The OECD Anti-Bribery Convention: Changing the Currents of Trade

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Abstract

This paper examines how criminalizing the act of bribing a foreign public official affects international trade flows using a watershed global anti-corruption initiative – the 1997 OECD Anti-Bribery Convention. This multilateral agreement criminalized foreign bribery (previously illegal only for U.S. firms) in countries that represent over 75% of world exports. I exploit temporal variation in the implementation of the Convention along with variation in the level of corruption of importing countries to quantify the effects of the Convention on bilateral exports. In contrast to previous work on U.S. efforts to criminalize foreign bribery, I use a large panel of exporters and importers to control for a broad range of confounding global and national trends and shocks. I find that, on average, the Convention caused a reduction in bilateral exports from signatory countries to high corruption importing countries relative to low corruption importing countries. In particular, we observe a 5.6% relative decline in bilateral exports to importing countries that lie one standard deviation lower on the Worldwide Governance Indicators index of corruption. This suggests that by creating large penalties for foreign bribery, the Convention indirectly increased transaction costs between importing countries with high levels of corruption and exporting countries that criminalized foreign bribery. The Convention may have induced OECD firms to divert their exports to less corrupt countries; while at the same time, non-OECD firms that are not bound by the Convention may have increased their exports to corrupt countries. I also find evidence that the effects of the Convention differed across product categories.

Keywords: corruption, bribery, gravity model, international trade, OECD Anti-Bribery Convention

1 Introduction

Until the end of the 1990s, it was commonplace for large multinational firms to bribe foreign public officials. In many countries, these payments were even tax-deductible. Media reports and anecdotal evidence indicate that firms offered bribes to negotiate preferential customs duties, create barriers to entry, and obtain government contracts. In response to growing concern over the magnitude of transnational bribery and the potential economic distortions it creates, the Organization of Economic Cooperation and Development (OECD) created the 1997 Convention on Combating Bribery of Foreign Public Officials in International Business Transactions. This multilateral agreement criminalized the act of bribing a foreign public official, which previously had been illegal only in the United States. It was heralded as the first anti-corruption initiative with global reach, covering almost all industrialized nations, which jointly represent over 75% of the world's exports. Although the OECD's intention was to create a level playing field in international business where contracts are awarded on merit rather than bribes paid, there may have been unintended consequences for trade.

This paper quantifies the effects of the OECD Anti-Bribery Convention on bilateral exports. In imposing large criminal and civil penalties for firms caught bribing, the Convention increased the cost of bribery, e.g., costs to avoid detection and punishment (Shleifer and Vishny, 1993). If OECD firms supplied fewer bribes due to these higher costs, their chances of obtaining export contracts in environments where bribery is common practice will have declined. I examine this hypothesis by testing whether countries that criminalize foreign bribery export relatively less to importers with higher levels of corruption.

I find that, on average, the Convention caused a reduction in total bilateral exports from countries that criminalized foreign bribery to high corruption importers relative to low corruption importers. In particular, we observe a 5.6% average decline in bilateral exports to more corrupt importers relative to less corrupt importers lying one standard deviation lower on the Worldwide Governance Indicators corruption index; for example, there is a 5.6% decline in exports to countries with corruption levels similar to those of Croatia (median level of corruption in the sample) relative to countries with corruption levels similar to those of Italy (one standard deviation less corrupt). This suggests that by increasing the cost of bribery, the Convention indirectly increased transaction costs between high corruption importers and those countries that criminalized foreign bribery; this may have induced some firms to reduce exports and others to exit the markets completely. The Convention may have induced OECD firms to divert their exports to less corrupt countries; while at the same time, non-OECD firms not bound by the

Convention may have increased their exports to corrupt countries. Moreover, the Convention differentially affected the exporters that criminalized foreign bribery. The Convention had no statistically significant effect on exporters from Scandinavian countries (where corruption levels are low) but a large effect on exporters from Eastern Europe and the former U.S.S.R. (where corruption levels are relatively high). These findings suggest that for some multinational firms, standards of governance at home may influence their behavior abroad.

The empirical analysis further shows that the effects of the Convention vary by product category, implying that the mechanisms of bribery may differ across industries. In particular, the relative decline in bilateral exports to more corrupt countries is much larger for homogeneous products (-13.1%) than for differentiated ones (-3.3%). This may partly reflect the ease with which public officials can find substitutes from firms that are able and willing to bribe after the Convention. The results could also reflect the fact that bribes are easier to hide in transactions involving specialized or differentiated goods, e.g., in infrastructure or defense projects (Rose-Ackerman, 1999).

This paper extends previous research in several dimensions. First, literature on the effects of anti-corruption legislation on international trade has focused exclusively on the U.S. adoption of the 1977 Foreign Corrupt Practices Act (FCPA) – the unilateral precursor to the OECD Convention that criminalized foreign bribery for U.S. firms.[1] In contrast, I focus on the multilateral OECD Convention, which was more widely implemented and includes a systematic monitoring process.[2] [3] Second, these previous studies examine a single exporter (U.S.) and a limited set of importers, while this paper focuses on a richer set of countries. Third, these studies generally rely on few controls for normal bilateral trade flows between countries. They often fail to control for global trends or shocks, e.g., 1970s oil crisis, and use ad-hoc or one-dimensional measures of corruption (e.g., news articles on bribery; expert opinion polls). (There are two papers by Cuervo-Cazurra (2006, 2008) that examine the effects of the OECD Convention on foreign direct investment. He

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[1] Studies on the impact of the U.S. FCPA find large declines in U.S. business activity in countries with high levels of corruption (Hines, 1995), in particular in countries where the U.S. did not have a regional advantage (Beck, Maher and Tschoegl, 1991). There are few studies on the direct impact of corruption on international trade; one exception is Lambsdorff (1998) who finds inconclusive evidence that an importer's level of corruption influences export behavior.

[2] All thirty members of the OECD and seven non-members have adopted the Convention. All countries are required to participate in the OECD Working Group on Bribery, which monitors and evaluates national implementation of the Convention.

[3] We might expect the effect of criminalizing foreign bribery to be different if implemented on a unilateral versus multilateral scale. In a theoretical work, Beck and Maher (1989) show that discriminatory regulation that only holds for certain firms is less effective in reducing levels of bribes than uniform regulation that holds for all firms.

finds that countries that adopt the Convention invest relatively less in more corrupt countries and are more sensitive to host country corruption than countries that did not adopt the Convention.)

Relative to this earlier research, this paper exploits extensive product-level trade data on a large panel of 143 exporters and 155 importers along with more comprehensive measures of corruption in order to better identify the effect of criminalizing foreign bribery.[4] The methodology extends the standard version of the gravity model of trade – which relates bilateral trade flows to importer and exporter characteristics that may promote or hinder trade – to control for normal trade flows between nations and controls for global and national trends and shocks that could confound the results. I use a pair fixed effects estimator that exploits time-series variation in bilateral exports and sweeps out cross-sectional variation, allowing for heterogeneous trading relationships.[5] I exploit temporal variation in the adoption of the Convention by exporting countries and variation in the level of corruption in importing countries. This source of identification (i.e., exporter-importer-time variation) allows me to effectively control for important unobservable time-varying country characteristics that could be correlated with endogenous exporter adoption of the Convention or with the importer's level of corruption.

To the best of my knowledge, this paper is the first systematic assessment of the impact of the OECD Anti-Bribery Convention on bilateral exports. It demonstrates that international agreements that target bribery can have measurable effects on domestic economic outcomes. And it provides new evidence of corruption in international trade by documenting changes in bilateral exports due to the criminalization of bribery; that is, if firms were not engaging in bribery, we would see no effect.[6]

This paper broadly contributes to an emerging literature in international trade that highlights the importance of a country's institutional quality and regulatory framework in promoting or hindering trade.[7] Anderson and Marcouiller (2002, 2005) and Nunn (2007) show that imperfect contract enforcement, corruption, and insecurity increase transaction costs, which in turn significantly reduce the volume of

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[4] It would be ideal to look at actual bribes paid, but such data do not exist. Merchandise export data are the most comprehensive and broadly available. Commercial service export data are only available for a subset of countries beginning in 1999. Bilateral foreign direct investment (FDI) data are available for most OECD countries and are utilized in ongoing research.

[5] This estimator accounts for country pairs that traditionally trade more or less often with each other.

[6] In a similar spirit of forensic economics, Fisman and Wei (2004) use detailed industry data from China and Hong Kong to investigate tax evasion and corruption. They find frequent underreporting of value and misclassification of goods from high-tax to low-tax categories – most likely facilitated by bribes to customs agents.

[7] See Belloc (2006) for a survey.

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trade between countries.[8] By making bribery more costly, the OECD Anti-Bribery Convention may have exacerbated such patterns.

The next section provides details on the Convention. Section 3 discusses a conceptual framework and describes the main hypotheses. Section 4 describes the estimation strategy and the data. Section 5 presents the main empirical results for bilateral exports and Section 6 presents the results by product category. Section 7 describes the sensitivity analysis and Section 8 concludes.

2 The OECD Initiative

> From a business perspective, the adoption of the OECD Convention
> on Combating Bribery of Foreign Public Officials in 1997 remains a
> major milestone in the fight against corruption in international trade.
> International Chamber of Commerce, 2007 [9]

The OECD Convention was the first global initiative that targeted the "supply-side" of bribery, i.e., bribe-paying multinationals.[10] The Convention requires signatories to "implement a comprehensive set of legal, regulatory and policy measures to prevent, detect, investigate, prosecute and sanction bribery of foreign public officials".[11] A public official includes anyone who exercises a public function at any level of government. Bribery is broadly defined to include aiding, abetting or authorizing bribery and pertains to payments that afford firms an unfair or unwarranted advantage – for example, bribes paid to secure a government contract, to get an import permit, or to start a business.[12]

Although in all countries it had been illegal to bribe a domestic public official, until the Convention, foreign bribery was illegal only in the United States.[13]

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[8] This evidence provides a potential explanation for the disproportionate amount of trade observed between high-income countries.

[9] ICC Note (2007), p.1.

[10] In 1996 the Organization of American States (OAS) adopted the first convention to criminalize foreign bribery – The Inter-American Convention Against Corruption – that covered countries like Mexico, Canada and Brazil in the Americas. However, this agreement encouraged, but did not require, signatories to criminalize foreign bribery. Moreover, unlike the OECD Anti-Bribery Convention, the OAS convention has no system of monitoring or evaluation.

[11] *The OECD Fights Foreign Bribery,* p. 1.

[12] Similar to the US Foreign Corrupt Practices Act, the Convention does not include "facilitation" or "grease" payments used to induce public officials to perform regularly required services.

[13] The US criminalized foreign bribery through the Foreign Corrupt Practices Act of 1977. Sweden also passed legislation in 1977 that criminalized bribery of any public or private employee. By default, foreign public officials were included, however, specific cases could only be prosecuted and pursued if the host country where the bribery took place asked the Government of Sweden to prosecute – these restrictions were judged to have severely hampered the effectiveness of the law. (Nichols, 1997)

During negotiations a number of countries, including Germany, France, Japan and the UK, voiced concerns that early ratification would translate into trade disadvantages. Their firms claimed that bribing public officials was a necessary part of business transactions in certain countries. Bribes were even considered tax-deductible business expenses in Belgium, Denmark, Iceland, Norway, France, Germany, and Sweden, among others. As a compromise, it was agreed that the Convention would only enter into force after ratification by five of the ten largest OECD exporters, representing at least 60% of total OECD exports.

Negotiations took place in three rounds in 1997, ratification began in 1998, and the Convention entered into force on February 15, 1999.[14] Scholars have described the rapid negotiations of the OECD Convention as the result of a few key developments: (i) mounting U.S. pressure on OECD members due to shifts in preferences of domestic interest groups (i.e., large multinationals gave up hope that the FCPA would be repealed and instead began to lobby for global criminalization of foreign bribery); (ii) increased public awareness of corruption due to a multitude of domestic bribery scandals in Europe, as well as the work of non-governmental organizations like Transparency International; and (iii) growing complaints from developing countries over supply-driven bribery by powerful multinational firms.[15] (In most countries, including China, Russia and India, foreign bribery is still not illegal.)

Each country was required to adopt national legislation that criminalized foreign bribery in accordance with its own set of national laws, and in concordance with sanctions for similar economic crimes.[16] Information on ratification of the Convention and implementation of national legislation is provided in Appendix I. The Convention also requires participation in a systematic program of monitoring and evaluation conducted by the OECD Working Group on Bribery. The group is made up of representatives from each signatory country. To date the group has completed a first phase evaluation of all countries; they are currently completing a second round of evaluations.

Moreover, until 1999 Sweden used to allow tax deductions for "commissions", as bribes were often called in developing countries. In the empirical work, I do not consider Sweden's adoption of the 1977 law.

[14] See Appendix I for a description of events leading up to the Convention as well as the official text of key articles of the Convention.

[15] Tarullo (2003-04)

[16] This feature, known as "functional equivalence", requires each country to change its laws to incorporate the tenets of the Convention; in some countries bribery is part of the penal code, in others it is part of the criminal code.

Penalties vary by country but usually include large fines for firms and individuals, as well as incarceration.[17] In France and Australia, punishment includes 10 years in prison and/or a fine. In many European countries, the prison sentence is up to 5 years and there are separate fines for natural and legal persons. The U.S. has some of the strictest penalties – up to $2 million for a criminal violation and up to 15 years in prison. In contrast, Japan's penalties include a maximum imprisonment of 3 years and a maximum fine of 3 million Japanese Yen.[18]

Most investigations stem from allegations of fraud made by competitors, tax accountants in revenue collection agencies, importing country parties, foreign diplomatic missions, and international financial businesses. Transparency International, a prominent international anti-corruption NGO, gathered data on prosecutions and investigations related to the OECD Anti-Bribery Convention in selected countries from 2005 to 2007. In 2005 there were 50 reported cases and 51 reported investigations. In 2006 there were 99 prosecutions and 176 investigations. And in 2007 there were 138 prosecutions and 228 investigations. These estimates most likely provide a lower bound for several reasons. First, governments do not always disclose ongoing investigations. Second, some countries only keep such information at the court level, i.e., if prosecutions do not reach court, there is no data on them. In some cases, prosecutors and firms reach plea agreements, which may include fines and penalties, but these data are not easily accessible. This has been the case in many cases brought against U.S. companies by the Department of Justice.[19] Third, in some countries various government agencies deal with bribery investigations, making it difficult to obtain consistent, complete information.[20]

Canada, Germany, South Korea, Sweden, the United Kingdom and the United States have all had convictions of foreign bribery, including the imprisonment of a CEO. Over 60 companies and individuals have been penalized.[21] Companies have been fined millions of dollars; and some have been disqualified from participating in public procurement markets. In its 2003 annual report on international bribery –*Addressing the Challenges of International Bribery and Fair Competition*– the U.S. Department of Commerce writes:

> We estimate that between May 1, 2002 and April 30, 2003, the competition for 40 contracts worth $23 billion may have been affected

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[17] In this paper, I do not use data on penalties as they are not available for all signatory countries.

[18] See implementing legislation by country, available at
https://www.oecd.org/document/30/0,2340,en_2649_34859_2027102_1_1_1_1,00.html

[19] *Recent Trends and Patterns in FCPA Enforcement*, p. 7.

[20] See *Mid-term Study of Phase 2 Reports*, OECD Working Group on Bribery, p. 71-72.

[21] *OECD Working Group on Bribery Annual Report*, 2006. p.164.

by bribery by foreign firms of foreign officials. This is a sharp drop from the previous five years, which averaged very close to 60 contracts each year. *The decline in alleged incidents of foreign bribery is based almost entirely on the actions of firms from two prominent OECD member states. There was no change in the number of contracts sought by non-OECD member state firms, raising their share of this activity to 40 percent during the past 12 months.*[22] (emphasis added)

Convictions and investigations across signatory countries suggest that nations are serious about prosecuting infringements of the OECD Anti-Bribery Convention and that the Convention is being enforced. According to the OECD Working Group on Bribery, however, enforcement continues to vary across countries; comprehensive data on enforcement is not currently available. [23]

3   Conceptual Framework

In this section I present a simple conceptual framework to describe what we should expect and to aid in interpreting the results. By creating large criminal penalties for being caught bribing a foreign public official, the OECD Anti-Bribery Convention increased the costs of foreign bribery. The new costs are driven by the probability of being caught and the penalties if caught, including large fines and imprisonment. If bribery is illegal, OECD firms that bribe must incur additional costs to avoid detection and punishment, e.g., setting up offshore accounts or hiring third-party intermediaries. (Shleifer and Vishny, 1993) (For ease of exposition, I use the terms OECD and non-OECD to describe firms from countries that adopt and do not adopt the Convention, respectively.)

As the cost of supplying bribes increases, the supply of bribes by OECD firms will decrease. This in turn will reduce their likelihood of obtaining a government contract in countries with high levels of corruption, where public officials allocate contracts to the firm that pays the largest bribe rather than the firm offering the best quality-price option.[24] As a result, we would expect a decline in

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[22] *Addressing the Challenges of International Bribery and Fair Competition*. 2003. p.37-38.

[23] See *Mid-term Study of Phase 2 Reports*, OECD Working Group on Bribery, for recommendations of national enforcement procedures.

[24] This could also affect the likelihood of entering the market or receiving favorable tax or tariff treatments. For example, in high corruption countries, government expenditure may be skewed towards sectors in which it is easier to hide graft, e.g., defense, and away from sectors where it is difficult to hide graft. (Mauro, 1998) Shleifer and Vishny (1993) describe a typical case, "To maximize the value of their personal revenues, bureaucrats prohibit imports of goods on which bribes cannot be collected without detection, and encourage imports of goods on which they can collect bribes. As a consequence, the menu of both consumer and producer goods available in the country is determined by corruption opportunities rather than tastes or technological needs". (p. 614)

OECD exports to high corruption countries after the implementation of the OECD Anti-Bribery Convention. This is the central hypothesis that I test in the empirical analysis.

To better understand the firm-level decisions behind the aggregate effects, consider a large multinational OECD firm that bribes foreign officials to obtain export contracts in a corrupt country.[25] In this environment, the probability of winning a contract is an increasing function of bribes paid.[26] I assume that the environment in the importing country remains fixed, i.e., public officials continue to demand bribes after the Convention. (Below I discuss the case where this may not hold.)

After the Convention, the OECD firm has two options: to stop or to continue bribing. If the firm completely stops bribing, we would expect a decline in its exports to the corrupt country given the decline in its probability of winning a contract. To continue bribing the OECD firm must exploit more expensive channels in order to evade detection and punishment, as it is now faced with criminal sanctions for foreign bribery. If the additional costs come out of profits, then the importing market becomes less attractive relative to other markets. Consequently, the OECD firm may reduce its exports to the corrupt country or exit the market completely. If instead the firm increases its prices to cover the additional costs, its goods will be less attractive to consumers, relative to competitors' goods, resulting in the loss of some business. It follows that, on average, exports of the OECD firm to the corrupt country will decline.

These effects may vary across product category. The corruption literature suggests that there is more scope for corruption in transactions involving differentiated or specialized products due to less competitive market structures and higher rents.[27] Moreover, since contracts in differentiated products are more relationship-intensive, pre-Convention contracting may have involved more bribery.[28] Therefore we might expect to observe a larger decline in OECD exports of differentiated products. On the other hand, Rose-Ackerman (1999) argues that it is easier to hide graft when dealing with more complex or capital-intensive goods

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[25] It is possible that within the same OECD country, some firms bribe and others do not. A discussion of the determinants of the initial decision to bribe is outside the scope of this paper.

[26] Survey data indicate that in many countries it is common to pay between 10-15% of the total contract value in kickbacks when doing business with the government. See *Bribery in Procurement*, OECD 2007.

[27] See Krueger (1974) and Rose-Ackerman (1975, 1999).

[28] Rauch (1999) discusses the importance of network search mechanisms in transactions involving differentiated products. He classifies goods into homogeneous and differentiated products; I use this classification in the empirical work. Nunn (2007) also argues that differentiated goods involve relationship-specific contracting; he too uses the Rauch classification of goods.

because cost estimation is more complicated, making it easier to inflate prices and provide kickbacks without getting caught. This task may be more difficult when, for example, purchasing goods that are sold at world prices. Therefore, we would expect a smaller effect for differentiated products, relative to products sold on exchanges. We derive a similar prediction if export contracts and bribes are the outcomes of a bargaining process. If there are few available substitutes (i.e., specialized, differentiated products) and the public project must be completed, the public official will have less bargaining power vis-à-vis the OECD firm. In this case the firm may retain its contracts even when paying a smaller bribe, and so we would expect a smaller decline in OECD exports of differentiated products. If the public official can easily find close substitutes from firms that are still willing and able to bribe, we would expect a large decline in OECD exports of products that are easily substitutable, like homogeneous goods. (China, one of the world's largest exporters, has yet to criminalize foreign bribery.[29]) I test these alternative predictions in the empirical work below using the Rauch (1999) product classification.

In developing the predictions thus far, I have assumed that the level of corruption in the importing country remains constant; however we might observe different results if there are changes in this environment. Although the criminalization of foreign bribery should have reduced OECD exports to high corruption countries on average, the response of individual OECD firms will depend on several factors that cannot be directly tested without firm-level data on contracts and bribes. In particular, an individual OECD firm's response will depend on (i) enforcement efforts by its home country; (ii) competition by non-OECD, bribe-paying firms; and (iii) discretionary power of the public official in allocating contracts.

The credibility of enforcement and the magnitude of criminal penalties may vary by OECD country, but evidence from prosecutions and convictions indicate that the Convention is being enforced in a number of countries. The empirical results capture the effect of such enforcement measures on average.[30]

The second two factors relate to the possible indirect effect of the Convention on corruption in the importing country. One possibility is that all OECD firms stop bribing and the public official has no outside options to procure

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[29] In a recent article on economic growth in Africa, Ted Miguel (2008) writes: "[The] Chinese … have a major advantage over their Western counterparts in that they know how to make money in a developing–country business environment where the rule of law is optional, corruption and bribery are the norm, and infrastructure is patchy. Their experiences at home give them a big leg up on the competition."

[30] In future work I plan to exploit variation in penalty data (being collected) to examine how the effects of the Convention vary across OECD countries.

the necessary products.[31]   Therefore the public official will no longer be able to demand bribes and procurement corruption will decline. In this case, if we think of bribery as a transaction cost that was eliminated by the Convention, we may expect an increase in OECD exports to the corrupt country. Eliminating the need to bribe could also have an impact on OECD and non-OECD firms that were not previously in the market because they were unable to pay a bribe. This no-corruption scenario, however, is not supported by recent survey data and prosecutions indicating that OECD firms still bribe when doing business abroad.[32]   Moreover, if the public official has discretionary power in pursuing a project, i.e., if he can cancel the project if he is unsatisfied with the bribes offered, or if there are competing non-OECD firms (foreign or domestic) that are willing to bribe, then OECD firms will not possess sufficient bargaining power to stop bribing and maintain the same level of business.

4   Methodology and Data

This section describes the empirical strategy and provides summary statistics on the data. I utilize the gravity model of international trade to control for normal trade flows between countries in order identify changes in bilateral trade caused by the OECD Anti-Bribery Convention. The gravity model describes bilateral trade flows as a function of trade barriers and frictions, as well as factors that promote trade.[33] In recent years, it has been used to estimate the impact of regional trade agreements (Frankel, 1997; Krueger, 1999), the WTO (Rose, 2004), and currency unions (Rose, 2000; Baldwin, 2006). The analysis focuses on the intensive margin of trade and asks whether, conditional on trading, the Convention affected bilateral exports.   (The issue of selection is discussed in Section 5.2.)   All equations are estimated using ordinary least squares.

I present five equations, each of which addresses specific pitfalls in gravity estimation that have been acknowledged in the literature. The first two specifications examine whether the Convention affected bilateral exports to all bilateral trading partners regardless of their level of corruption.[34]   The last three address the main

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[31] At the total export level of aggregation, there are many non-OECD firms that are not bound by the Convention; however, for certain product groups OECD firms may only compete among themselves.
[32] See Hellman *et al.* (2000, 2002) and Betra *et al.* (2004).
[33] Although typically criticized for weak theoretical underpinnings, the model has recently been shown to be broadly consistent with the major theories of international trade (Deardorff, 1998; Anderson and van Wincoop, 2003, 2004).
[34] The setup can be viewed in a difference-in-differences (DD) framework, where countries that adopted the Convention make up the treatment group and countries that did not adopt make up the

question of this paper: what was the effect of the Convention on bilateral exports to high corruption versus low corruption importing countries? In the benchmark and preferred specifications (equations 4 and 5 below), I use a pair fixed effects estimator that exploits the time-series variation in exports around country-pair averages to identify changes in bilateral exports brought about by the Convention. The estimator sweeps out all cross-sectional variation between bilateral pairs, as well as cross-sectional variation between importers and cross-sectional variation between exporters (which may be correlated with adoption). This method controls for time-invariant differences between exporters that may have led to the adoption of the Convention. It also controls for factors that may be correlated with the variable of interest (which includes the importer's level of corruption) but are difficult to observe or to measure, e.g., political, ethnic, and cultural linkages.[35] For example, if countries traditionally traded with each other before the Convention due to unobservable ties between corrupt cronies, the estimator controls for this relationship by allowing a unique intercept for each bilateral pair.

4.1 Empirical Specifications

The first specification is as follows:

$$\ln Exports_{ijt} = \delta_1 Conv_{it} + X_{ijt}\beta + P_{ij}\phi + \alpha_i + \alpha_j + \alpha_t + \varepsilon_{ijt} \qquad [\text{Eq1}]$$

where i indexes the exporter, j indexes the importer and t indexes time. The dependent variable is the log of the value of bilateral exports from exporter i to importer j in year t in real US dollars.[36] $Conv_{it}$ is an indicator variable that turns on after exporter i implements legislation criminalizing foreign bribery, i.e., the legislation enters into force. Throughout the sample period it equals zero for non-signatory countries and equals one for the U.S.; it moves from zero to one for signatory countries.[37] The δ_1 coefficient provides an estimate of the effect of the Convention on bilateral exports from countries that implemented the Convention. A negative coefficient would imply that, on average, the Convention decreased bilateral exports from countries that criminalized foreign bribery to their trading partners. δ_1 captures the Convention's effect on signatory countries relative to non-

control group. However in contrast to most DD settings the Convention indirectly affects the control group, whose relative profitability depends on the actions of the treatment group.

[35] See Cheng and Wall (2004) and Baldwin and Taglioni (2006).

[36] Nominal exports were converted to real exports (base year 2000) using the US CPI index.

[37] For years in which the implementing legislation enters into force during the fourth quarter, the indicator turns on in the following year. As a robustness test I use the actual calendar year of the legislation; the results are very similar.

signatory countries. Though the former group was directly affected by the Convention, the latter group may have been indirectly affected, e.g., picking up trade that the former lost. Without firm-level data, it is not possible to separately identify the effects for each group.

X_{ijt} are time-varying factors that influence exports. They include indicators for common currencies and memberships in the same regional free trade agreements or WTO/GATT; a measure of exchange rate volatility; logs of real GDP in thousands of US dollars (base year 2000) and logs of population in thousands. I use the standard deviation of the previous year's monthly nominal exchange rates as a measure of exchange rate volatility, as in Rose (2000).

P_{ij} represents time-invariant pair variables that are typically included in gravity regressions to control for normal trade flows between countries. They include distance between exporter i and importer j in thousands of km; indicators for common language, common colonizer, and colonial ties; and categorical variables for landlocked countries and island nations.

The time dummies (α_t) control for macroeconomic shocks or trends that could confound the results, for example global changes in transport costs due to oil shocks or technology. Baldwin and Taglioni (2006) also argue that time dummies are necessary to correct for the use of the aggregate U.S. price index (instead of country-specific indices) to deflate nominal trade data.

I use exporter (α_i) and importer (α_j) dummies to address the omitted variable bias due to omitted multilateral resistance terms, as described in Anderson and van Wincoop (2003). In a theoretical derivation of the gravity model, the authors show that bilateral trade between two countries depends on the barriers between the two countries relative to the barriers between each country and the rest of the world. The multilateral resistance terms, which are typically excluded from empirical gravity models, depend on all bilateral trade barriers and vary over time. Exporter and importer fixed effects completely control for the bias due to multilateral resistance in a cross-section setting. (This method is common practice in the literature; see Anderson and van Wincoop (2003) and Feenstra (2002).) However, in a panel setting, it is necessary to account for the time-series variation in the bias as well by including exporter- and importer-specific time dummies.[38] In this specification, the variable of interest ($Conv_{it}$) varies by exporter over time and cannot be identified if I include exporter-specific time dummies. (The preferred specification below incorporates such dummies.) Therefore this first equation only

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[38] See Baldwin and Taglioni (2006); Subramanian and Wei (2007); Mitchner and Weidenmier (2008). See Ruiz and Vilarubbia (2007) and Novy (2008) for illustrations of alternative methods that address this bias.

addresses the cross-sectional bias due to the multilateral resistance terms. Finally I include robust standard errors (ε_{ijt}) clustered by pair in order to allow for correlation in errors between observations from the same pair.[39]

The second specification uses the pair fixed effects estimator described above to allow for heterogeneity in bilateral trading relationships. The model is as follows:

$$\ln Exports_{ijt} = \delta_1 Conv_{it} + X_{ijt}\beta + \alpha_{ij} + \alpha_t + \varepsilon_{ijt} \qquad \text{[Eq2]}$$

where α_{ij} are asymmetric pair fixed effects, i.e., $\alpha_{ij} \neq \alpha_{ji}$. The pair fixed effects subsume the exporter and importer dummies in Equation 1.

The next three models exploit variation in the importer's level of corruption to answer the central question of this paper: did the OECD Convention cause countries to export relatively less to more corrupt importing countries? This is equivalent to adding an interaction between the Convention dummy and an index of corruption for importing countries.

Equation 3 allows estimation of the traditional time-invariant pair gravity variables and includes exporter, importer and time dummies for reasons described above. The model is as follows:

$$\ln Exports_{ijt} = \delta_1 Conv_{it} + \delta_2 (Signatory_i * Corr_j)_{ij} + \delta_3 (Conv_{it} * Corr_j)_{ijt}$$
$$+ X_{ijt}\beta + P_{ij}\phi + \alpha_i + \alpha_j + \alpha_t + \varepsilon_{ijt} \qquad \text{[Eq3]}$$

where $Signatory_i$ is a dummy for exporters that adopt and implement the OECD Convention in any year. It captures permanent differences between exporters that adopted the Convention and those that did not. The $Signatory_i$ dummy would typically be included by itself, but here it is subsumed by the exporter fixed effects.

$Corr_j$ is an index that measures the pre-Convention level of corruption in importer j. I use the 1998 "control of corruption" measure from the Worldwide Governance Indicators by Kaufmann, Kraay and Mastruzzi (2007) due to its widespread country coverage.[40] The index is a weighted average of variables related to perceptions on the control of corruption from household, firm and expert surveys collected by multiple organizations. I reverse the scale so higher values correspond

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[39] This method allows for cross-sectional correlation, not time-series correlation in standard errors. The results are robust to clustering at the exporter or at the importer level; however I present results clustered by pair as is standard in the empirical gravity literature.

[40] The 1998 index is the first with broad country coverage and uses data from 1997 (before ratification of the Convention).

to higher levels of corruption. (As shown in the sensitivity analysis in section 7, the results are robust to the use of alternative measures of corruption.) The $Corr_j$ variable would typically be included separately, but is subsumed by the importer fixed effects.

The interaction between $Signatory_i$ and $Corr_j$ controls for permanent differences in the trading relationships between signatories and high (or low) corruption importers. For example, signatory countries – who on average have higher standards of governance – may always prefer to export to importers with lower levels of corruption.

The variable of interest, $(Conv_{it} * Corr_j)_{ijt}$, captures the heterogeneous effects of the Convention by the level of corruption in the importing country. A negative δ_3 coefficient indicates that the Convention decreased exports from countries that criminalized foreign bribery to importers with high levels of corruption, relative to importers with lower levels of corruption.

Equation 4 is the benchmark specification. It is the most commonly used specification in the gravity literature.[41] The model is written as follows:

$$\ln Exports_{ijt} = \delta_1 Conv_{it} + \delta_3 (Conv_{it} * Corr_j)_{ijt} + X_{ijt}\beta + \alpha_{ij} + \alpha_t + \varepsilon_{ijt} \qquad \text{[Eq4]}$$

The pair fixed effects (α_{ij}) subsume the exporter and importer dummies included in Eq3.

Finally the preferred specification is displayed in equation 5 [Eq5]. It includes exporter- and importer-specific time dummies to fully control for the multilateral resistance terms described above. The regression also controls for potentially important time-varying factors for exporters and for importers that could confound the results and for which I am missing data, e.g., on-going trade liberalization or average tariff levels. The preferred specification is as follows:

$$\ln Exports_{ijt} = \delta_3 (Conv_{it} * Corr_j)_{ijt} + X_{ijt}\beta + \alpha_{ij} + \alpha_{it} + \alpha_{jt} + \varepsilon_{ijt} \qquad \text{[Eq5]}$$

where α_{it} and α_{jt} are exporter- and importer-specific time dummies, respectively. The exporter-time dummies subsume the $Conv_{it}$ variable.

In a comprehensive review of the empirical gravity literature, Baldwin and Taglioni (2006) argue that when possible the optimal specification should include exporter- and importer-specific time dummies, pair fixed effects, and time dummies. (This preferred specification is rarely used in the literature because many variables of

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[41] Baldwin and Taglioni (2006), p.18.

interest vary by exporter or importer over time; see Subramanian and Wei (2007) and Mitchener and Weidenmier (2008) for examples. See Ruiz and Vilarrubia (2007) and Novy (2008) for illustrations of the time-series bias caused by omitting time-varying multilateral resistance terms.)

4.2 Samples

The sample of exporters and importers was selected based on data availability for the fifteen-year span: 1992-2006. Data on control variables are available for 155 countries and some export data are available for 143 of these 155 countries.[42] (See Appendix II for a list of countries and details on all data sources.) There are 22,022 pairs (143*154) in the sample, for a total of 330,330 possible exporter-importer-time observations; 22.45% of observations are missing export data. The regression analysis uses only positive trade flows in order to perform a logarithmic transformation, as in the vast majority of empirical gravity papers. However, countries may choose to trade in a non-random way. To get a sense of the non-random factors, I present characteristics of pairs with positive trade flows and pairs with zero trade flows in Table 1. The full sample consists of 256,164 observations, with approximately 69% positive trade flows.[43] Pairs with positive trade tend to be larger, in terms of both GDP and population. They are also more likely to share a common border, a common language, and a common currency, and are more likely to participate in a regional trade agreement. Selection bias is discussed in detail in Section 5.2.

The descriptive statistics also underscore stark differences between signatory and non-signatory countries. There are 94.28% positive export flows for signatory countries, but only 58.51% positive flows for non-signatory countries. Conditional on exporting, the average of real exports is $821,279,000 for signatories, but $179,857,000 for controls. (Average real exports for signatories not including the U.S. are $712,165,000.) Also, signatory countries are, on average, smaller and richer relative to non-signatory countries. These differences suggest that it is important to

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[42] Of the 234 countries and territories available in Comtrade, ten were excluded due to limited or sporadic trade data and 41 were excluded due to limited or no corruption data (e.g., Antarctica) – a significant proportion of the latter are territories or protectorates of other countries (e.g., Netherlands Antilles). Belgium and Luxembourg were excluded because they jointly report trade data until 1999; Macao was excluded because it is a protectorate of China. Eighteen countries were excluded due to a lack of GDP or population data and seven countries were excluded because they were missing exchange rate data. Notably, Taiwan is excluded from the sample due to missing control variable data. The remaining 155 countries make up the final sample of importers, as listed in Appendix II.

[43] Although this proportion is much higher than what is typically found in the literature, the difference is explained by the selected sample (143 exporters versus over 180 in some papers) and the careful treatment of missing and zero trade flows, as described in Appendix II.

control for both permanent and time-varying differences between these two groups, as in Equation 5.

In addition to the analysis of total bilateral exports, I investigate the Convention's effect on exports of three types of products using the Rauch classification: (i) homogeneous – sold on an organized exchange; (ii) reference priced – prices are listed in trade publications; and (iii) differentiated – all other commodities.[44] At the 3-digit product level (257 product lines from 001-899), 22.2% of products are classified as homogeneous; 26.1% as reference-priced and 51.8% as differentiated. About half (49.7%) of the non-missing trade flows of homogeneous products are positive, in contrast to 54.4% for reference-priced products and 63.9% for differentiated products.

Table 2 summarizes the positive export product samples used in the empirical work. In the product regressions, the dependent variable is the total value of exports for each type of good for each country pair in a given year. The magnitudes of average real exports of homogeneous and reference-priced goods are similar and are substantially smaller (less than a third) than that of differentiated products. Table 3 breaks down the product samples by signatory and non-signatory countries. The patterns are similar to the sample of total aggregate exports, with large differences between signatory and non-signatory countries.

5   Bilateral Export Results

The empirical analysis shows that, on average, the OECD Anti-Bribery Convention reduced bilateral OECD exports to importers with high levels of corruption relative to importers with lower levels of corruption. (For ease of exposition, I use OECD to refer to all countries that implemented the Convention, although this includes 5 non-OECD nations.) Table 4 displays the OLS estimates for equations (1)-(5) in columns (1)-(5), respectively. There is no evidence that the Convention had an effect on bilateral OECD exports to all trading partners on average; the coefficient on the Convention dummy changes sign across specifications and is not statistically different from zero. Rather, the impact of the Convention on bilateral OECD exports is detected once we allow the effect to vary across importers based on their level of corruption.

We observe a statistically significant 5.6% decline in OECD exports to more corrupt countries relative to less corrupt countries that lie approximately one

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[44] Rauch (1999) includes both a liberal and a conservative classification of products. In this paper I use the liberal classification, however the results are robust to use of the conservative classification.

standard deviation lower on the corruption index; for example, OECD exports to countries with corruption levels similar to that of Croatia (median level of corruption) decline 5.6% relative to OECD exports to countries with lower corruption levels similar to that of Italy (one standard deviation below the median). This translates to a $45.9 million relative reduction in bilateral OECD exports.[45] At the tails of the distribution, we observe a 20% decline in bilateral OECD exports to countries with corruption levels similar to that of Liberia (most corrupt in sample) relative to countries with corruption levels similar to that of Sweden (least corrupt in sample).

The estimates for the coefficients of interest in the benchmark (column 4) and preferred (column 5) specifications imply that the specification including exporter, importer, and time dummies (column 3) suffers from downward bias. After controlling for heterogeneity in trading relationships (with pair fixed effects) and time-varying multilateral resistance (with exporter-specific and importer-specific time dummies), the coefficient of interest gains precision and magnitude.

The coefficients on the traditional gravity variables (in columns 1 and 3) have the expected signs and are mostly significant at the one percent level. Countries that are larger tend to trade more with each other. Participating in a regional trade agreement significantly increases trade between country pairs and the importer's GDP has a larger effect than that of the exporter, consistent with Frankel (1996). In column 1, being part of a currency union is shown to significantly increase trade, as shown in Rose (2000); in the second two columns, this effect is imprecise. The coefficient on WTO membership is also sensitive to the specification. Since there is little variation in these two membership variables during the sample period, it may not be possible to separately identify their effects from the time-invariant pair effects.[46] Greater exchange rate volatility hinders trade, though these estimates are not always precise.[47] Finally, countries that share a common language, a common colonizer, a common border, or were ever in a colonial relationship are all more likely to trade with each other; in contrast, countries that are farther apart are less likely to trade with each other.

5.1 Discussion and Additional Results
The main findings are consistent with the predictions described above. Since the Convention increased the costs of foreign bribery, it had a differential impact on firms exporting to high corruption countries where bribery is widespread, relative to

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[45] Average annual real bilateral exports (2000 dollars) from signatory countries equals $821,279,400.
[46] Baldwin and Taglioni (2006), p. 18.
[47] Evidence on the effects of exchange rate volatility has been mixed.

countries where bribery is less common. The findings suggest that in response to large expected penalties for foreign bribery, some OECD firms may have reduced their bilateral exports to high corruption countries, while others may have simply exited such markets. It is possible that a portion of export contracts were diverted to firms from countries that did not sign the Convention, like China or India. However, using aggregate trade data, it is impossible to disentangle these two effects. The coefficient of interest, therefore, captures the possibility that non-OECD countries may have experienced an increase in exports to high corruption countries as a result of the Convention.

To explore which exporters are driving the results, I re-run the analysis for select exporters. I group signatory countries into four categories based on their level of corruption (using the same corruption index that was used for importers). Table 5 displays the coefficient of interest for each group. (All regressions use the preferred specification and include all countries that did not adopt the Convention.) We see no effect, on average, for the least corrupt exporters (e.g., Sweden, Switzerland). These findings are not surprising since, on average, fewer firms from less corrupt exporting countries were probably engaged in bribery before the Convention. In contrast, the most corrupt exporters (e.g., Mexico, Bulgaria, Argentina) exhibit a large, significant post-Convention decline in bilateral exports to high corruption importers relative to low corruption importers. Multinational firms based in these more corrupt countries may be more likely to offer and pay bribes based on the culture of bribery at home.[48] Furthermore, since low corruption countries are, on average, more developed, these firms may be more productive or have higher quality products, giving them a competitive advantage vis-à-vis their counterparts; e.g., these firms may not need to rely on bribes to get on a list of bidders for public contracts. Finally, firms from more developed countries might exploit the political clout of their home countries, which are prominent world players, to win contracts. (For example, French aviation and nuclear firms signed contracts worth over $30 billion with Chinese partners during President Sarkozy's 2008 visit to China.[49])

I next draw on the corruption literature to further explore heterogeneous effects for exporters. Firm-level and cross-country empirical analyses have shown high levels of corruption in Eastern Europe and former Soviet nations and low levels

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[48] Lambsdorff (1998) provides some mixed evidence that exporters exhibit different tendencies to offer bribes.

[49] *New York Times* Online Edition. November 27, 2007. Available at
http://www.nytimes.com/2007/11/27/business/worldbusiness/27trade.html?_r=1&scp=1&sq=sar kozy%20visit%20to%20china%20and%20nuclear&st=cse&oref=slogin

of corruption in Nordic countries.[50]   The differences in the impact of the Convention for exporters in the two regions are dramatic. The results are displayed in the first two columns of Table 6; regressions use the preferred specification (Eq5). We observe no statistically significant effect of the OECD Convention for Nordic exporters; these firms are less likely to have been engaged in bribery before the implementation of the Convention.   In contrast, the coefficient for Eastern European and former Soviet nations is large and significant. This finding may be driven by several factors. First, given the high levels of corruption in these countries, multinational firms from these countries may have been accustomed to bribing in order to get things done in the pre-Convention period. Second, many of these countries were going through accession to the European Union (EU) during the sample period.   Although the regressions control for EU membership, these countries may have been systematically lowering their trade barriers with developed countries over time. Third, as part of EU accession, these countries were forced to adopt stricter governance standards, which may have indirectly affected their bilateral trade agreements, on which I do not have data. Therefore, the coefficient of interest for this group may be capturing the effect of the Convention as well as some residual effects of EU accession.

5.2 Selection

In this section, I describe potential selection bias due to the exclusion of zero trade flows from the regression samples. Selection bias stems from a correlation between the independent variables and unobservables contained in the standard errors. For example, countries that have high bilateral trade barriers are likely to have low unobservable barriers that make it worthwhile to trade. This correlation will result in a downward bias on the estimates of the observable trade barriers. This is a concern in the gravity literature where it is common practice to exclude country pairs with zero trade flows.

I use two strategies to address this concern. The first strategy exploits a Poisson estimator for count data to incorporate the zero trade flows; the second examines subsets of countries that were trading together before the Convention. (In a recent paper, Helpman, Melitz and Rubinstein (2008) propose a two-stage estimation

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[50] See, for example, Kaufmann *et al.* (2007) for a discussion of country differences and trends in governance.

procedure to explain zero and positive trade flows; however I am unable to implement this procedure due to data limitations.[51])

First I use the pseudo-maximum-likelihood Poisson estimation method proposed by Silva and Tenreyro (2006), who argue that traditional gravity estimates from log linear models are biased under heteroscedasticity. In the estimation, the dependent variable is the value of exports from exporter i to importer j in year t. The sample includes all positive and zero trade flows. Due to the large number of fixed effects in the preferred specification, I use the benchmark specification (Eq4). The results are insignificantly different from zero. (Results not shown.)

Next I limit the sample to country pairs that traded together in the beginning of the sample period. This method tests changes in the intensive margin of trade, conditional on trading in an earlier period. I run the preferred specification on the sample of country pairs that traded with each other at the beginning of the sample period (1992). (Results not shown.) The coefficient of interest is very similar to the main result presented above. I re-run this test for country pairs that trade together in 1993, 1994, 1995, and 1996 (before the creation of the Convention); the coefficient of interest remains robust to these changes. Together with the previous results, these findings suggest that the Convention acted on the intensive rather than extensive margin of trade.

6   Results by Product Category

In this section I use the Rauch classification of goods to investigate whether the Convention differentially affected bilateral exports of specific categories of products. Table 7 presents the results for homogeneous, reference-priced and differentiated products using the benchmark (Eq4, left panel) and preferred (Eq5, right panel) specifications.

The coefficient of interest is negative and statistically significant across products and specifications, consistent with the story of increased transaction costs between OECD countries and more corrupt importing countries. However, the differences in magnitude suggest that the underlying mechanisms of bribery may differ across products. After the Convention, OECD countries exported 13.1% fewer homogeneous products, on average, to more corrupt importers relative to less corrupt importers (one standard deviation lower on the corruption index). In

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[51] The procedure is similar to the Heckman correction. The first stage entails a Probit selection equation that uses costs of entry (and alternatively, common religion) as an exclusion restriction; the second stage incorporates the selection correction as well as a proxy for firm heterogeneity. Data on costs of entry are not available over time and common religion does not change over time, therefore I am unable to use these exclusion restrictions in a panel setting.

contrast, there is only a 3.3% relative reduction in bilateral exports of differentiated products. (Results from the preferred specification are most plausible since homogenous and reference-priced goods, which are very similar, exhibit similar magnitudes.)

These findings are consistent with several explanations described in the conceptual framework section. Firms selling specialized goods may have more relative bargaining power since foreign public officials have fewer outside options when negotiating with them; therefore, even if these firms reduced their bribes or increased their prices to cover the additional costs imposed by the Convention, they may have been able to retain business. Whereas, in more competitive industries-where substitutes are readily available – officials may have shifted their contracts to firms that were willing and able to bribe after the Convention. (For example, U.S. firms have lodged complaints to the U.S. Department of Commerce that firms from countries where foreign bribery is not illegal have won public contracts by bribing foreign public officials.[52]) Additionally, since it may be more difficult to conceal bribery in markets for homogeneous products (where prices are common knowledge), enforcement of the Convention may, on average, be stronger.

7   Robustness

To test the robustness of the results, I pursue a number of strategies, including using alternative measures of corruption, checking for outliers, and testing alternative explanations for the results. Unless otherwise noted, all tests use the preferred specification (Eq5).

I first investigate an alternative explanation for changes in export patterns that we observe, namely, China's entry into the World Trade Organization (WTO). If China – a very large exporter who is yet to adopt the Convention – systematically exports more to high corruption countries than to low corruption countries, then an increase in its exports could produce similar patterns to those we observe in the main results above. The timing of this event, however, is not consistent with the observed results – China only entered the WTO in December 2001, after 27 of 33 countries had implemented legislation criminalizing transnational bribery. Moreover, most tariff and trade restrictions were slowly phased out between 2002 and 2005.[53]   As a

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[52] *Addressing the Challenges of International Bribery and Fair Competition.* 2003.

[53]Furthermore, there is a special Transitional Safeguard Mechanism in place during a 12-year period starting from the date of accession in cases where imports of products of Chinese origin cause or threaten to cause market disruption to the domestic producers of other WTO members. From http://www.wto.org/english/thewto_e/countries_e/china_e.htm

simple test, I re-estimate the regressions for total exports using data from 1992-2000. The coefficient of interest is significant and slightly larger in magnitude (–6.7%); thus the effects of the Convention are observed even before China's entry into the WTO.

Next, I discuss potential omitted factors that could confound the results. In order to bias the coefficient of interest in the preferred specification, an omitted variable must (i) vary by country pair over time and (ii) be correlated with the exporter's year of implementation or the importer's level of corruption. One possibility is a bilateral trade agreement or sanction. Since it was not possible to collect such data for all bilateral pairs in my sample, I collected data on importing countries that were under UN sanctions during the sample period.[54] There is little change in the coefficient of interest when these importers are excluded from the sample, suggesting that this particular criterion is not very important.

I test alternative measures of corruption and poor governance, beginning with the well-known Corruption Perception Index by Transparency International (1998 data). The country coverage of this index is fairly low (79 out of 155), but the coefficient of interest is robust to the use of this reduced sample. I then test three alternative measures of governance provided by Kaufmann, Kraay, Mastruzzi (2007): (i) rule of law; (ii) regulatory quality; and (iii) government effectiveness. I reverse the indices so that higher values indicate worse governance. I substitute the indices, one at a time, for the corruption index used above. There is little qualitative effect on the results, which is not surprising given the high degree of correlation between all of these measures. And finally, I test three measures from the World Bank's Doing Business Project: (i) the overall ease of doing business within a country; (ii) the burden of procedural requirements associated with importing and exporting; and (iii) the efficiency of contract enforcement. The coefficient of interest remains statistically significant and of comparable magnitude. Taken together, these results imply that a broader set of institutional factors is at play; the Convention differentially affected bilateral exports to importing countries based not only on their level of corruption, but also on broader institutional and governance factors.

We might be concerned that the importer's level of corruption is proxying for other importer characteristics through which the Convention may influence bilateral exports. To test this possibility, I include the main variable of interest along with interactions of the Convention dummy with proxies for levels of development and economic ties. Specifically, I include interactions with exporter and importer GDP, membership in a regional trade agreement, and membership in a currency

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[54] These countries include Angola, Ethiopia, Haiti, Liberia, Libya, Rwanda, Serbia/Montenegro, Sierra Leone, Somalia, and South Africa

union – one at a time and simultaneously. (Results not shown.) The coefficient of interest is robust to the inclusion of the interactions, but its magnitude goes down (-3.6%) when including the interaction with importer's GDP. This result is not surprising since GDP and corruption levels are highly correlated. The interactions with the GDP variables and the currency union dummy are significant, suggesting that these country and country pair factors may also influence the Convention's effect on bilateral exports. I also interact the Convention variable with the traditional bilateral pair gravity variables; the coefficient of interest is not sensitive to these permutations.

To test for non-linearities in the corruption index, I replace the corruption index with dummy variables for different parts of the distribution. I divide the index in thirds and in fourths and then interact the dummies with the Convention dummy. In each case the lowest (least corrupt) group is excluded from the regressions. The coefficients of interest are displayed in Table 8. The findings suggest that importing countries at various points of the distribution experience a decline in bilateral exports from countries that criminalize bribery relative to the least corrupt group of importing countries and that these effects are large.[55]

I also examine whether individual countries or groups of countries are driving the results. I systematically exclude exporters that adopt the Convention one at a time; the results are not sensitive to this strategy. Neither are the results sensitive to the exclusion of large non-signatory exporters – i.e., China, India, and Russia – or of oil-producing nations.[56] The results are also robust to the exclusion of geographical groups of importing countries.[57]

Finally I explore changes in the tax-deductible status of bribes; I test whether these changes had an additional impact on bilateral exports. Before the Convention, twelve countries allowed bribes to be deducted from business expenses for tax purposes.[58] The 1996 *OECD Recommendation of the Council on the Tax Deductibility of Bribes to Foreign Corrupt Officials* encouraged members to disallow such deductions; most countries adopted such laws just before adopting the Convention or at the same time. To test whether this legislation had an impact on bilateral exports after

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[55] The coefficients of interest in the benchmark specification for differentiated products are not statistically significant; however this could be due to a downward bias caused by omitted variables. These coefficients are significant in the preferred specification.

[56] I exclude all OPEC nations that are in the sample: Algeria, Ecuador, Indonesia, Nigeria, Qatar, Saudi Arabia, UAE, and Venezuela.

[57] I use the World Bank regional classification: Africa, Asia (East Asia developing and NIC and South Asia), Latin America, Middle East and North Africa, Eastern Europe and the former USSR, and Island nations.

[58] Australia, Austria, Denmark, France, Germany, Iceland, Netherlands, New Zealand, Norway, Sweden, Switzerland and Portugal.

controlling for the effect of the OECD Convention, I include a dummy for the non-deductible status of bribes in addition to the main variable of interest. This indicator is equal to one when bribes are not tax-deductible in the signatory country. The results are shown in Table 9; I use the benchmark specification since the non-deductible dummy varies at the exporter level over time and would be swept out in the preferred specification by the exporter-specific time dummies.) Disallowing deductions of bribes decreased bilateral exports from countries that criminalized bribery by approximately 4.5%. This effect may be a result of increased accounting and bookkeeping costs that occur at headquarters and affect a firm's overall costs. The main coefficient of interest is robust to the inclusion of the non-deductible dummy.

8   Conclusion

As academics and policymakers struggle to understand and promote economic growth in today's developing countries, many have come to believe that corruption has a profound influence on economic performance and long-run development. This paper investigates one particular form of corruption – bribery of foreign public officials. It provides empirical evidence that bribery indeed occurs to a measurable extent in international export transactions and that criminalizing foreign bribery has affected firm behavior. In particular, I examine the impact of the 1997 OECD Anti-Bribery Convention – the first global anti-corruption initiative targeted at the supply-side of bribery – on bilateral exports. The Convention created criminal and civil penalties for firms and managers caught bribing foreign public officials. I identify the effects of criminalizing foreign bribery using variation in the exporter's adoption of the Convention along with variation in the level of corruption in importing countries. I use product-level panel data on 143 exporters and 155 importers from 1992-2006 to explore the effects on total bilateral exports and bilateral exports by product category.

Controlling for a variety of confounding factors, I find that, on average, countries that implemented the Convention experienced a 5.6% decline in bilateral exports to more corrupt countries relative to less corrupt countries one standard deviation lower on the corruption index; this translates to an approximate $46 million relative decline in bilateral exports. This finding is consistent with economic theory, which suggests that by creating penalties for foreign bribery, the Convention increased the costs of doing business in corrupt countries where winning a contract is a function of bribes paid. As a result, some firms may have decreased exports to more corrupt countries, while other firms may have completely exited these markets.

The main effect also captures other possible changes at the firm level. First, OECD firms may have redirected some of their exports to less corrupt countries. And second, non-OECD firms may have increased their exports to corrupt countries, possibly picking up former OECD business. These findings support previous work on the effects of criminalizing foreign bribery in the U.S., which showed an economically and statistically significant decline in U.S. business activity in corrupt countries following the adoption of the FCPA.[59]

The second key empirical finding is that the relative decline in exports to high corruption countries is observed across product categories, with larger relative declines for homogenous goods (-13.1%) and smaller relative declines for differentiated ones (-3.3%). These findings are consistent with various explanations. Sellers of differentiated or specialized products may have more bargaining power vis-à-vis public officials than sellers of homogeneous products; therefore the former may be able to obtain export contracts even if they bribe less or increase their prices to cover the costs of evading detection. An alternative explanation follows a typology of public procurement bribery proposed by Rose-Ackerman (1999). She argues that graft is more easily concealed in contracts involving specialized products. It follows that the Convention may not have had as much bite in transactions involving differentiated products where prices are more fungible and bribes are easier to hide.

Finally, I find evidence that the effects of the OECD Anti-Bribery Convention differ by exporting country. In particular, we do not observe significant effects for exporting countries with low levels of corruption (i.e., Nordic countries), while we observe large effects for those with high levels of corruption (i.e., Eastern European and former Soviet countries). These results suggest the behavior of multinational firms may be shaped by the institutional culture in their home countries.

What remains to be answered is whether the OECD Anti-Bribery Convention attained its objective of reducing foreign bribery. Even if OECD firms were deterred from bribing, competitors not bound by the Convention may have increased their bribes paid. In effect, the Convention may have altered the composition of bribe payers, as well as the composition of firms doing business in more corrupt countries. Such changes may have had distributional and efficiency implications that cannot be explored with aggregate data, underscoring the need for firm-level analyses. While this current paper has examined the aggregate effects of one specific anti-corruption initiative, it draws attention to potential firm-level

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[59] Hines (1995) shows a 4% average decline in U.S. shares of aircraft imports in corrupt countries relative to U.S. shares of aircraft imports in non-corrupt countries.

responses and, more broadly, highlights the roles of domestic and international institutions in fostering economic transactions.

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Table 1 : Statistics for Total Export Sample

	Positive Flows Only			Positive and Zero Flows		
	Full sample	*Signatories*	*Non-signatories*	*Full sample*	*Signatories*	*Non-signatories*
Dependent variables						
Log real exports	8.22	9.54	7.33	8.22	9.54	7.33
Real exports (in '000 US$)	437,706	821,279	179,857	302,191	774,275	105,236
Export dummy	1	1	1	0.69	0.94	0.59
Control variables		*Mean*			*Mean*	
Exporter GDP* (in $US million)	404,000	881,000	83,000	285,000	836,000	54,300
Importer GDP* (in $US million)	302,000	221,000	356,000	223,000	209,000	229,000
Exporter population (in '000)	61,617	41,636	75,049	46,423	39,976	49,113
Importer population (in '000)	47,326	39,081	52,869	39,261	37,223	40,111
Exchange Rate Volatility*	0.07	0.07	0.07	0.07	0.07	0.08
Log distance (in '000 km)	8.61	8.63	8.60	8.72	8.66	8.74
Corruption 1998	-0.10	0.01	-0.18	0.00	0.04	-0.02
		Percent			*Percent*	
Strict currency union	1.05	1.01	1.08	0.78	0.95	0.71
Regional trade agreement	1.78	1.13	2.23	1.36	1.06	1.48
One in GATT/WTO	25.38	21.93	27.70	29.61	23.26	32.25
Both in GATT/WTO	72.40	77.82	68.76	67.13	76.29	63.30
None in GATT/WTO	2.22	0.25	3.54	3.27	0.44	4.45
Border	2.78	2.10	3.24	1.99	2.00	1.98
Common language	16.22	9.54	20.71	15.98	9.07	18.86
Common colonizer	8.71	0.15	14.46	10.23	0.14	14.44
Colonial ties	2.13	3.31	1.34	1.49	3.14	0.80
Landlocked country pairs						
Neither	73.85	71.34	75.54	71.17	70.83	71.32
One	24.15	26.20	22.78	26.54	26.73	26.46
Both	2.00	2.47	1.68	2.29	2.44	2.23
Island country pairs						
Neither	63.90	64.30	63.64	59.73	62.96	58.38
One	31.43	31.80	31.18	34.96	32.96	35.80
Both	4.67	3.90	5.19	5.31	4.09	5.83
Observations	176,855	71,095	105,760	256,164	73,105	183,059

* Some observations are missing data

Table 2 : Statistics for Sample of Positive Export Flows

	Homogeneous	Reference-priced	Differentiated
Dependent variables			
Log real exports	7.25	7.30	7.54
Real exports (in '000 US$)	88,109.9	97,974.2	322,243.3
Control variables		*Mean*	
Exporter GDP* (in $US million)	495,000	494,000	434,000
Importer GDP* (in $US million)	381,000	350,000	316,000
Exporter population (in '000)	72,636	72,146	65,215
Importer population (in '000)	55,154	50,641	48,083
Exchange Rate Volatility*	0.07	0.07	0.07
Log distance (in '000 km)	8.52	8.55	8.59
Corruption 1998	-0.46	-0.50	-0.43
		Percent	
Strict currency union	1.32	1.17	1.13
Regional trade agreement	2.25	2.08	1.88
One in GATT/WTO	23.48	24.14	24.73
Both in GATT/WTO	74.52	73.78	73.17
None in GATT/WTO	2.01	2.08	2.11
Border	3.76	3.42	2.97
Common language	17.17	16.23	16.61
Common colonizer	8.36	8.01	8.57
Colonial ties	2.92	2.70	2.32
Landlocked country pairs			
Neither	76.78	76.38	74.31
One	21.54	21.93	23.74
Both	1.68	1.69	1.95
Island country pairs			
Neither	65.68	65.08	63.93
One	29.60	30.21	31.29
Both	4.73	4.72	4.79
Observations	127,545	139,515	163,728

* Some observations are missing data

Table 3: Statistics for Product Groups, by Signatory and Non-Signatory

Dependent variables	Homogeneous Goods			Reference-Priced Goods			Differentiated Goods		
	Full	*Signatories*	*Non-signatories*	*Full*	*Signatories*	*Non-signatories*	*Full*	*Signatories*	*Non-signatories*
Log real exports	7.25	7.78	6.84	7.30	8.12	6.61	7.54	9.02	6.44
Real exports (in '000 US$)	88,109	118,721	64,098	97,974	164,129	41,770	322,243	596,404	119,852
Control variables		*Mean*			*Mean*			*Mean*	
Exporter GDP* (in $US million)	495,000	997,000	101,000	494,000	951,000	106,000	434,000	899,000	90,700
Importer GDP* (in $US million)	381,000	278,000	463,000	350,000	245,000	438,000	316,000	227,000	382,000
Exporter population (in '000)	72,636	45,593	93,848	72,146	43,864	96,173	65,215	42,176	82,223
Importer population (in '000)	55,154	46,501	61,942	50,641	42,316	57,713	48,083	39,762	54,225
Exchange Rate Volatility*	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Log distance (in '000 km)	8.52	8.54	8.51	8.55	8.59	8.52	8.59	8.62	8.57
Corruption 1998	-0.46	-1.31	0.21	-0.50	-1.27	0.15	-0.43	-1.27	0.18
		Percent			*Percent*			*Percent*	
Strict currency union	1.32	1.29	1.34	1.17	1.13	1.2	1.13	1.04	1.19
Regional trade agreement	2.25	1.42	2.89	2.08	1.25	2.79	1.88	1.15	2.42
One in GATT/WTO	23.48	20.13	26.11	24.14	20.53	27.20	24.73	21.65	27.00
Both in GATT/WTO	74.52	79.67	70.47	73.78	79.26	69.13	73.17	78.13	69.50
None in GATT/WTO	2.01	0.21	3.42	2.08	0.21	3.67	2.11	0.22	3.50
Border	3.76	2.67	4.61	3.42	2.34	4.33	2.97	2.15	3.57
Common language	17.17	10.74	22.21	16.23	9.65	21.82	16.61	9.70	21.72
Common colonizer	8.36	0.17	14.78	8.01	0.15	14.68	8.57	0.15	14.78
Colonial ties	2.92	4.18	1.93	2.70	3.71	1.83	2.32	3.43	1.50
Landlocked									
Neither	76.78	75.25	77.98	76.38	72.78	79.44	74.31	71.36	76.49
One	21.54	23.02	20.39	21.93	25.04	19.30	23.74	26.16	21.96
Both	1.68	1.73	1.64	1.69	2.18	1.27	1.95	2.48	1.55
Islands									
Neither	65.68	65.83	65.56	65.08	66.07	64.23	63.93	64.66	63.38
One	29.60	30.14	29.17	30.21	30.21	30.20	31.29	31.48	31.15
Both	4.73	4.03	5.27	4.72	3.71	5.57	4.79	3.86	5.47
Observations	127,545	56,067	71,478	139,515	64,084	75,431	163,728	69,535	94,193

* Some observations are missing data

Table 4 : The Impact of the OECD Convention on Bilateral Exports

	(1)	(2)	(3)	(4)	(5)
Convention	0.019	-0.02	0.02	-0.019	
	[0.019]	[0.018]	[0.019]	[0.018]	
Convention*Corruption			-0.023	-0.054	-0.056
			[0.014]	[0.010]**	[0.013]**
Signatory*Corruption			-0.008		
			[0.023]		
Regional Trade Agreement	1.097	0.102	1.096	0.089	0.095
	[0.095]**	[0.035]**	[0.095]**	[0.034]**	[0.039]*
Currency Union	0.535	0.08	0.52	0.041	-0.026
	[0.115]**	[0.046]	[0.116]**	[0.047]	[0.055]
Exchange Rate Volatility	-0.054	-0.002	-0.056	-0.012	-0.269
	[0.040]	[0.033]	[0.040]	[0.033]	[0.132]*
One country in GATT/WTO	-0.213	0.141	-0.206	0.142	-0.124
	[0.075]**	[0.066]*	[0.075]**	[0.066]*	[0.284]
Both countries in GATT/WTO	0.061	0.346	0.068	0.352	-0.017
	[0.076]	[0.070]**	[0.076]	[0.070]**	[0.561]
Log Exporter GDP	0.411	0.384	0.41	0.382	
	[0.030]**	[0.028]**	[0.030]**	[0.028]**	
Log Importer GDP	0.558	0.633	0.558	0.635	
	[0.027]**	[0.024]**	[0.027]**	[0.024]**	
Log Exporter Population	0.666	1.096	0.664	1.094	
	[0.165]**	[0.155]**	[0.165]**	[0.155]**	
Log Importer Population	-0.082	-0.103	-0.055	-0.024	
	[0.119]	[0.108]	[0.123]	[0.112]	
Log distance (in '000 km)	-1.602		-1.6		
	[0.021]**		[0.021]**		
Common Language	0.614		0.615		
	[0.043]**		[0.043]**		
Common Colonizer	0.813		0.812		
	[0.059]**		[0.059]**		
Colonial Relationship	1.179		1.18		
	[0.092]**		[0.092]**		
Land Border	0.535		0.535		
	[0.104]**		[0.105]**		
# Landlocked 0/1/2	4.122		4.12		
	[0.538]**		[0.537]**		
# Island 0/1/2	4.363		4.353		
	[0.660]**		[0.660]**		
N	174464	174464	174464	174464	175001
R^2	0.76	0.91	0.76	0.91	0.92
Country dummies	yes	n/a	yes	n/a	n/a
Time dummies	yes	yes	yes	yes	n/a
Pair fixed effects	no	yes	no	yes	yes
Country-specific time dummies	no	no	no	no	yes

(1) OLS estimation with robust standard errors clustered by pair, in brackets. Each column represents a separate regression. Columns 1-5 run equations 1-5, respectively. (2) The dependent variable is the log of real exports for a country-pair in a given year. For signatory countries: mean of log exports is 9.54 and mean of real exports is $821,279,400. (3) Variable of interest: Convention*Corruption; Convention equals 1 for signatories in years when legislation criminalizing foreign bribery is in force, and zero otherwise. Corruption index is for importing country, with a mean of -0.103 and standard deviation of 1.05. (4) Sample: positive export flows from 1992-2006. (5) Exports and GDP are measured in 2000 dollars. (6) Population is in thousands; distance is in thousands km. * denotes significance at 5%; ** denotes significance at 1%.

Table 5: Coefficient of Interest For
Samples of Select Exporters

Signatory Country	Group	Convention* Corruption
Lower levels of corruption		
Finland		
Switzerland		
Denmark		
Sweden	1	-0.008
Netherlands		[0.020]
New Zealand		
Norway		
United Kingdom		
Germany		
Canada		
Iceland		
Australia	2	-0.051
Austria		[0.020]*
Ireland		
France		
Spain		
Portugal		
Chile		
Japan		
Italy	3	-0.079
Slovenia		[0.022]**
Hungary		
Greece		
Poland		
Czech Republic		
Estonia		
Korea, Rep.		
Brazil		-0.087
Slovak Republic	4	[0.024]**
Argentina		
Turkey		
Bulgaria		
Mexico		
Higher levels of corruption		

Note: Separate regressions are run for each group using the preferred specification. Each sample includes the list signatory countries as well as all non-signatory countries.

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Table 6: Results for Select Samples

	(1)	(2)
	Nordic	**Eastern Eur & fmr USSR**
Convention*Corruption	-0.037	-0.178
	[0.026]	[0.042]**
Regional Trade Agreement	0.039	0.074
	[0.066]	[0.069]
Currency Union	-0.093	-0.11
	[0.106]	[0.123]
Exchange Rate Volatility	-0.433	-0.406
	[0.157]**	[0.159]*
One country in GATT/WTO	-0.17	-0.189
	[0.304]	[0.304]
Both countries in GATT/WTO	-0.154	-0.187
	[0.600]	[0.598]
N	117354	111671
R^2	0.9	0.89

(1) OLS estimation, with robust standard errors clustered by pair, in brackets. (2) The dependent variable is the log of real exports for a country-pair in a given year. Each column represents a different regression on a different sample of the data, listed at the top of the column. All regressions use the preferred specification in Equation 5. (3) Variable of interest Convention equals 1 for signatories in years when legislation criminalizing foreign bribery is in force, and zero otherwise. (4) Sample: positive export flows from 1992-2006. (5) Nordic exporters include Denmark, Finland, Iceland, Norway, and Sweden. Eastern European and former USSR includes Bulgaria, Czech Republic, Estonia, Poland, Slovenia, Slovak Republic. * denotes significance at 5%; ** denotes significance at 1%.

Table 7 : The Impact of the OECD Convention on Total Bilateral Exports and Bilateral Exports by Product Category

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			Reference-priced				Reference-priced	
	Full Sample	Homogeneous	priced	Differentiated	Full Sample	Homogeneous	priced	Differentiated
Convention*Corruption	-0.054	-0.109	-0.056	-0.062	-0.056	-0.131	-0.104	-0.033
	[0.010]**	[0.018]**	[0.013]**	[0.011]**	[0.013]**	[0.022]**	[0.017]**	[0.014]*
Convention	-0.019	-0.042	-0.068	0.036				
	[0.018]	[0.029]	[0.022]**	[0.018]*				
Regional Trade Agreement	0.089	0.256	0.218	0.013	0.095	0.489	0.225	-0.017
	[0.034]**	[0.060]**	[0.046]**	[0.033]	[0.039]*	[0.067]**	[0.050]**	[0.036]
Currency Union	0.041	0.232	0.057	0.022	-0.026	0.297	-0.038	-0.076
	[0.047]	[0.076]**	[0.053]	[0.052]	[0.055]	[0.082]**	[0.059]	[0.053]
Exchange Rate Volatility	-0.012	-0.05	0.027	0.053	-0.269	-0.051	-0.293	-0.269
	[0.033]	[0.054]	[0.040]	[0.035]	[0.132]*	[0.240]	[0.162]	[0.134]*
One country in GATT/WTO	0.142	0.367	0.122	0.028	-0.124	-0.321	-0.162	-0.154
	[0.066]*	[0.109]**	[0.076]	[0.063]	[0.284]	[0.612]	[0.405]	[0.257]
Both countries in GATT/WTO	0.352	0.591	0.346	0.215	-0.017	-0.482	0.012	-0.059
	[0.070]**	[0.115]**	[0.080]**	[0.067]**	[0.561]	[1.217]	[0.803]	[0.505]
Log Exporter GDP	0.382	0.35	0.287	0.443				
	[0.028]**	[0.043]**	[0.035]**	[0.028]**				
Log Importer GDP	0.635	0.513	0.69	0.667				
	[0.024]**	[0.039]**	[0.029]**	[0.025]**				
Log Exporter Population	1.094	0.725	2.415	0.966				
	[0.155]**	[0.228]**	[0.187]**	[0.158]**				
Log Importer Population	-0.024	0.632	-0.815	-0.29				
	[0.112]	[0.174]**	[0.131]**	[0.108]**				
N	174464	125843	137508	161345	175001	126208	137939	161825
R^2	0.91	0.84	0.89	0.92	0.92	0.86	0.9	0.93
Time dummies	yes	yes	yes	yes	n/a	n/a	n/a	n/a
Pair fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Country-specific time dummies	no	no	no	no	yes	yes	yes	yes

(1) OLS estimation, with robust standard errors clustered by pair, in brackets. (2) The dependent variable is the log of real exports for a country-pair in a given year. Each column represents a different regression on a different sample, listed at top of column. For comparison columns 1 and 5 reproduce the results for the full sample from Table 4. The other columns use aggregate samples for each product group, listed at the top of the column. Columns 1-4 use the benchmark specification; columns 5-8 represent the preferred specification. (3) Variable of interest: Convention*Corruption; Convention equals 1 for signatories in years when legislation criminalizing foreign bribery is in force, and zero otherwise. Corruption index is for importing country. (4) Sample: positive export flows from 1992-2006. (5) Exports and GDP are measured in 2000 dollars. (6) Population is in thousands; distance is in thousands km. * denotes significance at 5%; ** denotes significance at 1%.

Table 8: Corruption Index as a Categorical Variable

	(1) Full Sample	(2) Homogeneous	(3) Reference-priced	(4) Differentiated	(1) Full Sample	(2) Homogeneous	(3) Reference-priced	(4) Differentiated
Conv*bribeprone2	-0.132	-0.153	-0.207	-0.06	-0.1	-0.155	-0.139	-0.096
	[0.035]**	[0.054]**	[0.042]**	[0.035]	[0.039]*	[0.060]**	[0.046]**	[0.040]*
Conv*bribeprone3	-0.107	-0.327	-0.19	-0.038	-0.153	-0.152	-0.316	-0.085
	[0.036]**	[0.059]**	[0.046]**	[0.037]	[0.040]**	[0.065]*	[0.050]**	[0.040]*
Conv*bribeprone4					-0.095	-0.344	-0.215	-0.054
					[0.040]*	[0.064]**	[0.051]**	[0.041]
Regional Trade Agreement	0.092	0.488	0.223	-0.017	0.097	0.496	0.225	-0.016
	[0.039]*	[0.064]**	[0.050]**	[0.036]	[0.039]*	[0.063]**	[0.050]**	[0.036]
Currency Union	-0.024	0.314	-0.029	-0.071	-0.028	0.309	-0.046	-0.08
	[0.055]	[0.077]**	[0.059]	[0.053]	[0.055]	[0.078]**	[0.060]	[0.054]
Exchange Rate Volatility	-0.268	-0.059	-0.293	-0.268	-0.267	-0.058	-0.292	-0.267
	[0.132]*	[0.226]	[0.162]	[0.134]*	[0.132]*	[0.226]	[0.162]	[0.134]*
One country in GATT/WTO	-0.137	-0.319	-0.196	-0.167	-0.148	-0.32	-0.208	-0.172
	[0.284]	[0.577]	[0.404]	[0.257]	[0.284]	[0.577]	[0.403]	[0.257]
Both countries in GATT/WTO	-0.049	-0.489	-0.066	-0.088	-0.066	-0.487	-0.079	-0.093
	[0.561]	[1.148]	[0.802]	[0.505]	[0.561]	[1.147]	[0.800]	[0.505]
N	175001	126208	137939	161825	175001	126208	137939	161825
R^2	0.92	0.86	0.9	0.93	0.92	0.86	0.9	0.93

(1) OLS estimation, with robust standard errors clustered by pair, in brackets. (2) The dependent variable is the log of real exports for a country-pair in a given year. Each column represents a different regression on a different sample, listed at the top of the columns. All regressions use the preferred specification in Equation 5. (3) Variable of interest: Convention*Bribeprone2, Convention*Bribeprone3, and Convention*Bribeprone4; Convention equals 1 for signatories in years when legislation criminalizing foreign bribery is in force, zero otherwise. Bribeprone categorical variables are dummies for various parts of the distribution. In columns (1)-(4), the corruption index is broken into three groups; the bottom third (least corrupt) is excluded. In columns (5)-(8), the corruption index is broken into four groups; the bottom quartile (least corrupt) is excluded. (4) Sample: positive export flows from 1992-2006. * denotes significance at 5%; ** denotes significance at 1%.

Table 9: Including the Non-deductible Status of Bribery

	(1)	(2)	(3)	(4)
	Full Sample	**Homogeneous**	**Reference-priced**	**Differentiated**
Non-deductible bribes	-0.045	-0.2	-0.024	-0.058
	[0.020]*	[0.033]**	[0.026]	[0.021]**
Convention*Corruption	-0.054	-0.107	-0.056	-0.062
	[0.010]**	[0.017]**	[0.013]**	[0.011]**
Convention	-0.007	0.016	-0.061	0.053
	[0.018]	[0.029]	[0.022]**	[0.018]**
Regional Trade Agreement	0.088	0.25	0.217	0.012
	[0.034]**	[0.057]**	[0.046]**	[0.033]
Currency Union	0.046	0.253	0.059	0.028
	[0.047]	[0.072]**	[0.053]	[0.052]
Exchange Rate Volatility	-0.011	-0.045	0.028	0.055
	[0.033]	[0.051]	[0.040]	[0.035]
One country in GATT/WTO	0.141	0.36	0.122	0.026
	[0.066]*	[0.102]**	[0.076]	[0.064]
Both countries in GATT/WTO	0.35	0.582	0.345	0.213
	[0.070]**	[0.109]**	[0.080]**	[0.068]**
Log Exporter GDP	0.377	0.329	0.284	0.437
	[0.028]**	[0.040]**	[0.035]**	[0.028]**
Log Importer GDP	0.635	0.513	0.69	0.667
	[0.024]**	[0.037]**	[0.029]**	[0.025]**
Log Exporter Population	1.082	0.647	2.406	0.949
	[0.156]**	[0.216]**	[0.188]**	[0.159]**
Log Importer Population	-0.023	0.646	-0.814	-0.288
	[0.112]	[0.164]**	[0.131]**	[0.108]**
Constant	-19.823	-20.382	-25.904	-18.582
	[1.876]**	[2.612]**	[2.234]**	[1.903]**
N	174464	125843	137508	161345
R^2	0.91	0.84	0.89	0.92
Time dummies	yes	yes	yes	yes
Pair fixed effects	yes	yes	yes	yes

(1) OLS estimation, with robust standard errors clustered by pair, in brackets. (2) The dependent variable is the log of real exports for a country-pair in a given year. Each column represents a different regression on a different sample. The samples are listed at the top of the columns. All regressions use the benchmark specification in Equation 4. (3) Variable of interest: Non-deductible bribes equals one in years when bribes are not tax-deductible, and zero otherwise. There are 12 signatory countries where bribery was tax deductible prior to the advent of the OECD Convention. (4) Sample: positive export flows from 1992-2006. (5) Exports and GDP are measured in 2000 dollars. (6) Population is in thousands; distance is in thousands km. * denotes significance at 5%; ** denotes significance at 1%.

Appendix I: The OECD Convention and Related Documents

In 1989 the OECD officially added the bribery of foreign public officials to its agenda. In 1994 the OECD Ministerial Council adopted the *Recommendation of the Council on Bribery in International Business Transactions*. It was a non-binding, "soft law" instrument which encouraged member nations to take steps to detect and combat the bribing of foreign public officials, though criminalization was not explicitly addressed. Countries took few steps to address these concerns.

The 1996 *OECD Recommendation of the Council on the Tax Deductibility of Bribes to Foreign Corrupt Officials* stated, "Member states which do not disallow the deductibility of bribes to foreign public officials re-examine such treatment with the intention of denying this deductibility".[60]

The 1997 *Revised Recommendation of the Council on Combating Bribery in International Business Transactions* used stronger language and provided prescriptive steps that laid the foundation for negotiations for the OECD Convention. Negotiations began immediately after the Recommendation was issued with the aim of creating a treaty that would be open to signatures by the end of 1997. Legislative proposals were to be submitted to each country's legislative body by April 1, 1998 with hopes of enactment by year-end. The first countries began ratifying the Convention in 1998. On February 15, 1999, the OECD Convention went into force for all signatories.

Below is the official text for the first four Articles of the OECD Anti-Bribery Convention (OECD, 1998: DAFFE/IME/BR(97)20)

Article 1: The Offence of Bribery of Foreign Public Officials

1. Each Party shall take such measures as may be necessary to establish that it is a criminal offence under its law for any person intentionally to offer, promise or give any undue pecuniary or other advantage, whether directly or through intermediaries, to a foreign public official, for that official or for a third party, in order that the official act or refrain from acting in relation to the performance of official duties, in order to obtain or retain business or other improper advantage in the conduct of international business.

2. Each Party shall take any measures necessary to establish that complicity in, including incitement, aiding and abetting, or authorisation of an act of bribery of a foreign public official shall be a criminal offence. Attempt and conspiracy to bribe a

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[60] http://www.oecd.org/document/32/0,2340,en_2649_34855_2048160_1_1_1_1,00.html

foreign public official shall be criminal offences to the same extent as attempt and conspiracy to bribe a public official of that Party.

3. The offences set out in paragraphs 1 and 2 above are hereinafter referred to as "bribery of a foreign public official".

4. For the purpose of this Convention:

a. "foreign public official" means any person holding a legislative, administrative or judicial office of a foreign country, whether appointed or elected; any person exercising a public function for a foreign country, including for a public agency or public enterprise; and any official or agent of a public international organisation;

b. "foreign country" includes all levels and subdivisions of government, from national to local;

c. "act or refrain from acting in relation to the performance of official duties" includes any use of the public official's position, whether or not within the official's authorised competence.

Article 2: Responsibility of Legal Persons

Each Party shall take such measures as may be necessary, in accordance with its legal principles, to establish the liability of legal persons for the bribery of a foreign public official.

Article 3: Sanctions

1. The bribery of a foreign public official shall be punishable by effective, proportionate and dissuasive criminal penalties. The range of penalties shall be comparable to that applicable to the bribery of the Party's own public officials and shall, in the case of natural persons, include deprivation of liberty sufficient to enable effective mutual legal assistance and extradition.

2. In the event that, under the legal system of a Party, criminal responsibility is not applicable to legal persons, that Party shall ensure that legal persons shall be subject to effective, proportionate and dissuasive non-criminal sanctions, including monetary sanctions, for bribery of foreign public officials.

3. Each Party shall take such measures as may be necessary to provide that the bribe and the proceeds of the bribery of a foreign public official, or property the value of which corresponds to that of such proceeds, are subject to seizure and confiscation or that monetary sanctions of comparable effect are applicable.

4. Each Party shall consider the imposition of additional civil or administrative sanctions upon a person subject to sanctions for the bribery of a foreign public official.

Article 4: Jurisdiction

1. Each Party shall take such measures as may be necessary to establish its jurisdiction over the bribery of a foreign public official when the offence is committed in whole or in part in its territory.

2. Each Party which has jurisdiction to prosecute its nationals for offences committed abroad shall take such measures as may be necessary to establish its jurisdiction to do so in respect of the bribery of a foreign public official, according to the same principles.

3. When more than one Party has jurisdiction over an alleged offence described in this Convention, the Parties involved shall, at the request of one of them, consult with a view to determining the most appropriate jurisdiction for prosecution.

4. Each Party shall review whether its current basis for jurisdiction is effective in the fight against the bribery of foreign public officials and, if it is not, shall take remedial steps.

**Important Years in the Implementation of the OECD Convention,
by Signatory Country**

Signatory	Ratification	Entry into force	Entry into force of implementing legislation
Argentina*	2001	2001	1999
Australia	1999	1999	1999
Austria	1999	1999	1998
Belgium	1999	1999	1999
Brazil*	2000	2000	2002
Bulgaria*	1998	1999	1999
Canada	1998	1999	1999
Chile*	2001	2001	2002
Czech Republic	2000	2000	1999
Denmark	2000	2000	2000
Estonia*	2004	2005	2004
Finland	1998	1999	1999
France	2000	2000	2000
Germany	1998	1999	1999
Greece	1999	1999	1998
Hungary	1998	1999	1999
Iceland	1998	1999	1998
Ireland	2003	2003	2001
Italy	2000	2001	2000
Japan	1998	1999	1999
South Korea	1999	1999	1999
Luxembourg	2001	2001	2001
Mexico	1999	1999	1999
Netherlands	2001	2001	2001
New Zealand	2001	2001	2001
Norway	1998	1999	1999
Poland	2000	2000	2001
Portugal	2000	2001	2001
Slovak Republic	1999	1999	1999
Slovenia*	2001	2001	1999
Spain	2000	2000	2000
Sweden	1999	1999	1999
Switzerland	2000	2000	2000
Turkey	2000	2000	2003
United Kingdom	1998	1999	2002
United States**	1998	1999	1977

* Non-OECD member nations; ** US ratified the Convention but the legislation was in place from 1977, after the passage of the FCPA

Appendix II: Data

Description and Sources

All data were collected for the fifteen-year span: 1992-2006. Annual nominal gross bilateral export data come from the United Nations Comtrade Standard International Trade Classification, Revision 3.[61] Data were collected at the 3-digit industry level in current USD and aggregated for analysis. Comtrade export data are largely compiled from customs documents of UN member nations. Export data come from the free circulation area and premises for customs warehousing or commercial free zones. Export data include exports and re-exports; re-exports are goods that have been previously imported and are in the same state.

IMF Direction of Trade Statistics (DOTS) export data (used to distinguish zero trade flows) are compiled from customs documents. Member countries of the IMF are required to provide export and import data by country of destination and country of origin; however many countries do not provide data on a consistent basis. Researchers at the IMF estimate trade flows if a country does not report trade for a specific period. The simplest estimation procedure uses reported data from a country's partners and a factor of 1.1 to covert export f.o.b. values to import c.i.f. values (or vice versa). Other extrapolation uses a matrix of trade across broad country groups or previous years of reported data. Product-level data are not available.

Data on corruption come from the Worldwide Governance Indicators constructed by Kaufmann, Kraay, and Mastruzzi of the World Bank Group.[62] Data on product differentiation at the 4-digit level (SITC Rev 2) come from Rauch (1999).

Data on historical and cultural ties, currency unions, and regional trade agreements for 1992-2000 come from Rose (2000) and Rose (2002). I updated the data using IMF, WTO, and CIA sources. Exchange rate data come from the IMF International Financial Statistics Database; I use the conventional *rf* series which represents period-average national currency units per U.S. dollar based on monthly averages of market rates or official rates of the reporting country.

Data on gross domestic product and population come from the World Bank Development Indicators. GDP data are converted to real 2000 dollars using the U.S. CPI.[63] Data on distance comes from the Centre d'Etudes Prospectives et

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[61] Gross exports consist of exports and re-exports

[62] Data are available at http://info.worldbank.org/governance/wgi/index.asp

[63] Data are available at http://www.bls.gov/cpi/

d'Informations Internationals. Distances are calculated using the great circle formula.[64]

Rauch classification

The Rauch classification is available for 4-digit SITC Rev 2 products. I mapped the classifications to my 3-digit SITC Rev 3 data. First I map the 4-digit industry data to 3-digit industry data. For the vast majority of 3-digit products, all of the 4-digit products are of one classification (e.g., homogeneous). For those 3-digit products where the 4-digit products have different classifications, I choose the classification that is the most frequently found in the corresponding 4-digit products. I then match the 3-digit SITC Rev 2 data with my 3-digit SITC Rev 3 data. The revisions are quite similar, though some product numbers have changed. Finally, I sum over the export data for each of the classifications. This results in three datasets: homogeneous product exports, reference-priced exports, and differentiated product exports.

Missing and zero trade flows

The section on selection uses export data that include both positive and zero trade flows. I use data from the IMF Direction of Trade Statistics database to aid in differentiating between export data that has not been reported or collected (i.e., missing) and exports that are equal to zero (i.e., a country does not export to certain countries in one or more years) as the Comtrade database only includes positive trade flows.

The final sample includes 143 exporters and 155 importers from 1992-2006, for a total of 330,330 pair-year observations. There are 176,855 positive total export flows (53.54%) in this sample. The DOTS database covers 288,420 observations (87.3%); the trade flow is positive, zero, or N.A. (which I denote as missing); the observations that are missing from the DOTS data are designated as missing. The DOTS data include 56.16% positive trade flows, 27.75% zero trade flows, and 16.09% missing trade flows.

156,039 of the 330,330 observations have positive exports in both data. 8,442 observations have positive exports in Comtrade but are missing from DOTS; these observations are not changed. 91,683 observations have zero trade flows in DOTS. 12,374 of these have positive trade flows in Comtrade and are not changed[65]; the remaining observations (79,309) are designated as zero trade flows in my dataset.

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[64] The formula uses latitudes and longitudes of the most important city (in terms of population) or of its official capital. Data available at http://www.cepii.fr/anglaisgraph/bdd/distances.htm

[65] Some of the Comtrade export values are very small (e.g., US$100); in such cases the difference between the databases may result from different statistical thresholds for data collection.

Some observations that are not included in the Comtrade data are either missing (44,704) or positive (29,462) in the DOTS database; these observations are denoted missing. This procedure was done using data on total exports since DOTS only provides total trade data. Observations that are missing from the final total export dataset are designated as missing for all product category datasets as well. The final sample for total exports includes 74,166 missing observations out of a possible 330,330 pair-year observations.

List of Countries Included in the Final Sample

Albania	Dominica	Lao PDR***	Saudi Arabia
Algeria	Dominican Rep.	Latvia	Senegal
Angola***	Ecuador	Lebanon	Seychelles
Argentina	Egypt, Arab Rep.	Liberia***	Sierra Leone
Armenia	El Salvador	Libya***	Singapore
Australia	Equatorial Guinea***	Lithuania	Slovak Republic
Austria	Estonia	Macedonia, FYR	Slovenia
Bahrain	Ethiopia	Madagascar	Solomon Islands***
Bangladesh	Fiji	Malawi	South Africa
Barbados	Finland	Malaysia	Spain
Belarus	France	Maldives	Sri Lanka
Belize	Gabon	Mali	St. Kitts and Nevis
Benin	The Gambia	Malta	St. Lucia
Bhutan***	Germany	Mauritania	St. Vincent, the Grenadines
Bolivia	Ghana	Mauritius	Sudan
Brazil	Greece	Mexico	Suriname
Brunei	Grenada	Moldova	Sweden
Bulgaria	Guatemala	Morocco	Switzerland
Burkina Faso	Guinea	Mozambique	Syrian Arab Republic
Burundi	Guinea-Bissau***	Nepal	Tajikistan
Cambodia	Guyana	Netherlands	Tanzania
Cameroon	Haiti	New Zealand	Thailand
Canada	Honduras	Nicaragua	Togo
Cape Verde	Hong Kong, China	Niger	Tonga
Central African Rep.	Hungary	Nigeria	Trinidad and Tobago
Chad***	Iceland	Norway	Tunisia
Chile	India	Pakistan	Turkey
China	Indonesia	Panama	Uganda
Colombia	Ireland	Papua New Guinea	Ukraine
Comoros	Israel	Paraguay	United Arab Emirates
Congo, Dem. Rep.***	Italy	Peru	United Kingdom
Congo, Rep.	Jamaica	Philippines	United States
Costa Rica	Japan	Poland	Uruguay
Cote d'Ivoire	Jordan	Portugal	Vanuatu
Croatia	Kazakhstan	Qatar	Venezuela
Czech Republic	Kenya	Romania	Vietnam
Denmark	Kiribati***	Russian Federation	Yemen
Djibouti***	Korea, Rep.	Rwanda	Zambia
	Kyrgyz Republic	Samoa	Zimbabwe

*** Only included as importers; export data is not available for these countries.