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

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Changing the Currents of Trade

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Abstract:
This paper examines the effects of a watershed anti-corruption initiative –the 1997 OECD Anti-Bribery Convention– on international trade flows. I exploit variation in the timing of implementation by exporters and in the level of corruption of importers to quantify the Convention's effects on bilateral exports. Using a large panel of country pairs to control for confounding global and national trends and shocks, I find that, on average, the Convention caused a reduction in exports from signatory countries to high corruption importers relative to low corruption importers. This suggests that by creating large penalties for foreign bribery, the Convention indirectly increased transaction costs between signatory countries and high corruption importers. I also find evidence that the Convention's effects differed across product categories.

I. 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 for U.S. firms. 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. Despite the Convention's importance, there has been no systematic study of its impact on international trade; this paper seeks to fill this gap.

This paper quantifies the effects of the OECD Anti-Bribery Convention on bilateral exports. In creating large criminal and civil penalties, the Convention increased the cost of bribery, e.g., costs to avoid detection and punishment (Shleifer and Vishny, 1993). If, as a result, OECD firms supplied fewer bribes, 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 implemented the Convention 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 that lie 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, inducing some firms to reduce exports and others to exit the markets. These firms may have diverted 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. I also find that the Convention differentially affected exporter behavior. The Convention had no statistically significant effect on exporters from Scandinavian countries (where corruption levels are low) but had 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 demonstrates that the effects of the Convention vary by product category, suggesting 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 willing and able 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 trade has focused exclusively on the 1977 U.S. Foreign Corrupt Practices Act (FCPA) – the unilateral precursor to the OECD Convention that criminalized foreign bribery for U.S. firms.[1] [2] In contrast, I focus on the multilateral OECD Convention, which was more widely implemented and includes a

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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 exporter behavior.

[2] Two papers (Cuervo-Cazurra 2006, 2008) examine the effects of the OECD Convention on foreign direct investment. Results suggest that countries that adopt the Convention invest relatively less in high corruption countries and are more sensitive to host country corruption than countries that do not adopt the Convention.

systematic monitoring process.[3] [4] 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).

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.[5] 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. The model controls 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 the time-series variation in bilateral exports and sweeps out cross-sectional variation, allowing for heterogeneous trading relationships.[6] I exploit variation in the timing of implementation for exporting countries that adopt the Convention 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 and implementation 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

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[3] All thirty members of the OECD and eight 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.

[4] We might expect the effect of criminalizing foreign bribery on corruption and on trade 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.

[5] 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.

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

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.[7]

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.[8] 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 trade between countries.[9] 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 provides sensitivity analysis and Section 8 concludes.

II. 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 [10]

The OECD Convention was the first global initiative that targeted the "supply-side" of bribery, i.e., bribe-paying multinationals.[11] The Convention requires signatories

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[7] 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.

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

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

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

to "implement a comprehensive set of legal, regulatory and policy measures to prevent, detect, investigate, prosecute and sanction bribery of foreign public officials".[12] A public official includes anyone who exercises a public function at any level of government, including in public agencies and enterprises, and in international organizations. Bribery is broadly defined to include aiding, abetting or authorizing bribery; it pertains to payments that afford firms an unfair or unwarranted advantage in, for example, securing a government contract, acquiring an import permit, or starting a business.[13] 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. [14] (Appendix I provides more information on the Convention and its related documents.)

Although in all countries it had been illegal to bribe domestic public officials, until the Convention, the United States was the only country to outlaw the bribery of foreign officials.[15] 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.[16] As a compromise, it was agreed that the Convention would

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[11] In 1996 the Organization of American States (OAS) adopted the first convention to criminalize foreign bribery – The Inter-American Convention Against Corruption. However, this agreement did not require signatories to criminalize foreign bribery and unlike the OECD Convention, the OAS convention has no system of monitoring or evaluation.

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

[13] Similar to the U.S. Foreign Corrupt Practices Act, the Convention does not cover "facilitation" or "grease" payments used to induce public officials to perform regularly required services.

[14] To date the group has completed a first phase evaluation for all countries; it is currently completing a second phase.

[15] The U.S. 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) 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; rather, I use Sweden's 1999 implementation of the OECD Convention for identification. The results are robust to Sweden's exclusion from the sample.

[16] Information on the tax-deductibility of bribes was gathered by the author from country reports available here: http://www.oecd.org/document/24/0,3343,en_2649_34859_1933144_1_1_1_1,00.html

only enter into force after ratification by five of the ten largest OECD exporters, representing at least 60% of total OECD exports. (In most countries, including China, Russia and India, foreign bribery is still not illegal.)

Negotiations took place in three rounds in 1997, ratification began in 1998, and the Convention entered into force on February 15, 1999.[17] (See Table 1 for a list of dates of national legislation implementation.) 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.[18]

Each country was required to adopt national legislation that criminalized foreign bribery in accordance with its own set of national laws and sanctions for similar economic crimes.[19] Penalties vary by country but typically include large fines for firms, and fines and incarceration for individuals.[20] 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. Japan's penalties include a maximum imprisonment of 3 years and a maximum fine of 3 million Japanese Yen. In contrast, the U.S. has stricter penalties – up to $2 million for a criminal violation and up to 15 years in prison.[21]

Canada, Germany, South Korea, Sweden, the U.K. and the U.S. have had convictions of foreign bribery. Over 60 companies and individuals have been penalized,

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[17] 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.

[18] Tarullo (2003-04)

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

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

[21] 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

e.g., fines of millions of dollars and disqualification from participating in public procurement markets.[22] 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. Recently Transparency International, a prominent international anti-corruption NGO, gathered data on Convention-related prosecutions and investigations in select countries; the data show substantial increases in both. In 2005 there were 50 reported prosecutions and 51 reported investigations. In 2006 there were 99 prosecutions and 176 investigations. In 2007 there were over 250 prosecutions and 263 investigations. And in 2008 there were 351 prosecutions and 336 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, e.g., cases brought by the U.S. Department of Justice, but these data are not easily accessible.[23] Third, in some countries various government agencies deal with bribery investigations, making it difficult to obtain consistent, complete information.[24]

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.[25]

III.   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

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[22] *OECD Working Group on Bribery Annual Report* (2006), p.164.

[23] *Recent Trends and Patterns in FCPA Enforcement* (2006), p. 7.

[24] See *Mid-term Study of Phase 2 Reports* (2006), p. 71-72.

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

caught bribing a foreign public official, the OECD Anti-Bribery Convention increased the cost of such bribery for OECD firms. (For ease of exposition, I denote firms from countries that adopt and do not adopt the Convention as OECD and non-OECD firms, respectively.) The additional cost stems from being caught (with certain probability) and the penalties if caught, i.e., legal fees, fines, and imprisonment. If bribery is illegal, firms that bribe must exploit more expensive channels to avoid detection and punishment, e.g., setting up offshore accounts or hiring third-party intermediaries. (Shleifer and Vishny, 1993) As the cost of supplying a bribe increases, the supply of bribes by OECD firms will decrease. This, in turn, will reduce their likelihood of obtaining a government contract in high corruption countries, assuming that in such environments the probability of winning a contract is an increasing function of bribes paid.[26] As a result, we should expect a decline in 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.[27] (I assume that there is a credible threat of enforcement and that the importing country environment remains fixed, i.e., corrupt public officials continue to demand bribes after the Convention; below I discuss the case where this may not hold.)

We might also be interested in identifying effects for specific groups of products since levels of corruption may vary across industries. 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.[28] Also, since contracts in differentiated products are more relationship-intensive, pre-

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[26] In its report, *Bribery in Public Procurement* (2007), the OECD states, "Expressed as percentage of a contract, bribes in transnational business may range from 5 to 25 per cent or even more." (p.47) The theoretical and empirical corruption literature indicates that bribery may undermine competitive bidding markets and alter the composition of government expenditure and/or international trade. 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". Mauro (1998) finds that 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, e.g., education.

[27] Since measures of corruption are on a relative country-level scale, it is impossible to identify absolute reductions in exports to high corruption countries; therefore in the empirical work, I estimate changes in exports to countries that are relatively more corrupt (than other importers) using the Worldwide Governance index on corruption.

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

Convention contracting may have involved more bribery.[29][30] Therefore we might expect to observe a larger decline in OECD exports of differentiated products. On the other hand, it may be easier to hide graft when dealing with differentiated goods that are more complex or capital-intensive since cost estimation is more complicated, making it easier to inflate prices to provide kickbacks without getting caught (Rose-Ackerman, 1999). So we would expect a smaller decline for differentiated products. Since it is more difficult to inflate prices when purchasing goods at world prices, 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 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. Furthermore, we would expect a larger decline in OECD exports of homogeneous goods if public officials can easily find substitutes from non-OECD firms that are willing and able to bribe. I test these alternative predictions in the empirical work below using the Rauch (1999) product classification.

The predictions above assume that the Convention is being enforced and that the level of corruption in the importing country remains constant after the Convention. If OECD countries do not enforce the Convention at all, we should not see any effects; however, evidence from prosecutions and convictions indicate that the Convention is being enforced in many countries. If the importing country environment changes as a result of the Convention, we might also expect different results. If all OECD firms stop bribing and public officials do not have any outside options to procure necessary products, then the officials will no longer be able to demand bribes and procurement corruption will decline.[31] If such bribes had been adding to the overall transaction costs

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[30] 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 in his empirical analysis.

[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.

between OECD countries and corrupt countries, we might observe an increase in OECD exports to corrupt countries after the Convention.[32] This no-corruption equilibrium, however, is not supported by recent survey data or current prosecutions which indicate that OECD firms still engage in bribery when doing business abroad.[33] Moreover, if there are competing non-OECD firms (foreign or domestic) that are willing to bribe or if the public official has full discretionary power in pursuing a project, i.e., if he can cancel the project if he is unsatisfied with the bribes offered, then OECD firms will not possess sufficient bargaining power to stop bribing while maintaining the same level of business. As a result, we would expect a relative decline in exports to corrupt countries.

In an alternative situation, both the costs and benefits of bribery may have changed. For example, when the cost of bribery increases, some OECD firms may stop bribing and leave corrupt markets. Consequently, the benefits of bribery may increase for remaining firms. In this case, the reduction in exports from some OECD firms might be offset by increases in exports by other OECD firms. Although these environmental factors and mechanisms are important, they cannot be directly tested without firm-level data on contracts and bribes; therefore the empirical results capture the effects of the Convention on average.

IV. Methodology and Data

This section describes the empirical strategy and data used to identify changes in bilateral trade caused by the OECD Anti-Bribery Convention. The analysis focuses on the intensive margin of trade and asks whether, conditional on trading, the Convention affected bilateral exports. (Issues of selection and the extensive trade margin are discussed in Section 5.2.) I utilize the gravity model of international trade to control for normal trade flows between countries. The model describes bilateral trade flows as a

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[32] 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.
[33] See Hellman *et al.* (2000); Betra *et al.* (2004); *Transparency International Progress Report* (2009)

function of trade barriers and frictions, as well as factors that promote trade.[34] 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).

I present five equations, each of which addresses specific pitfalls in gravity estimation that have been acknowledged in the literature. All equations are estimated using ordinary least squares. I begin with a simple empirical model that examines the Convention's effect on bilateral exports to all trading partners regardless of their level of corruption (equations 1 and 2).[35] I then turn to the main hypothesis: whether the Convention had a differential effect on OECD exports to high corruption versus low corruption countries (equations 3, 4, and 5).

In the benchmark and preferred specifications (equations 4 and 5), I use a pair fixed effects estimator that allows for heterogeneity in bilateral trading relationships. The benchmark model – with pair fixed effects and time dummies – is the most commonly used specification in the gravity literature.[36] Both specifications exploit the time-series variation in exports around country-pair averages and sweep out cross-sectional variation between bilateral pairs, as well as between importers and between exporters. This methodology controls for time-invariant differences between exporters that may have led to the adoption of the Convention or the timing of its implementation. It also controls for time-invariant factors that may be correlated with the variable of interest but are difficult to observe or to measure, e.g., political, ethnic, and cultural linkages.[37] 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.

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[34] The model dates back to Tinbergen (1962). Although previously criticized for weak theoretical underpinnings, the model has been shown to be broadly consistent with the major theories of international trade (Deardorff, 1998; Anderson and van Wincoop, 2003, 2004).

[35] 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 control group. However in contrast to a typical DD setting, the Convention indirectly affects the control group, whose relative profitability depends on the actions of the treatment group.

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

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

A. 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 U.S. dollars.[38]

      $Conv_{it}$ 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..[39] The δ_1 coefficient provides an estimate of the effect of the Convention on bilateral exports for countries that implemented the Convention. A negative coefficient would imply that, on average, exports from signatory countries declined relative to exports from non-signatory countries. Though the former group was directly affected by the Convention, the latter group may have been indirectly affected, i.e. some trade may have been diverted to non-signatory countries. Without firm-level data, it is not possible to separately identify the effects for signatories and non-signatories.

      X_{ijt} are time-varying factors that influence exports. They include indicators for a common currency and membership in the same regional free trade agreements or WTO/GATT; logs of real GDP in thousands of U.S. dollars (base year 2000); logs of population in thousands; and a measure of exchange rate volatility. 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,

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[38] Nominal exports were converted to real exports (base year 2000) using the U.S. CPI index.

[39] 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.

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 include 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).[40] 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. [41] 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.[42] In equation 1, the variable of interest $(Conv_{it})$ varies by exporter over time and cannot be identified if I include exporter-specific time dummies; thus this equation only addresses the cross-sectional bias due to the multilateral resistance terms. Finally I include robust standard errors (ε_{ijt}) that are clustered by pair, in order to allow for correlation in errors between observations from the same pair.[43]

The second specification, using the pair fixed effects estimator described above, is as follows:

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[40] The exporter dummy subsumes a time-invariant indicator for Signatory countries that would have been included.

[41] This method is common practice in the literature; see Feenstra (2002) and Anderson and van Wincoop (2003).

[42] See Baldwin and Taglioni (2006)

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

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

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. This specification examines the Convention's effect on bilateral exports while accounting for unobserved heterogeneity among bilateral country pairs.

Equations 3-5 include an interaction between the Convention dummy and a measure of corruption levels in importing countries to test whether exports were differentially affected based on these levels. Equation 3 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 ever implement the Convention. It captures permanent differences between exporters that adopt the Convention and those that do not.

$Corr_j$ 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.[44] 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 to higher levels of corruption. (The results are robust to the use of alternative measures of corruption; see section 7.)

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.

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[44] The 1998 index is the first with broad country coverage. It uses data from 1997, before ratification of the Convention.

(Both the $Signatory_i$ and $Corr_j$ dummies would typically be included by separatley, but here they are subsumbed by the exporter and importer fixed effects, respectively.)

The variable of interest, $(Conv_{it} * Corr_j)_{ijt}$, captures the heterogeneous effects of the Convention. 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, the benchmark specification, is 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 $(Signatory_i * Corr_j)_{ij}$ interaction, as well as the importer and exporter dummies.

Equation 5, 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. This preferred specification fully controls for the multilateral resistance terms described above. It also controls for potentially important country-specific time-varying factors that could confound the results and for which I am missing data, e.g., on-going trade liberalization or average tariff levels.

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 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.)

B. 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; export data are available for 143 of these 155 countries in the UN Comtrade database.[45] (See Table 2.) (Appendix II provides detailed descriptions of the data sources.) There are 22,022 pairs (143*154) in the sample, for a total of 330,330 possible exporter-importer-time observations; some of these observations (22.45%) 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. In Table 3 I present characteristics of pairs with positive trade flows and pairs with zero trade flows. The full sample consists of 256,164 observations with non-missing export data, with approximately 69% positive trade flows.[46] Pairs with positive trade tend to be larger, in terms of 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. Potential selection bias due to these non-random factors is discussed 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 have smaller populations and are richer relative to non-signatory countries. These differences suggest that it is important to control for both permanent and time-varying differences between these two groups, as is done in Equation 5.

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[45] Of the 234 countries and territories available in Comtrade for the sample period, 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 lack GDP or population data and seven countries lack exchange rate data. Notably, Taiwan is excluded from the sample due to missing control variable data.

[46] Although this proportion is much higher than what is typically found in the literature, the difference is explained by the selected sample and the careful treatment of missing and zero trade flows, as described in Appendix II.

To investigate the Convention's effect on specific types of exports, I use 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.[47] At the 3-digit SITC Revision 3 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 4 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 a given country pair in a given year. The magnitudes of average real exports of homogeneous and reference-priced goods are similar and are substantially smaller than that of differentiated products. Table 5 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.

V. Bilateral Export Results

The empirical analysis shows that, on average, the OECD Anti-Bribery Convention reduced bilateral exports from OECD countries to importers with high levels of corruption relative to importers with lower levels of corruption. (See Table 6.) (For ease of exposition, I use OECD to refer to countries that implemented the Convention, although this includes 5 non-OECD nations.)

There is no evidence that the Convention had an effect on average OECD bilateral exports; the coefficient on the Convention dummy is not statistically different from zero and changes sign across specifications (equations 1 and 2). Rather, the impact of the Convention is detected once we allow the effect to vary across importers based on their level of corruption (equations 3, 4, and 5). Also, after controlling for heterogeneity in trading relationships (pair fixed effects) and time-varying multilateral resistance

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[47] 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 the use of the conservative classification.

(country-specific time dummies), the coefficient of interest gains precision and magnitude.

In the preferred specification (equation 5), we observe a statistically significant 5.6% decline in OECD exports to more corrupt countries relative to less corrupt countries that lie approximately one 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% (or $45.9 million) relative to OECD exports to countries with lower corruption levels similar to that of Italy (one standard deviation below Croatia).[48] At the tails of the corruption distribution, we observe a large (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 coefficients on the traditional gravity variables (e.g., distance, common language) 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, p.140). 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.[49] Greater exchange rate volatility hinders trade, though these estimates are not always precise.[50] 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.

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[48] Average annual real bilateral exports (2000 U.S. dollars) from signatory countries are $821,279,400.
[49] This concern is discussed in Baldwin and Taglioni (2006), p. 18.
[50] Evidence in the literature on the effects of exchange rate volatility has been mixed.

A. Discussion and Additional Results

The main findings are consistent with the main predictions described above. By increasing the costs of foreign bribery, the Convention had a differential impact on exports to countries with higher levels of corruption relative to countries where bribery is less common. Several firm-level stories are consistent with these findings. OECD firms may have reduced their exports to high corruption countries; may have completely exited such markets; or may not have solicited new contracts in such markets. Some of the existing or potential trade contracts may have been diverted to firms from countries not bound by the Convention, i.e., China, India; as a result, the Convention may have led to trade creation between non-OECD countries and high corruption countries.

Anecdotal evidence from the international business community, as well as firm reports and news investigations, lend support to some of these potential mechanisms. For example, 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 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.[51]

Moreover, some non-OECD firms may have a comparative advantage in working in more corrupt environments. In a recent article on economic growth in Africa, Ted Miguel (2008) writes:

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[51] *Addressing the Challenges of International Bribery and Fair Competition* (2003), p.37-38.

[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.[52]

I next examine the effects of the Convention for groups of exporters, based on their own level of corruption since we might expect different effects for exporters with low levels of corruption, who may not be accustomed to bribing, and those with high levels of corruption who may be more likely to offer and pay bribes based on the culture of bribery at home.[53] Table 7 displays the coefficient of interest for groups of exporters, grouped into terciles, quartiles, and quintiles, using the benchmark (equation 4) and preferred (equation 5) specifications. (I employ the same corruption index used for importers to rank exporters.) We observe stronger effects for exporters with higher levels of corruption. For exporters with the lowest levels of corruption, we observe no statistically significant effect. These findings are not surprising; we expect, on average, fewer firms from these countries to have been engaged in bribery before the Convention. These low corruption countries are also, on average, more developed and may have firms that are more productive or have higher quality products, giving them a competitive advantage vis-à-vis their counterparts. As a result, such firms may not need to rely on bribes to get on a list of bidders for public contracts. Finally, some firms might exploit the political clout of their home countries to win contracts, e.g., French aviation and nuclear firms signed contracts worth over $30 billion with Chinese partners during President Sarkozy's 2008 visit to China.[54]

To further explore heterogeneous effects for exporters, I draw on the corruption literature. Firm-level and cross-country empirical research suggests that levels of corruption are high in Eastern Europe and former Soviet nations and low in Nordic

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[52] Miguel (2008), p.1.
[53] Lambsdorff (1998) provides some evidence that exporters exhibit different tendencies to offer bribes.
[54] Clark and Lague (2007)

countries.[55] The results are displayed in Table 8. The differences in the impact of the Convention for exporters in the two regions are dramatic. We observe no statistically significant effect of the OECD Convention for Nordic exporters; in contrast, the coefficient for Eastern European and former Soviet nations is large and significant. The latter 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. These firms may have been dependent on bribes before the Convention and may not have been as competitive once bribery became more expensive. 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.[56] 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 can be considered an upper bound, capturing the effect of the Convention as well as some residual effects of EU accession.

Additionally 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.[57] 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 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.

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

[56] Results are robust to the inclusion of a dummy variable indicating the beginning of EU negotiations as well.

[57] Australia, Austria, Denmark, France, Germany, Iceland, Netherlands, New Zealand, Norway, Sweden, Switzerland and Portugal. Information on the tax-deductibility of bribes was gathered by the author from country reports available here:
http://www.oecd.org/document/24/0,3343,en_2649_34859_1933144_1_1_1_1,00.html

(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.) 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.

B. Selection

In this section, I describe potential selection bias due to the exclusion of zero trade flows. 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 zero trade flows; the second strategy limits the analysis to countries that were trading together before the Convention. (In a recent paper, Helpman, Melitz and Rubinstein (2008) propose a two-stage estimation procedure to address selection; however I am unable to implement this procedure due to data limitations.[58])

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,

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[58] The procedure is similar to a 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.

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, as well as 1993, 1994 and 1995. The coefficients of interest are very similar to the main result presented above. (Results not shown.) Together with the previous results, these findings suggest that the Convention acted on the intensive rather than extensive margin of trade.

VI. 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 10 presents the results for homogeneous, reference-priced and differentiated products using the benchmark (left panel) and preferred (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 countries relative to less corrupt countries (one standard deviation lower on the corruption index). In contrast, we observe 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.[59]) Finally, the smaller effects that we observe for differentiated products may be due to the ease with which bribery may be concealed in such markets.

VII. Robustness

To test the robustness of the results, I pursue a number of strategies, including using alternative measures of corruption, checking for outliers, and exploring alternative explanations for the results.

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 large exporter who is yet to adopt the Convention – systematically increases its exports to high corruption countries, relative to low corruption countries, we would observe patterns similar to 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 foreign bribery. Moreover, most tariff and trade restrictions were slowly phased out between 2002 and 2005.[60] As a simple test, I re-estimate the regressions for total exports using data from 1992-2001. The coefficient of interest is robust; the effects of the Convention are observed even before China's entry into the WTO.

Next, I consider potential omitted factors that could confound the results. In order to bias the coefficient of interest in the preferred specification, an omitted variable

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[59] *Addressing the Challenges of International Bribery and Fair Competition* (2003), p. 37-38.

[60] 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

must vary by country pair over time and be correlated with either the exporter's year of implementation or the importer's level of corruption. One possibility is a bilateral trade agreement or sanction. Since such data for all bilateral pairs in my sample are difficult to obtain, I collected data on importing countries that were under UN sanctions during the sample period.[61] There is little change in the coefficient of interest when these importers are excluded from the sample.

I test alternative measures of corruption and poor governance I use the 1998 Corruption Perception Index by Transparency International and three alternative 1998 measures of governance provided by Kaufmann, Kraay, Mastruzzi (2007): (i) rule of law; (ii) regulatory quality; and (iii) government effectiveness. I reverse the governance 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 among the indicators. This exercise suggests that the effects of the Convention are determined by a broader set of institutional and governance factors.

We might also be concerned that the importer's level of corruption is proxying for other importer characteristics through which the Convention may influence bilateral exports. I add interactions of the Convention dummy with proxies for levels of development, i.e., exporter and importer GDP, one at a time and simultaneously. 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 is not surprising since GDP and corruption levels are highly correlated. The interactions are significant, suggesting that these 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 effects of the corruption index, I replace the 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

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

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coefficients of interest are displayed in Table 11. The findings reinforce the main results; importing countries at various points of the distribution experience a decline in OECD exports from countries that criminalize bribery relative to the least corrupt group of importing countries.

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. Nor are the results sensitive to the exclusion of large non-signatory exporters (i.e., China, India, and Russia) or oil-producing nations (i.e., Algeria, Ecuador, Indonesia, Nigeria, Qatar, Saudi Arabia, UAE, and Venezuela). The results are also robust to the systematic exclusion of geographical groups of importing countries.[62]

VIII. 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 – the bribery of foreign public officials. It provides empirical evidence that bribery indeed occurs to a measurable extent in international business transactions and that criminalizing foreign bribery has affected firm behavior. 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 timing of implementation 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 using the Rauch classification.

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[62] 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.

Controlling for a variety of confounding factors, I find that, on average, countries that implemented the Convention reduced bilateral exports by 5.6% 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 U.S., which showed an economically and statistically significant decline in U.S. business activity in corrupt countries following the adoption of the FCPA.[63]

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 several 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

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[63] 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.

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 analysis. While this current paper has examined the aggregate effects of one specific anti-corruption initiative, it draws attention to potential firm-level responses and, more broadly, highlights the roles of domestic and international institutions in fostering economic transactions.

References

Addressing the Challenges of International Bribery and Fair Competition. United States Department of Commerce, International Trade Administration. (2003).

Anderson, James and Douglas Marcouiller. "Insecurity and the Pattern of Trade: an Empirical Investigation," *The Review of Economics and Statistics.* Vol 84. No 2. (2002). 342-352.

Anderson, James and Douglas Marcouiller. "Anarchy and Autarky: Endogenous Predation as a Barrier to Trade," *International Economic Review.* Vol 46. No 1. (February 2005). 189-213.

Anderson, James and Eric van Wincoop, "Gravity with Gravitas: A Solution to the Border Puzzle," *The American Economic Review.* Vol 93. No 1. (March 2003). 170-192.

Baldwin, Richard E., "The Euro's Trade Effects," Working Paper European Central Bank No 594. (March 2006).

Baldwin, Richard E. and Taglioni, Daria, "Gravity for Dummies and Dummies for Gravity Equations," NBER Working Paper No W12516. Available at SSRN: http://ssrn.com/abstract=930606. (September 2006).

Batra, Geeta, Daniel Kaufmann and Andrew H. W. Stone. "The Firms Speak: What the World Business Environment Survey Tells Us about Constraints on Private Sector Development," IDEAS Econ WPA. Microeconomics 0405004. (2004). Available at http://ideas.repec.org/e/pka21.html.

Beck and Maher. "Competition, Regulation and Bribery," *Managerial and Decision Economics.* Vol 10. No 1. (March 1989). 1-12.

Beck, Maher and Tschoegl. "The Impact of the Foreign Corrupt Practices Act on US Exports," *Managerial and Decision Economics.* Vol 12. No 4. (1991). 295-303.

Belloc, Marianna. "Institutions and International Trade: a Reconsideration of Comparative Advantage," *Journal of Economic Surveys*. Vol 20. No 1. (2006).

Bribery in Public Procurement: Methods, Actors, and Counter-Measures. Paris: OECD Publishing. (2007).

Cheng, I-Hui and Howard J. Wall. "Controlling for Heterogeneity in Gravity Models of Trade and Integration," Working paper 1999-010E. The Federal Reserve Bank of St. Louis. (July 2004).

Clark, Nicola and David Lague. "Airbus Part of $30 Billion in Contracts with China," *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=sarkozy%20visit%20to%20china%20and%20nuclear&st=cse&oref=slo gin

"Convention on Combating Bribery of Foreign Public Officials in International Business Transactions," Working Group on Bribery in International Business Transactions. OECD. DAFFE/IME/BR(97)20. (April 8, 1998).

CPI (Consumer Price Index) data available at http://www.bls.gov/cpi/

Cuervo-Cazurra, Alvaro. "Who Cares About Corruption," *Journal of International Business Studies*. Vol 37. (2006). 806-822.

Cuervo-Cazurra, Alvaro. "The Effectiveness of Laws Against Bribery Abroad," *Journal of International Business Studies*. Vol 39. (2008). 634-651.

Deardoff, Allan. "Determinants of Bilateral Trade: Does Gravity Work in a Neoclassical World?" in *The Regionalization of the World Economy*. Ed: Jeffrey Frankel. Chicago: University of Chicago Press. (1998). 7-22.

Feenstra, Robert C. "Border Effects and the Gravity Equation: Consistent Methods for Estimation," *Scottish Journal of Political Economy.* Vol 49. No 5. (November 2002). 491-506.

Fisman, Raymond and Shang-Jin Wei. "Tax Rates and Tax Evasion: Evidence from 'Missing Imports' in China," *Journal of Political Economy.* Vol 12. No 2. (2004). 471-496.

Frankel, Jeffery. *Regional Trading Blocs in the World Economic System.* Washington DC: Institute for International Economics. (1997).

Hakkala, Katariina Nilssonm, Pehr-Johan Norback, and Helena Svaleryd. "Asymmetric Effects of Corruption on FDI: Evidence from Swedish Mulinational Firms," *The Review of Economics and Statistics.* Vol 90. No 4. (November 2008). 627-642.

Hellman, Joel S., Geraint Jones, and Daniel Kaufmann, "Seize the State, Seize the Day," World Bank Policy Research Working Paper 2444. (September 2000).

Helpman, Elhanan, Marc Melitz, and Yona Rubinstein. "Trading Partners and Trading Volumes," *The Quarterly Journal of Economics.* Vol CXXIII. Issue 2. (May 2008). 441-487.

Hines, James Roger. "Forbidden Payment: Foreign Bribery and American Business After 1977," NBER working paper W5266. (September 1995).

International Financial Statistics, International Monetary Fund. (2007). Available at http://www.imfstatistics.org/imf/

Kaufmann, Daniel, Aart Kraay, and Massimo Mastruzzi. "Governance Matters VI: Governance Indicators for 1996-2006," World Bank Policy Research Working Paper No 4280. (July 2007).

Krueger, Anne. "Trade Creation and Trade Diversion Under NAFTA." NBER Working Paper No 7429. (December 1999).

Krueger, Anne. "The Political Economy of the Rent-Seeking Society," *The American Economic Review*, Vol 64, No 3. (June 1974). 291-303

ICC note on 'the most important obstacle to the effective enforcement of the OECD Anti-Bribery Convention'. ICC Commision on Anti-Corruption, Department of Policy and Business Practices. (June 2007)

IMF Note on the OECD Convention on Combating Bribery of Foreign Public Officials in International Business Transactions. (September 18, 2001). Prepared by the Policy Development and Review Department.

Lambsdorff, Johan Graf. "An Empirical Investigation of Bribery in International Trade," *European Journal of Development Research.* Vol 10. No 1. (1998). 40-59.

Mauro, Paolo. "Corruption and the Composition of Government Expenditure," *Journal of Public Economics.* Vol 69. No 2. (August 1998). 263-279.

Mid-term Study of Phase 2 Reports. OECD Working Group on Bribery in International Transactions. (May 22, 2006).

Miguel, Ted. "Is It Africa's Turn," *Boston Review.* (May/June 2008). Available at http://bostonreview.net/BR33.3/miguel.php

Mitchener, Kris and Marc Weidenmier. "Trade and Empire," *Economic Journal.* Vol 118. Issue 522. (November 2008). 1805-1834.

Nichols, Philip M. "Outlawing Transnational Bribery through the World Trade Organization," *Law and Policy in International Business.* Vol 28. (1997).

No Longer Business As Usual: Fighting Bribery and Corruption. Paris: OECD Publishing. (2000).

Novy, Dennis. "Gravity Redux: Measuring International Trade Costs with Panel Data," (April 2008). University of Warwick. Research paper available on website: http://www2.warwick.ac.uk/fac/soc/economics/staff/academic/novy.

Nunn, Nathan. "Relationship-Specificity, Incomplete Contracts, and the Pattern of Trade," *The Quarterly Journal of Economics*. (May 2007). 569-600.

OECD Working Group on Bribery Annual Report. Paris: OECD Publishing. (2006).

Progress Report on Enforcement of the OECD Convention. Transparency International. (2009); (2008); (2007); (2006); (2005).

Rauch, James. "Networks Versus Markets in International Trade," *Journal of International Economics*. Vol 48. No 1. (June 1999). 7-35.

Recent Trends and Patterns in FCPA Enforcement/ FCPA Digest. Shearman and Sterling, LLP. (February 21, 2008).

Report to the Congress by the Comptroller General of the United States: Impact of Foreign Corrupt Practices Act on U.S. Business. United States General Accounting Office. (March 4, 1981).

Rose, Andrew K. "Do We Really Know that the WTO Increases Trade?" *The American Economic Review*. Vol 94. No 1. (March 2004). 98-114.

Rose, Andrew K. "One Money, One Market: the effect of common currencies on trade," *Economic Policy*.Vol 15. No 30. (April 2000). 9-45.

Rose-Ackerman, Susan. "The Economics of Corruption," *The Journal of Public Economics*. Vol 4. (1975). 187-203.

Rose-Ackerman, Susan. *Corruption and Government: Causes, Consequences and Reform*, Cambridge, UK: Cambridge University Press, (1999).

Ruiz, Juan M. and Josep M. Vilarrubia. "The Wise Use of Dummies in Gravity Models: Export Potentials in the Euromed Region," Working Paper 0720. Banco de Espana. (2007).

Shleifer, A. and R.W. Vishny, "Corruption," *The Quarterly Journal of Economics*. No 3. (August 1993). 599-617.

Silva, Santos and Silvana Tenreyro. "The Log of Gravity," *The Review of Economics and Statistics*. Vol 88. No 4. (November 2006). 641-658.

Smarzynska, Beata K. and Shang-Jin Wei. "Corruption and Cross-Border Investment: Firm-level Evidence," William Davidson Institute Working Paper 494. University of Michigan. (2002).

Straub, Stephane. "Opportunism, Corruption and the Multinational Firm's Mode of Entry," *Journal of International Economics*. Vol 74. No 2. (March 2008). 245-263.

Subramanian, Arvind and Shang-Jin Wei. "The WTO promotes trade, strongly but unevenly," *Journal of International Economics*. Vol 72. (2007). 151-175.

Tarullo, Daniel K. "The Limits of Institutional Design: Implementing the OECD Anti-Bribery Convention," *Virginia Journal of International Law*. 44. 665. (2003-2004).

Tinbergen, Jan. *Shaping the World Economy: Suggestions for an International Economic Policy.* New York: Twentieth Century Fund. (1962).

The OECD Fights Foreign Bribery. Available at the following webiste: http://www.oecd.org/document/24/0,2340,en_2649_34859_1933144_1_1_1_1,00.html

Wei, Shang-Jin. "How Taxing is Corruption on International Investors," The *Review of Economics and Statistics*. Vol LXXXII. No 1. (February 2000).

World Trade Organization information on China available at

http://www.wto.org/english/thewto_e/countries_e/china_e.htm

**Table 1.–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; Sources: *OECD Working Group on Bribery Annual Report* (2006)

Table 2.–Countries in Final Sample

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

* Export data not available

Table 3.–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

Note: Author's calculations; Sources: Export data are from UN COMTRADE; GDP and population data are from the World Bank World Development Indicators (2008); exchange rate data are from the IMF International Financial Statistics (2008); corruption data are from Kaufmann, Kraay and Mastruzzi (2007); distance data are from Centre d'Etudes Prospectives et d'Informations Internationals; the remaining variables come from Rose (2000,2002) for 1992-2000, with the author's updates for 2001-2006 using IMF, World Trade Organization, and CIA sources.

Table 4.–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: Neither	76.78	76.38	74.31
One	21.54	21.93	23.74
Both	1.68	1.69	1.95
Islands: 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

Note: Author's calculations; Sources: see Table 3.

Table 5.–Statistics by Product Category

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

Note: Author's calculations; Sources: see Table 3.

Table 6.–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 is 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%. Sources: see Table 3.

Terciles	*Group 1*	*Group 2*	*Group 3*		
Benchmark	-0.0223	-0.0709***	-0.0967***		
	[0.0164]	[0.0179]	[0.0217]		
Preferred	-0.0185	-0.0621***	-0.0911***		
	[0.0190]	[0.0197]	[0.0227]		
Quartiles	*Group 1*	*Group 2*	*Group 3*	*Group 4*	
Benchmark	-0.0166	-0.0569***	-0.0890***	-0.0942***	
	[0.0192]	[0.0184]	[0.0226]	[0.0247]	
Preferred	-0.00919	-0.0519**	-0.0799***	-0.0884***	
	[0.0210]	[0.0211]	[0.0235]	[0.0252]	
Quintiles	*Group 1*	*Group 2*	*Group 3*	*Group 4*	*Group 5*
Benchmark	0.00378	-0.0438**	-0.0591***	-0.161***	-0.0570*
	[0.0214]	[0.0205]	[0.0205]	[0.0245]	[0.0323]
Preferred	0.0137	-0.0557**	-0.146***	-0.0577*	-0.0396*
	[0.0232]	[0.0221]	[0.0256]	[0.0316]	[0.0228]

least corrupt ———————————————————————➤ *most corrupt*

(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. The benchmark specification uses equation 4; the preferred specification uses equation 5. (3) Variable of interest is 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) The top, middle and bottom panels divide exporters into three, four and five groups respectively, based on their level of corruption. (6) Regressions include the select exporters as well as all non-signatory countries and the U.S. * denotes significance at 5%; ** denotes significance at 1%. Sources: see Table 3.

Table 8.–Results for Select Samples

	(1)	(2)	(3)	(4)
	Nordic		**Eastern Europe & former USSR**	
Convention	-0.045		0.0447	
	[0.036]		[0.0396]	
Convention*Corruption	-0.046	-0.037	-0.248***	-0.233***
	[0.025]	[0.026]	[0.0282]	[0.0295]
Regional Trade Agreement	0.062	0.039	0.130**	0.132**
	[0.055]	[0.066]	[0.0528]	[0.0636]
Currency Union	0.158	-0.093	0.196*	-0.103
	[0.092]	[0.106]	[0.111]	[0.131]
Exchange Rate Volatility	0.045	-0.433	0.0835*	-0.438***
	[0.046]	[0.157]**	[0.0491]	[0.165]
One country in GATT/WTO	0.149	-0.17	0.130*	-0.105
	[0.069]*	[0.304]	[0.0720]	[0.322]
Both countries in GATT/WTO	0.387	-0.154	0.354***	-0.0524
	[0.075]**	[0.600]	[0.0783]	[0.635]
Log exporter GDP	0.56		0.579***	
	[0.036]**		[0.0385]	
Log importer GDP	0.569		0.565***	
	[0.033]**		[0.0361]	
Log exporter population	1.057		1.003***	
	[0.185]**		[0.193]	
Log importer population	0.476		0.593***	
	[0.152]**		[0.161]	
N	116928	117354	117555	117987
R²	0.89	0.9	0.886	0.897

(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. Columns 1 and 3 use the benchmark specification (equation 4) and columns 2 and 4 use the preferred specification (equation 5). (3) Variable of interest is 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) Nordic exporters include Denmark, Finland, Iceland, Norway, and Sweden. Eastern European and former USSR includes Bulgaria, Czech Republic, Estonia, Poland, Slovenia, Slovak Republic. All regressions include non-signatory countries and the U.S. * denotes significance at 5%; ** denotes significance at 1%. Sources: see Table 3.

Table 9.–Results 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	0.35	0.582	0.345	0.213
GATT/WTO	[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]**
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 is Non-deductible bribes, which 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%. Sources: see Table 3.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			Reference-priced				Reference-priced	
	Full Sample	Homogeneous		Differentiated	Full Sample	Homogeneous		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. 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 is 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%. Sources: see Table 3.

Table 11.–Results with 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
R²	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. All regressions use the preferred specification in Equation 5. (3) Variables of interest are 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%. Sources: see Table 3.

Appendix I

In this appendix I discuss documents related to the OECD Anti-Bribery Convention and provide the Convention's official text.

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".[64]

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.[65]

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

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

[65] "Convention on Combating Bribery of Foreign Public Officials in International Business Transactions" p.4-5.

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 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.

Appendix II

In this appendix, I describe the data used and provide a list of importing and exporting countries that are included in the final sample.

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.[66] Data were collected at the 3-digit industry level in current U.S. dollars 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 (2007) of the World Bank Group.[67] 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

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[66] Gross exports consist of exports and re-exports
[67] Data are available at http://info.worldbank.org/governance/wgi/index.asp

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 (2008). GDP data are converted to real 2000 dollars using the U.S. CPI.[68] Data on distance comes from the Centre d'Etudes Prospectives et d'Informations Internationals. Distances are calculated using the great circle formula.[69]

Rauch classification

The Rauch classification is available for 4-digit SITC Rev 2 products. I mapped the classifications to 3-digit SITC Revision 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. There are three resulting datasets of export flows: homogeneous, reference-priced, and differentiated.

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

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

[69] 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

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 [70]; the remaining observations (79,309) are designated as zero trade flows in my dataset. 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.

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[70] 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.