2. *Suppose there is a common marginal increase in the cost of bribery for the U.S. firm and its competitor under the FCPA. Then, the U.S. firm's probability of winning the contest increases if and only if it has an absolute disadvantage in bribery ($d_1(t) > d_2(t)$). Both firms' bribery efforts (y_1^* and y_2^*) decrease. If the firm with the absolute advantage in bribery is the favorite to win the contest ($d_1(t) < d_2(t)$ and $\Theta < 1$ or $d_1(t) > d_2(t)$ and $\Theta > 1$), then the firms' investment efforts (x_1^* and x_2^*) increase, and otherwise they decrease.*

A common marginal increase in the cost of bribery for both firms under the FCPA favors the firm with an absolute disadvantage in bribery. It unambiguously reduces both firms' bribery efforts since it increases both firms' punishment for bribery. However, the effect on the firms' investment efforts depends on which firm is the favorite to win the contest. Intuitively, when the firm with the absolute advantage in bribery is the favorite to win the contest, then the FCPA reduces the favorite's advantage, thereby balancing the contest and increasing both firms' investment efforts. On the other hand, when the firm with the absolute advantage in bribery is not the favorite to win the contest, then the FCPA increases the favorite's advantage, thereby unbalancing the contest and reducing both firms' investment efforts. By part (ii) of Lemma 1, the firm with the absolute advantage in bribery is the favorite if it also has an absolute advantage in productive investment or if it does not have an absolute advan-

tage in productive investment but the level of corruption in the host country is sufficiently high.

Thus, if the FCPA applies to both firms, then it reduces bribery efforts by both firms; and if its enforcement is targeted to activity in host countries with high levels of corruption, then it also increases productive investment by both firms, while not a priori harming the competitiveness of the U.S. firm.

6 Descriptive Evidence

Proposition 1 shows that if the FCPA is only applied to U.S. firms, then it harms the competitiveness of U.S. firms and either increases bribery by competing foreign firms or reduces productive investments by both U.S. and foreign firms. In this case, Donald Trump's statement that the FCPA puts U.S. firms at a disadvantage (see the introductory quote on page 2) is found to be correct.

However, Proposition 2 shows that if the FCPA is applied to both U.S. and foreign firms and targeted to activities in host countries where corruption levels are high, then it reduces bribery and increases investment without a priori harming U.S. competitiveness. So the key empirical questions are whether the FCPA is mainly applied to U.S. firms or is applied to both U.S. and foreign firms and whether or not it is typically targeted to activity in host countries with high levels of corruption in practice.

6.1 Analysis of Recent FCPA Cases

Table 1 provides a breakdown of FCPA cases over the period 2012-2016 by company name, fines, company location (U.S. versus non-U.S.), industry type, main competitor, host countries where bribery took place, and corruption levels in those host countries. The table reveals that FCPA enforcement actions have mainly been applied to activity in host countries with high levels of corruption, most commonly China, Russia, and Brazil. Transparency International has consistently given each of these countries a corruption perceptions index (CPI) that

is well below 50, where 0 is "highly corrupt" and 100 is "very clean." The table also reveals that FCPA enforcement actions have quite often been taken against foreign firms as well as U.S. firms. In two of the last four years, total FCPA fines on foreign firms exceeded that on U.S. firms. In 2016, fines against foreign firms totalled over $2.5 billion, whereas fines against U.S. firms totalled under $500 million. The 2016 cases included a $519 million fine on the Israeli pharmaceutical giant, Teva; a $795 million fine on the Dutch telecommunications giant, Vimpelcom; and a $957 million fine against the Brazilian petrochemical giant, Braskem. Most foreign multi-national companies have shares or bonds that trade in U.S. markets and are therefore also subject to the FCPA, at least in principle.

In practice, enforcement actions by the U.S. Securities and Exchange Commission (SEC) and Department of Justice against foreign firms are facilitated by cooperation from the governments of the home countries of these foreign firms. The fact that an increasing number of FCPA cases with blockbuster fines have been mounted against foreign firms indicates increasing international cooperation in anti-bribery efforts. For example, in the 2016 case against Vimpelcom for violations of the FCPA to obtain business in Uzbekistan, the SEC received cooperation from government prosecution and anti-bribery agencies in the Netherlands, Norway, Sweden, Switzerland, and Latvia.[7]

Another example that illustrates various other elements of our analysis is provided by the recent, record-setting FCPA cases against the Brazilian petrochemical and construction giants, Braskem and Odebrecht.

6.2 Example: Braskem and Odebrecht

Odebrecht is a Brazilian construction conglomerate, and Braskem is an affiliated petrochemical manufacturer. Odebrecht is involved in a wide variety of construction and industry-related projects around the world.[8] Braskem focuses

[7] https://www.sec.gov/news/pressrelease/2016-34.html
[8] http://www.odebrecht.com/en/odebrecht-group/about-group

on thermoplastic resins but produces many other chemical inputs.[9] Since 2001, Odebrecht and Braskem collectively spent $788 million on bribes through an Odebrecht bribery department called the "Division of Structured Operations."[10] Bribery mainly occurred in Brazil but also affected 11 other countries, most of which are in Latin America (Rosenberg and Raymond, 2016).

Despite the companies' relationship, they were charged separately under the FCPA.[11] US, Swiss, and Brazilian agencies cooperated in building a case that would ultimately result in Braskem agreeing to pay $957 million in fines in 2016, and in Odebrecht settling for $4.5 billion. Odebrecht demonstrated that it could only pay $2.6 billion, so the final resolution is expected to be a record-high $3.5 billion.[12]

In 2015, Odebrecht had 168,000 employees and $46 billion in revenues.[13] Hoover's database lists the Fluor Corporation of Irving, Texas, and the Bechtel Group of San Francisco, California as Odebrecht's two main competitors.[14] Fluor is the largest Fortune 500 engineering and construction company,[15] with over 60,000 employees and $19 billion in revenues in 2016.[16] Bechtel is the third largest international contractor by revenue[17], with 58,000 employees and $32.2 billion in revenues in 2015.[18] Two other Brazilian multinationals, OAS and Andrade Gutierrez, are also of note since they are the second and third largest Brazilian engineering and construction companies behind Odebrecht (Horch, 2015; Cascione, 2016). They also helped construct venues for the Rio Olympics, which means they almost certainly competed with Odebrecht for government

[9] https://www.braskem.com.br/profile

[10] https://www.justice.gov/opa/pr/odebrecht-and-braskem-plead-guilty-and-agree-pay-least-35-billion-global-penalties-resolve

[11] http://www.fcpablog.com/blog/2016/12/29/reconsidered-odebrecht-and-braskem-are-on-our-fcpa-top-ten-l.html

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[13] http://www.odebrecht.com/en/communication/releases/odebrecht-sas-revenue-totals-brl-1077-billion-usd-458-billion-11-mainly

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[16] http://investor.fluor.com/phoenix.zhtml?c=124955&p=irol-fundIncomeA

[17] http://www.enr.com/toplists/2015_Top_250_International_Contractors1

[18] https://www.forbes.com/companies/bechtel/

contracts (Eisenhammer, 2015). All of these companies have completed projects in Brazil over the last few years. Odebrecht must have out-competed/out-bribed all of them since it controlled the majority of projects for the Rio Olympics. All of the companies also have shares or bonds that are traded in the U.S. and so are subject to the FCPA (Schoenberg and Brice, 2015).

7 Conclusion

We developed a model to analyze the effects of the FCPA on competitiveness, bribery, and productive investment. Our results show that if the FCPA is applied only to U.S. firms, then it harms the competitiveness of U.S. firms and either increases bribery by non-U.S. firms or reduces productive investment by both U.S. and non-U.S. firms. However, if the FCPA is applied to both U.S. and non-U.S. firms and targets activity in host countries with high corruption levels, then it does not a priori harm the competitiveness of U.S. firms, and it reduces bribery and increases productive investment by both U.S. and non-U.S. firms. We also find that the recent history of FCPA enforcement actions indicates that the FCPA is increasingly being applied to non-U.S. as well as U.S. multinationals through cooperation from foreign governments. Provided this trend of international cooperation in anti-bribery efforts continues, our analysis suggests that the FCPA will not weaken U.S. competitiveness and will deter bribery while stimulating investment.

In our model, we assume that the degree of corruption in the host country (β) is exogenous and not affected by the FCPA. With international cooperation in anti-bribery efforts, it might be possible to reduce the demand for bribes as well as its supply in the host countries–effectively changing the culture of corruption in these countries. Specifically, FCPA fines could be applied not only to international firms for engaging in bribery, but also to government officials in the host countries for accepting bribes. Investigating the optimal mix of fines on international firms and on government officials in host countries for engaging in corruption is an interesting avenue for future research.

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Appendix: Proofs

Proof of Lemma 1. (i) We look for the equilibrium $(x_1^*, x_2^*, y_1^*, y_2^*)$ in the two-activity contest with marginal costs c_i and $d_i(t)$, $i = 1, 2$. The optimal interior solution for firm i is found by first deriving the cost function $C_i^*(z_i)$ as $\min\{c_i x_i + d_i(t) y_i\}$ subject to the constraint $f(x_i, y_i) = z_i$ and then solving the reduced contest with the derived cost function and payoffs $\pi_i(z_1, z_2) = \frac{z_i}{z_1 + z_2} - C_i^*(z_i)$. The cost function associated with the CD-type production function $f(x_i, y_i)$ is $C_i^*(z_i) = m_i z_i$, where $m_i = \left(\frac{1-\beta}{c_i}\right)^{-(1-\beta)} \left(\frac{\beta}{d_i(t)}\right)^{-\beta}$. The conditional demand of firm i is $x_i^* = \partial C_i^*/\partial c_i = \frac{\beta}{c_i} m_i z_i$ for productive investment and $y_i^* = \partial C_i^*(z_i)/\partial d_i = \frac{1-\beta}{d_i(t)} m_i z_i$ for bribery. The first-order conditions for firms 1 and 2 yield $z_2 (z_1 + z_2)^{-2} = m_1$ and $z_1 (z_1 + z_2)^{-2} = m_2$. Using notations $\Theta = \frac{m_1}{m_2} = \left(\frac{c_1}{c_2}\right)^{1-\beta} \left(\frac{d_1(t)}{d_2(t)}\right)^{\beta}$ and $\Lambda = \Theta (1 + \Theta)^{-2}$, we find that $z_2/z_1 = \Theta$ and then solve for $m_1 z_1 = m_2 z_2 = \Theta (1 + \Theta)^{-2}$. Thus, firm i's efforts are $x_i^* = \frac{1-\beta}{c_i}\Lambda$ and $y_i^* = \frac{\beta}{d_i(t)}\Lambda$. Firm 1's probability of winning is then $p_1^* = (1 + \Theta)^{-1}$.

(ii) We next derive conditions for $\Theta < 1$ and $\Theta > 1$. First, suppose $\frac{c_1}{c_2} = \frac{d_1(t)}{d_2(t)}$. Then, $\Theta = \frac{c_1}{c_2} = \frac{d_1(t)}{d_2(t)}$; $\Theta < 1$ when $\frac{c_1}{c_2} = \frac{d_1(t)}{d_2(t)} < 1$; and $\Theta > 1$ when $\frac{c_1}{c_2} = \frac{d_1(t)}{d_2(t)} > 1$. Next, consider $A = A(t) = \frac{d_1(t)/d_2(t)}{c_1/c_2} \neq 1$. Suppose the U.S. firm has an absolute advantage in both activities, that is, $\frac{c_1}{c_2} < \frac{d_1(t)}{d_2(t)} \leq 1$ or $\frac{d_1(t)}{d_2(t)} < \frac{c_1}{c_2} \leq 1$ holds. Then, $\Theta < 1$. Suppose the U.S. firm has an absolute disadvantage in both activities, that is, $1 \leq \frac{c_1}{c_2} < \frac{d_1(t)}{d_2(t)}$ or $1 \leq \frac{d_1(t)}{d_2(t)} < \frac{c_1}{c_2}$ holds. Then, $\Theta > 1$. Finally, suppose $\frac{c_1}{c_2} < 1 < \frac{d_1(t)}{d_2(t)}$ or $\frac{d_1(t)}{d_2(t)} < 1 < \frac{c_1}{c_2}$. Since $\Theta = \frac{c_1}{c_2} A^{\beta}$ is monotonic in β, there exists a unique $\widehat{\beta}$ such that $\Theta = 1$. Solving equation $\Theta = 1$ for β, we find that $\widehat{\beta} = \frac{\log\left(\frac{c_1}{c_2}\right)}{\log\left(\frac{c_1}{c_2}\right) - \log\left(\frac{d_1(t)}{d_2(t)}\right)} = -\frac{\log\left(\frac{c_1}{c_2}\right)}{\log A(t)} \in (0, 1)$. If $\frac{c_1}{c_2} < 1 < \frac{d_1(t)}{d_2(t)}$, then $A > 1$; Θ is exponentially increasing in β; and $\Theta < 1$ for $\beta < \widehat{\beta}$ and $\Theta > 1$ for $\beta > \widehat{\beta}$. If $\frac{d_1(t)}{d_2(t)} < 1 < \frac{c_1}{c_2}$, then $A < 1$; Θ is exponentially decreasing in β, and $\Theta < 1$ for $\beta > \widehat{\beta}$ and $\Theta > 1$ for $\beta < \widehat{\beta}$. Q.E.D.

Proof of Proposition 1. Consider $d_1(t) = d_1 + t$ and $d_2(t) = d_2$. From Lemma 1, $x_i^* = \frac{1-\beta}{c_i}\Lambda$, $y_1^* = \frac{\beta}{d_1 + t}\Lambda$, and $y_2^* = \frac{\beta}{d_2}\Lambda$, where $\Lambda = \Theta (1 + \Theta)^{-2}$ and $\Theta = \left(\frac{c_1}{c_2}\right)^{1-\beta} \left(\frac{d_1 + t}{d_2}\right)^{\beta}$ for $t \geq 0$; $i = 1, 2$. First, we show that $\frac{dy_1^*}{dt} < 0$. Indeed

$\frac{1}{\beta\Lambda}\frac{dy_1^*}{dt} = \frac{1}{(d_1+t)}\left(\frac{d\Lambda}{dt}\frac{1}{\Lambda} - \frac{1}{d_1+t}\right) < 0$ holds because $\frac{d\Lambda}{dt} = \frac{\partial\Lambda}{\partial\Theta}\frac{\partial\Theta}{\partial t}$, $\frac{\partial\Lambda}{\partial\Theta} = \frac{1-\Theta}{(1+\Theta)^3}$, and $\frac{\partial\Theta}{\partial t} = \beta\Theta\frac{1}{d_1+t}$ implies that $\frac{d\Lambda}{dt}\frac{1}{\Lambda} = \beta\frac{1-\Theta}{1+\Theta}\frac{1}{d_1+t} < \frac{1}{d_1+t}$. Next, $sign\left(\frac{dy_2^*}{dt}\right) = sign\left(\frac{dx_i^*}{dt}\right) = sign\left(\frac{d\Lambda}{dt}\right) = sign\,(1-\Theta)$; $i = 1, 2$. Hence, $\frac{dy_2^*}{dt} > 0$ and $\frac{dx_i^*}{dt} > 0$ if $\Theta < 1$, and $\frac{dy_2^*}{dt} < 0$ and $\frac{dx_i^*}{dt} < 0$ if $\Theta > 1$.

Total bribery effort $Y^* = y_1^* + y_2^*$ can be written as $Y^* = \beta\left(\frac{1}{d_1+t} + \frac{1}{d_2}\right)\Lambda$. Total differentiation of Y^* yields $\frac{dY^*}{dt} = \frac{\beta\Lambda}{(d_1+t)^2}\left(-1 + \beta\left(1 + \frac{d_1+t}{d_2}\right)\frac{1-\Theta}{1+\Theta}\right)$ since $\frac{d\Lambda}{dt}\frac{1}{\Lambda} = \beta\frac{1-\Theta}{1+\Theta}\frac{1}{d_1+t}$. Hence, $\frac{dY^*}{dt} < 0$ if and only if

$$\beta\left(1 + \frac{d_1+t}{d_2}\right)\frac{1-\Theta}{1+\Theta} < 1. \tag{A1}$$

This inequality clearly holds if the U.S. firm is the underdog ($\Theta > 1$). Since $\frac{1-\Theta}{1+\Theta} < 1$, another sufficient condition for $\frac{dY^*}{dt} < 0$ is $\beta\left(1 + \frac{d_1+t}{d_2}\right) \leq 1$, which can be written as $\beta \leq \widehat{\beta}$, where $\widehat{\beta} = \left(1 + \frac{d_1+t}{d_2}\right)^{-1}$. Suppose $\beta > \widehat{\beta}$. Using a continuous function $g = g(\frac{c_1}{c_2}, \frac{d_1+t}{d_2}, \beta) \equiv \beta\left(1 + \frac{d_1+t}{d_2}\right)\left(\frac{2}{1+\Theta} - 1\right) - 1$, inequality (A1) can be written as $g(\frac{c_1}{c_2}, \frac{d_1+t}{d_2}, \beta) < 0$. Function g is strictly decreasing in $\frac{c_1}{c_2}$. As $\frac{c_1}{c_2} \to 0$, we have $\Theta \to 0$ and $g \to \beta\left(1 + \frac{d_1+t}{d_2}\right) - 1 > 0$. As $\frac{c_1}{c_2} \to \infty$, we have $\Theta \to \infty$ and $g \to -\beta\left(1 + \frac{d_1+t}{d_2}\right) - 1 < 0$. Thus, by the Intermediate Value Theorem there exists a unique critical level $\frac{\widehat{c_1}}{c_2}$ for the absolute disadvantage of the U.S. firm in the productive activity, such that $g(\frac{c_1}{c_2}, \frac{d_1+t}{d_2}, \beta) < 0$ if $\frac{c_1}{c_2} > \frac{\widehat{c_1}}{c_2}$ and $g(\frac{c_1}{c_2}, \frac{d_1+t}{d_2}, \beta) > 0$ if $\frac{c_1}{c_2} < \frac{\widehat{c_1}}{c_2}$. Equation $g = g(\frac{c_1}{c_2}, \frac{d_1+t}{d_2}, \beta) = 0$ defines this critical level:

$$\frac{\widehat{c_1}}{c_2} = \left(\frac{\beta\left(1 + \frac{d_1+t}{d_2}\right) - 1}{\beta\left(1 + \frac{d_1+t}{d_2}\right) + 1}\right)^{\frac{1}{1-\beta}}\left(\frac{d_1+t}{d_2}\right)^{-\frac{\beta}{1-\beta}}. \tag{A2}$$

It follows that $\frac{dY^*}{dt} > 0$ if $\beta > \widehat{\beta}$ and $\frac{c_1}{c_2} < \frac{\widehat{c_1}}{c_2}$, and otherwise $\frac{dY^*}{dt} < 0$. Q.E.D.

Proof of Proposition 2. Consider $d_1(t) = d_1 + t$ and $d_2(t) = d_2 + t$. From Lemma 1, $x_i^* = \frac{1-\beta}{c_i}\Lambda$ and $y_i^* = \frac{\beta}{d_i+t}\Lambda$, where $\Lambda = \Theta\,(1+\Theta)^{-2}$ and $\Theta = \left(\frac{c_1}{c_2}\right)^{1-\beta}\left(\frac{d_1+t}{d_2+t}\right)^{\beta}$ for $t \geq 0$; $i = 1, 2$. Then, $\frac{1}{\beta\Lambda}\frac{dy_i^*}{dt} = \frac{1}{(d_i+t)}\left(\frac{d\Lambda}{dt}\frac{1}{\Lambda} - \frac{1}{d_i+t}\right) < 0$ if $\frac{d\Lambda}{dt}\frac{1}{\Lambda} < \frac{1}{d_i+t}$. From $\frac{d\Lambda}{dt} = \frac{\partial\Lambda}{\partial\Theta}\frac{\partial\Theta}{\partial t}$, $\frac{\partial\Lambda}{\partial\Theta} = \frac{1-\Theta}{(1+\Theta)^3}$, and $\frac{\partial\Theta}{\partial t} = \beta\Theta\frac{d_2-d_1}{(d_1+t)(d_2+t)}$, we find that $\frac{d\Lambda}{dt}\frac{1}{\Lambda} = \beta\frac{1-\Theta}{1+\Theta}\frac{d_2-d_1}{(d_1+t)(d_2+t)} = \beta\frac{1-1/\Theta}{1+1/\Theta}\frac{d_1-d_2}{(d_1+t)(d_2+t)} < \frac{1}{d_i+t}$ for $i = 1, 2$, and

thus $\frac{dy_i^*}{dt} < 0$. Next, $sign\left(\frac{dx_i^*}{dt}\right) = sign\left(\frac{d\Lambda}{dt}\right) = sign((1-\Theta)(d_2(t) - d_1(t)))$ for $i = 1, 2$. Hence, $\frac{dx_i^*}{dt} > 0$ when $\Theta < 1$ and $d_1(t) < d_2(t)$ or $\Theta > 1$ and $d_1(t) > d_2(t)$; and $\frac{dx_i^*}{dt} < 0$ if $\Theta < 1$ and $d_1(t) > d_2(t)$ or $\Theta > 1$ and $d_1(t) < d_2(t)$. Finally, from $p_1^* = (1+\Theta)^{-1}$ and $\frac{\partial \Theta}{\partial t} = \beta\Theta\frac{d_2 - d_1}{(d_1+t)(d_2+t)}$, we find that $\frac{dp_1^*}{dt} > 0$ if and only if $d_1(t) > d_2(t)$. Q.E.D.

Table 1. FCPA Enforcement Actions, 2012-2016

2016						
Firm	**Fine**	**Location**	**Industry**	**Main competitor**	**Main host countries**	**Host CPI**
U.S. firms						
SciClone	$12,000,000	CA	Pharmaceutical	Roche	China	40
PTC	$28,000,000	MA	Technology	Oracle	China	40
Qualcomm	$7,500,000	CA	Telecom	Cirrus	China	40
Las Vegas Sands	$9,000,000	NV	Casino and Resorts	MGM	China	40
Akamai	$650,000	MA	Internet service	Level 3 Com	China	40
Nortek	$300,000	RI	Home building	Johnson Controls	China	40
Analogic	$15,000,000	MA	Medical device	General Electric	Russia, Cyprus	26(R); 55(C)
Johnson Controls	$14,000,000	WI	HVAC systems	Raytheon	China	40
Key Energy	$5,000,000	TX	Oil field services	HelmerichPayne	Mexico	30
Nu Skin	$765,000	UT	Skin care products	Avon	China	40
OchZiff	$2,200,000	NY	Banking	UBS	Africa	-
JPMorgan	$264,000,000	NY	Banking	Citigroup	Asia-Pacific	-
General Cable	$75,000,000	KY	Wire and cable	Belden	Angola, Bangladesh	18(A); 26(B)
Total fines:	$433,415,000					
Non-U.S. firms						
Nordion	$500,000	Canada	Health science	Balchem	Russia	26
Novartis	$25,000,000	Switzerland	Pharmaceutical	Pfizer	China	40
SAP SE	$3,700,000	Germany	Software	IBM	Panama	38
VimpelCom	$795,000,000	Netherlands	Telecom	Telia	Uzbekistan	21
LAN Airlines	$22,000,000	Chile	Airline	Delta	Argentina	36
AstraZeneca	$5,000,000	U.K	Pharmaceutical	Pfizer	China, Russia	40(C); 26(R)
AnheuserBusch	$6,000,000	Belgium	Brewery	Carlsberg	India	40
GlaxoSmithKline	$20,000,000	U.K.	Pharmaceutical	Pfizer	China	40
Embraer	$205,000,000	Brazil	Aircraft	Bombardier	D.R., Saudi Arabia	31(D); 46(S);
Braskem	$957,000,000	Brazil	Petrochemical	Exxon Mobil	Brazil	40
Teva	$519,000,000	Israel	Pharmaceutical	Allergan	Russia, Ukraine	26(R); 29(U)
Total fines:	$2,558,200,000					

Table 1 continued

2015

Firm	Fine	Location	Industry	Main competitor	Main host countries	Host CPI
U.S. firms						
BristolMyers	$14,000,000	NY	Pharmaceutical	Pfizer	China	37
BNY Mellon	$14,800,000	NY	Banking	JP Morgan	Middle East	-
Mead Johnson	$12,000,000	IL	Pediatric nutrition	Danone	China	37
FLIR System	$9,500,000	OR	Technology	Lockheed Martin	Saudi Arabia	52
Goodyear	$16,000,000	OH	Tire	Michelin	Angola, Kenya	15(A); 25(K)
PBS&J	$3,400,000	FL	Engineering	AECOM	Qatar, Morocco	71(Q); 36(M)
Total fines:	$69,700,000					
Non-U.S. firms						
BHP Billiton	$25,000,000	Australia	Petroleum	Arconic	China	37
Hitachi	$19,000,000	Japan	Telecom	Fijitsu	South Africa	44
Total fines:	$44,000,000					

2014

Firm	Fine	Location	Industry	Main competitor	Main host countries	Host CPI
U.S. firms						
Avon	$135,000,000	NY	Beauty products	Mary Kay	China	36
Bruker	$2,400,000	MA	Technology	Danaher	China	36
BioRad Labs	$55,000,000	CA	Biochemical	Abbott Labs	Russia, Vietnam	27(R); 31(V)
Layne Christensen	$5,000,000	TX	Water	Black and Veatch	Africa	-
SmithWesson	$2,000,000	MA	Firearm	Glock	Pakistan, Indonesia	29(P); 34(I)
HewlettPackard	$108,000,000	CA	Technology	Dell	Russia, Poland	27(R); 61(P)
Alcoa	$384,000,000	NY	Aluminum	Rio Tinto	Bahrain	49
Total fines:	$691,400,000					
Non-U.S. firms						
-	$0	-	-	-	-	-
Total fines:	$0	-	-	-	-	-

Table 1 continued

Firm	Fine	Location	Industry	Main competitor	Main host countries	Host CPI
			2013			
U.S. firms						
ArcherDaniels	$36,000,000	IL	Food processors	Cargill	Ukraine	26
Stryker	$13,200,000	MI	Medical device	Depuy	Argentina, Greece	34(A); 40(G)
Diebold	$48,000,000	OH	Bank security	NCR	China, Indonesia	40(C); 32(I)
Ralph Lauren	$882,000	NY	Clothing	Pvh	Argentina	34
Parker Drilling	$4,000,000	TX	Oil and gas	Transocean	Nigeria	26
Total fines:	$106,582,000					
Non-U.S. firms						
Weatherford	$250,000,000	Switzerland	Oil field services	Baker Hughes	Cuba, Iran	46(C); 26(I)
Total S.A.	$398,000,000	France	Oil and gas	Exxon Mobil	Iran	26
Koninlijke Philips	$4,500,000	Netherlands	Technology	General Electric	Poland	60
Total fines:	$652,500,000					
			2012			
Firm	**Fine**	**Location**	**Industry**	**Main competitor**	**Main host countries**	**Host CPI**
U.S. firms						
Eli Lilly	$29,000,000	MD	Pharmaceutical	Pfizer	Russia, Brazil	28(R); 43(B)
Oracle	$2,000,000	CA	Technology	IBM	India	36
Pfizer	$45,000,000	NY	Pharmaceutical	Merck	Bulgaria, China	41(B); 39(Ch)
Orthofix	$5,200,000	TX	Medical device	Stryker	Mexico	34
Biomet	$22,000,000	IN	Medical device	JohnsonJohnson	Argentina, Brazil	35(A); 43(B)
Total fines:	$103,200,000					
Non-U.S. firms						
Allianz	$12,300,000	Germany	Insurance	Zurich Insurance	Indonesia	32
Tyco	$26,000,000	Ireland	Security	3M	China, France	39(C); 71(F)
Noble	$8,000,000	U.K	Petroleum	Transocean	Nigeria	27
SmithNephew	$22,000,000	U.K.	Medical device	JohnsonJohnson	Greece	36
Total fines:	$68,300,000					

Notes: Information on FCPA cases and fines are from the SEC (https://www.sec.gov/spotlight/fcpa/fcpa-cases.shtml). CPI is the Corruption Perceptions Index from Transparancy International (www.transparency.org/research/cpi/overview). Main competitor is the first entry on main competitors for a company in the Hoover's database (www.hoovers.com).