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Foreign investment and bribery: A firm-level analysis of corruption in Vietnam

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ABSTRACT

Among the concerns faced by countries pondering the costs and benefits of greater economic openness to international capital flows is the worry that new and powerful external actors will exert a corrupting influence on the domestic economy. In this paper, we use a novel empirical strategy, drawn from research in experimental psychology, to test the linkage between foreign direct investment (FDI) and corruption. The prevailing literature has produced confused and contradictory results on this vital relationship due to errors in their measurement of corruption which are correlated with FDI inflows. When a less biased operationalization is employed, we find clear evidence of corruption during both registration and procurement procedures in Vietnam. The prevalence of corruption, however, is not associated with inflows of FDI. On the contrary, one measure of economic openness appears to be the most important driver of reductions in Vietnamese corruption: the wave of domestic legislation, which accompanied the country's bilateral trade liberalization agreement with the United States (US-BTA), significantly reduced bribery during business registration.

1. Introduction

In the summer before the 2011 Communist Party Congress, Ngo Vinh Long, a leading historian of Vietnam, wondered whether the large inflows of foreign capital that followed the country's 2006 entry into the World Trade Organization (WTO) was biasing national and local decision making: As he put it, "Huge concentrations of money, especially from foreign sources, have been at the roots of many arbitrary decisions of the Vietnamese state (Ngo, 2010, p. 6)." His speculations were echoed by Vu Quang Viet, a Vietnamese-American economist and close adviser to leading Vietnamese reform figures in the 1980s and 1990s. Surveying the policies of economic openness and decentralization, he concluded, "This has helped make Vietnam more dynamic, capable of attracting more foreign direct investment (FDI), opening up the economy outwardly and generating much more wealth, and thus offering more spoils for abuse and bribery which have reached an unprecedented scale under the current regime (Viet, 2010, p. 17)".

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The issues highlighted by these prominent analysts raise important questions, not just for Vietnam, but for all countries pondering the costs and benefits of greater economic openness to international capital flows. In this paper, we use a novel empirical strategy, drawn from research in experimental psychology, to test the linkage between FDI and corruption hypothesized above. In so doing, we make two interlinked arguments. The prevailing literature has produced confused and contradictory results on this vital relationship, because errors in their measurement of corruption are correlated with FDI inflows, leading to spurious findings. When a less biased operationalization is employed, we find clear evidence of corruption during both registration and procurement procedures in Vietnam.[1] In addition, the most important driver of reductions in Vietnamese bribe schedules appears to be the wave of legislation that accompanied the country's bilateral trade agreement with the United States (US-BTA), which significantly reduced corruption during business registration.

Beyond simply studying the direct relationship between openness and corruption, however, we also pay careful attention to conditioning variables. After all, policy-makers cannot simply reject the documented benefits of foreign capital flows (job growth, revenue, expertise, technology and production spillovers), because they fear increased bribe schedules. Rather policy-makers want to know what economic sectors are particularly vulnerable to corruption, what types of capital flows are prone to engaging in corruption, and what policy measures can facilitate investment while limiting the negative fallout. Because our empirical strategy allows for the analysis of firm-level determinants, we can move beyond aggregate relationships to answer these questions directly.

To accurately measure corruption and its association with international capital flows, we embedded two survey experiments in the most comprehensive annual assessment of the businessmen environment in Vietnam, known as the Provincial Competitiveness Index (PCI), which is jointly administered by the Vietnamese Chamber of Commerce and Industry and the US-AID funded Vietnam Competitiveness Initiative (VNCI) (see Malesky, 2009 for methodological details). As a result, the samples are highly representative of the national and provincial level business population in Vietnam, thereby providing extremely accurate conclusions about the extent of corruption affecting the Vietnamese business sector, both with respect to small-scale corruption during business registration and the large-scale corruption associated with procurement projects.

The rest of the paper is structured into eight sections. Section 2 situates the theoretical questions motivating this paper within the broader international political economy literature on corruption and lays out the core hypothesis to be explored. Section 3 discusses a number of common research design and measurement problems which have afflicted previous efforts at studying the relationship between corruption and foreign investment. Section 4 provides a description of the original data used in this paper. Section 5 describes the core empirical strategy used in the analysis and presents aggregate results related to trends in corruption among sampled domestic and foreign firms. Section 6 formally expresses the estimation technique for the main firm-level empirical analysis and lists all variables of interest. Section 7 presents and explains results from the firm-level analysis. Section 8 provides concluding remarks and caveats to the findings presented.

Anticipating our results, we find clear evidence of both small and large-scale corruption in Vietnam. In general, 22.9% of operations in Vietnam pay bribes during the registration period, and 34.6% pay bribes when trying to secure government procurement contracts. Not enough foreign firms compete for government procurement to obtain a clear estimate of their complicity in grand corruption, but it is clear that the proportion of foreign firms paying bribes at registration is slightly less than for domestic firms, although this result is not statistically significant. Delving further into the individual level analysis, we find that the US Bilateral Trade Agreement (US-BTA) led to a significant (28%) reduction in bribes paid at registration, but its impact was most prominently felt by foreign invested enterprises (FIEs).

2. The international political economy of corruption

Unfortunately, the international political economy (IPE) literature does not offer clear-cut findings on the relationship between economic openness and corruption to draw upon. This is particularly true when it comes to the role of FDI in facilitating corrupt behavior by government officials. The prevailing argument in the literature suggests that opening a country to FDI or trade flows should reduce corruption, as competition will lower monopoly rents and drive down bribe schedules (Ades & Di Tella, 1999; Larrain & Taveres, 2004; Rose-Ackerman, 1978). Treisman (2000) finds a relationship between openness and corruption (measured by imports/GDP), but concludes that the effect is substantively small. Other scholars concur with the competition hypothesis, but also argue that the adoption of Western business practices and international preferences for transparency has an equally positive effect on how governments do business (Gerring & Thacker, 2005; Kwok & Tadesse, 2006).

An alternative literature observes the same negative correlations between FDI and corruption in cross-national datasets but offers the opposite causal interpretation – that foreign investors are attracted to less corrupt business environments (Gatti, 2004; Lambsdorff, 1999; Wei, 2000). Rodriqguez, Uhlenbruck, and Eden (2005) find that corruption does not deter FDI so much as alter its entry strategy, finding that in highly corrupt environments, FIEs are far more likely to choose wholly owned subsidiaries over joint ventures.

Other scholars have disputed the notion that openness to foreign investment reduces corruption, arguing that FIEs can actually augment corruption in some environments. Hellman, Geraint, and Daniel (2002), using survey data drawn from transition economies in Eastern Europe and the Former Soviet Union, find that foreign firms are just as likely to engage in

[1] Survey instruments, firm-level, and provincial-level data are available at www.pcivietnam.org.

corruption as their domestic counterparts, and significantly more likely to engage in corruption in economies, where the policy making process had been captured by large, domestic operations. Their findings were confirmed by Soreide's (2006) study of Norwegian FIE transactions in transition economies. Hellman et al. (2002) conclude that foreign firms face a disadvantage when competing with domestic firms, because they lack the dense local social networks and local business acumen available to their native counterparts. Moreover, these operations are "sitting ducks for rapacious politicians to extract rents (13)" because their exit opportunities are more constrained. In business environments, where competition is constrained, FIEs may use corruption to level the playing field, gain market share, and pass the bribe cost on to consumers through higher prices. Tanzi and Davoodi (1997) go further, arguing that FIEs face higher incentives to bribe, because relatively small transactions from their perspective, have a sizable impact on the living standards of local officials, and therefore can be more persuasive.

Even more dangerously, foreign investment has been thought to play an agency role in the resource curse, whereby countries endowed with oil and mineral wealth may develop worse governance over time (Ross, 2001). Multinational corporate investors in extractive industries have been accused of supporting the administration of corrupt elites or, at times, even financing civil wars and regional instability. FDI into extractive industries supplies the basis for public expenditures and can therefore substitute the need for the government to stimulate more balanced economies. For similar reasons, we expect foreign investment into extractive industries, which are also subject to strict and often arbitrary restriction, to also be more prone to corruption as both briber and bribe-taker are equally profiting from national resources.

On a more general level, Bliss and Di Tella (1997) and Ades and Di Tella (1999) demonstrate that in economic sectors characterized by high rents, corruption is much more likely. Though the empirical findings do not prove it, the authors propose that FIEs, which arrive in search of higher profit margins, are also more likely to engage in corrupt practices. The effects of home country legal institutions, such as the FCPA, do not fare well in these analyses, as the survey evidence indicates that FIEs have found innumerable ways to avoid these restrictions (Moran, 2006). Indeed, Wei (2000) and Hellman et al. (2002) find no evidence at all that foreign investors from home countries with such legal institutions behave differently than their unconstrained foreign and domestic counterparts.

In summary, a survey of the literature yields the following three hypotheses:

H1 (poor institutions hypothesis): FIEs are associated with higher rates of corruption than domestic counterparts.
H2 (competition hypothesis): Liberalization will reduce the rates of corruption particularly among FIEs.
H3 (resource curse hypothesis): Corruption rates for FIEs are greatest among those invested in resource extraction and exploitation.

3. Measurement error in the relationship between FDI and corruption

Contributors to the FDI-corruption literature come to the debate with strong theory and very poor data, which contributes to the confusing results cited above. After all, each of the analysts surveyed above find empirical support for their arguments, whether pro, con, or conditional. Contemporary approaches to studying FDI and corruption are prone to four types of well-known biases: (1) perception biases of respondents in how they respond to Likert scales; (2) anchoring bias in the way corruption and bribes are understood; (3) biases caused by the respondent's confidence that the information they reveal will not be used to punish them; and (4) question wording which invites respondents to answer about others' experience with corruption and not their own, leading to exaggeration of the true bribe schedule.

None of these biases would be problematic for a research endeavor if they affected responses randomly, so that the measurement error simply created noise around the estimated effects. They would be problematic but not fatal if the bias was systematic, so that all respondents were influenced to over-estimate or under-estimate the level of corruption by the same amount. But these scenarios are unlikely. The core problem faced by researchers is that all of the current approaches used to analyze the relationship between FDI and corruption are prone to the statistical problem known as "systematic and variable measurement error in the dependent variable." This type of measurement error causes severe problems for causal inference, because the measurement error in the dependent variable is correlated with the independent variable, which the analyst intends to evaluate. As a result, the researcher will identify a relationship between the outcome and an independent invariable that is in fact simply an artifact of errors in the data collection exercise.

To put a finer point on this critique, variables, such as political institutions, socio-economic factors, and social capital, are likely to influence the level of bias in a respondent's answer. Indeed, Treisman (2000) finds that perceived corruption is thought to be lower in countries with democratic institutions, media freedom, and high economic development, while it is perceived to be worse in poor countries, with more intrusive regulations, and less democratic protection. These factors explain 90% of the variation of cross-national indices in perceived corruption. Nevertheless, actual corruption, measured by the proportion of respondents self-reporting bribe payments is not associated with any of these political and economic factors (Treisman, 2000). Unfortunately, the factors that drive the measurement error in international indices of corruption will also be associated with the level of FDI into a particular locality. As a result, the correlations with FDI shown above, especially the conditional correlations demonstrated in respect to institutional quality, may result from the relationship between FDI and its correlation with the errors in measurement of corruption – not from the causal relationship identified by the authors. Without correcting this problem, we can never be sure of the true implications of greater openness to FDI flows.

Systematic and objective measures of corruption are hard to come by, forcing researchers to rely on perceptions data drawn from surveys or aggregations of several of these perception measures, such as the Transparency International

(Corruption Perceptions Index) or the World Bank's (Control of Corruption Index). These aggregate indicators are problematic for four reasons.

First, empirical evidence has demonstrated that perceptions of corruption and measures of actual corruption are only weakly correlated (Olken, 2009; Treisman, 2007). Moreover, substantial individual-level biases exist in how respondents answer corruption perceptions questions. These biases tend to be associated with features such as social trust and ethnic heterogeneity, which may lead researchers to attribute causal effects that do not exist in reality (Olken, 2009). Perceptions of corruption are a poor operationalization of actual corruption because participants in corrupt activities may fear retribution from government officials if they respond candidly. In fact, in some cases, perceptions of corruption may actually be inversely correlated with actual corruption, because good governance initiatives in less corrupt countries may expose the few incidents of corruption to a large public. In less transparent countries, grand corruption may be entirely unobserved. Less appreciated, but equally problematic is the fact that individuals and firms are often complicit in the corrupt activity, using bribes as a way to expedite regulatory transactions or win lucrative contracts. Because these firms are guilty of illegal behavior, they are unlikely to admit their culpability on individual surveys.

Second, anchoring bias is a major concern (King, Murray, Salomon, & Tandon, 2004). The standard corruption perceptions question used on the World Bank's Investment Climate Analysis, which is included in both the World Bank and Transparency International measures, is asked as a Likert scale, where respondents are invited to answer how much of an obstacle corruption is in their business environment or how often firms are subject to bribe requests as well as the monetary size of their bribe. These questions assume that respondents understand the concepts of corruption and bribe similarly across socio-cultural contexts and institutional environments. This is hardly the case. As administrators of these interviews know intimately, respondents disagree on all sorts of issues regarding the definition of corruption: whether small gifts or in-kind payments should be counted as a bribe; whether to count bribes that were requested and not initiated by themselves; whether having a family member in a government office assist your procurement application can be deemed corrupt. These are only examples, but where biases in the conceptual understanding of corruption are associated with political or societal factors, analyses of the relationship between corruption and FDI will also be biased.

Third, the standard technique in survey design used to elicit evidence by shielding the respondent from culpability in corrupt behavior is unsatisfactory. A common survey question will attempt to protect respondents by asking them to respond indirectly by reflecting their answer about complicity away from themselves. For instance, "What proportion of firms *in your line of business* pay bribes?" or "What proportion of annual revenue is lost to corruption *among firms like yours*?" Although these questions provide some anonymity, there is no guarantee that the firm will trust the interviewer. Inferring patterns of corruption is difficult with such questions, because the level of trust different respondents have regarding these questions is not systematic and likely correlated with determinants of corruption that we are interested in. For instance, political institutions which encourage trust and confidence in the leadership will lead respondents to answer more honestly on such questions. In environments where institutions are worse and trust lower, respondents will be less likely to answer honestly, and may even object to answering the question altogether. For the specific comparison of domestic and foreign firms used by Hellman et al. (2002), differential responses could actually be driving their fascinating results. FIEs may have lower fears of retribution than domestic firms, who have no exit option, and therefore may be more likely to respond honestly to such a query.

Fourth, even if respondents do feel confident in the shielding technique, the approach invites respondents to speculate on the size of corruption rather than drawing solely on their own experience. Rumor and hearsay could sneak into responses, causing respondents to over-estimate the true size of corruption in their localities. Thus, inferences drawn from such questions likely over-estimate the true size of corruption faced by entrepreneurs. Once again, the size of the over-estimation will depend on characteristics of the society that researchers may hope to analyze.[2]

Two problems also exist with the measurement of FDI. First, Most work on the relationship between corruption and foreign investment uses aggregate data on FDI flows rather than firm-level analysis. Unfortunately, aggregate data do not allow us to distinguish between new projects, attracted to low corruption environments, or increases in the capital of existing projects after entry, which would provide better evidence for the competition hypothesis, as it indicates that investors are driving down monopoly rents and creating opportunities for expansion. Secondly, most works do not explicitly compare the corruption faced by foreign investors to the corruption faced by domestic investors in the same country. Without comparing both, analysts cannot disentangle how much FIEs alter the bribe schedule upon entry, and how much they simply adapt to pre-existing norms.

In our empirical strategy below, we attempt to correct for measurement error in perceptions of corruption by measuring corruption experience directly with respect to both foreign and domestic firms. This approach allows us to offer the first unbiased assessment of the impact of economic openness on corruption.

[2] Survey instruments, firm-level, and provincial-level data are available at In addition to the measurement error, selection effects have also been noted. Knack and Afzar (2003) show that most international indicators of corruption are drawn from data on countries where multi-national corporations have the greatest interest and often the greatest activity, thereby excluding small and poorly governed economies. When a dataset of corruption is used that is not prone to such selection bias, the significant relationships tend to fall apart.

4. Characteristics of Vietnam and the PCI respondent data

4.1. Foreign direct investment in Vietnam

Analysts of the Vietnamese economy have highlighted the important contributions of Foreign Direct Investment (FDI) to economic growth, trade, employment growth, and poverty alleviation throughout the country. One prominent economist surveying development in Vietnam in the twenty years since the first Foreign Investment Law (FIL) succinctly claimed, "Vietnam's economic growth can be described as being mainly brought by FDI" (Tran, 2007, p. 223). Indeed, over the past two decades, Vietnam has benefitted tremendously from Foreign Direct Investment (FDI) inflows. Since Vietnam first opened up to global capital flows in 1987, FDI has averaged about 5% of GDP, accounting for nearly $49 billion in implemented investment (World Bank, 2010). Even before entry into the WTO, Vietnam was among the most attractive developing countries for FDI projects, but after WTO entry in 2006, FDI attraction exploded with inflows increasing to 10% of GDP (World Bank, 2010). In 2010, Vietnam attracted $18.6 billion and 969 projects in licensed investment, which was actually down 20% from 2009, as investors held back on projects while awaiting Vietnam's new leadership (GSO, 2010). To put this number in comparative perspective, as a share of GDP, Vietnam is the third largest recipient of FDI in the ASEAN region. More important than the size of the investment has been the contribution of FDI to the Vietnamese economy. In 2010, FIEs accounted for 54% ($38 billion) of Vietnamese exports, 39% of industrial output (including oil production), and 23% (1.8 million) of the nation's business sector employment, which excludes household enterprises and agricultural employment (GSO, 2010).

How much FDI has influenced general economic growth, welfare, and poverty alleviation in Vietnam is difficult to assess, because foreign investment enterprises (FIEs) are attracted to economic performance as much as they contribute to it. Nevertheless, several recent contributions have used creative empirical strategies to demonstrate the impact of FDI on economic growth (Anwar & Nguyen, 2009), labor productivity in manufacturing (Vu, 2008), and positive economic spillovers to the domestic economic through labor mobility (Nguyen et al., 2008).

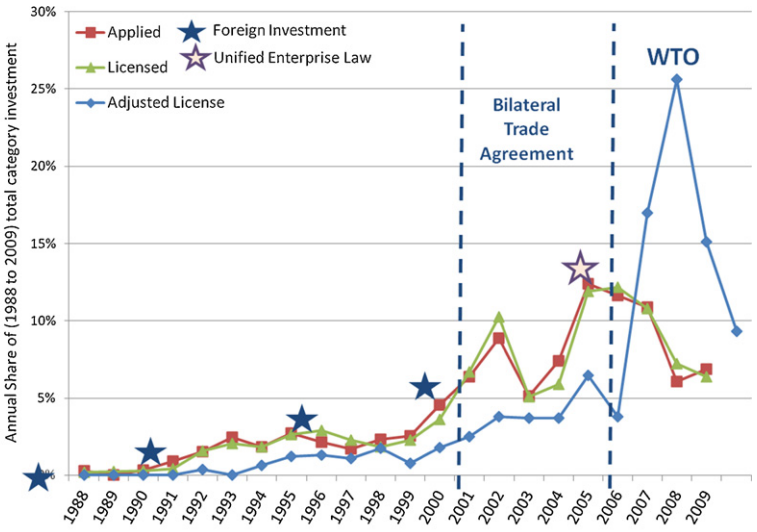
4.2. Foreign direct investors in the PCI survey

The PCI survey is a highly representative selection of 7300 domestic firms and 1155 FIEs which are located throughout country's 63 provinces, although many of the provinces have only one or two active FDI projects. The sample frame for selection was the list of registered domestic firms and FIEs in the General Tax Authority database of registered operations. Excluding businesses that had incorrect telephone numbers and addresses, and therefore could not be reached, the response rate was about 30% for domestic operations and 20% for FIEs. While these non-response rates are actually much lower than the rates commonly received in the international business literature (White & Luo, 2006), they are still large enough to create concerns about reliability (Dillmann, Eltinge, Groves, & Little, 2002). As a result, it is reasonable to ask whether non-response creates selection bias that might affect our conclusions. In Appendix 1, we compare the PCI data to available information from the General Statistical Office's Enterprise Census and Tax Authority Databases. The table shows that PCI data reflects observable characteristics of the national population and therefore offers a highly accurate depiction of foreign investors in Vietnam. Consequently, the conclusions we draw can be trusted and generalized to the underlying population.

The GSO Enterprise Census (2009) identifies 5620 active FIEs in Vietnam, which includes 4609 100% FDI, and 1011 joint ventures (JVs). By this metric, the PCI accounts for 20% of the entire population of foreign investors found in the country! Just as with the GSO, we find that investors from East Asia dominate the sample. Investors from South Korea, Taiwan, Japan, and mainland China alone account for 67% of the active businesses surveyed. When we add investors from neighbors in Southeast Asia, the figure approaches 75%. These numbers correspond closely to the calculations drawn by the MPI/GSO. Although it is important to remember that a great deal of US investment is listed as originating in Hong Kong and Singapore for a variety of logistical and tax-based reasons, so US investment is probably understated (Parker, Phan, & Nguyen, 2005). Respectable numbers exist for Western investors as well. The PCI-FDI sample contains 30 investors from France, 28 from the US (including Guam and US Virgin Islands), and 23 from Australia, and 12 from Germany, in addition to a host of others from Western Europe, Russia and Eastern Europe, and Latin America.

Because the PCI research team employs a stratified sampling strategy that is meant to mirror characteristics of investors at the provincial level, the PCI data oversample locations that account for a small share of FDI in the country. This is useful methodologically, as it means that we can draw statistically representative inferences about locations that are not as popular for investors and compare them to favored locations. A nationally representative sampling, where we drew only one to two investors from these locations, would not allow such comparisons. It does mean, however, that we need to be careful about generalizing directly from the PCI sample to the country as a whole. To put it simply, a straight aggregation of the PCI-FDI survey would discount the importance of Ha Noi and HCMC, where 65% of FIEs are located, according to the GSO. To capture national-level statistics on FDI, we re-weight the results, so that the investors in these locations account for their true national share, rather than the 29% they account for in the PCI-FDI survey.

Using the re-weighted sample to reflect national proportions, we find that 84% of the FIEs in Vietnam are 100% foreign owned. This figure, which is in agreement with GSO Enterprise Census Data is remarkable, because early in the Vietnamese investment history (1987–1991), 100% foreign owned investment was not allowed and investors were obligated to joint



note: Figure shows within category annual shares of surveyed respondents that applied (squares), were licensed (triangles), or adjusted their license (diamonds). Stars signify the years of new or amended Foreign Investment Law. Dashed lines delineate the years after Vietnam's accession to the U.S. Bilateral Trade Agreement and World Trade Organization. Shares are calculated by authors, based on data from the 2010 Provincial Competitiveness Index (PCI) Survey.

Fig. 1. Entry and adjustment years of surveyed foreign firms.

venture with SOEs. While 100% FDI was possible under the 1991 revision to the Foreign Investment Law, it was still difficult, as access to land hinged heavily on findings a state-owned local partner. Thus until 1996, FDI came primarily in the form of joint ventures with state owned enterprises, accounting for over 70% of approved projects and 75% of total registered capital between 1988 and 1996. The 1996 revisions of the Foreign Investment Law facilitated 100% direct investment and led to the trend we observe today. Very few foreign firms have taken advantage of the 2005 Enterprise Law's invitation to register as a domestic operation with foreign capital (Tran, 2007).

Fig. 1 illustrates the entry year of firms in our sample. We track the entry dates over the iterations of the Foreign Investment Law (FIL), the 2005 Unified Enterprise Law, as well as the 2001 Bilateral Trade Agreement with the United States (US-BTA), and 2006 WTO Entry. Most of the firms in our sample are relatively young operations in Vietnam. Over 77% were established and licensed after the US-BTA, although we cannot say for certain that the US-BTA was the primary stimulant for their entry, because other important changes were also taking place in the Vietnam economy at the time. Interestingly, we do not see a tremendous rise in new entrants from our sample after Vietnam's admission to the WTO as might have been expected. It appears that most of that increased investment post-WTO in our sample of enterprises was from existing firms, who were adjusting their investment licenses.

Confirming the results of the Vietnam Competitiveness Report (Ketels, Nguyen, Nguyen, & Do, 2010), 65% of FIEs in the PCI survey are engaged in manufacturing, predominantly in garments and shoes, light electronics, and food processing. 28% of FIEs are involved in the service, retail, or financial sectors. These statistics differ sharply from the private, domestic firms in the PCI survey, where 65% of are engaged in the service sector, 13% are working in construction or infrastructure development, and only 17% of domestic firms operate in the manufacturing sector. Output of FIEs is primarily destined for export; 55% of all firms and 67% of manufacturing enterprises export over half of their output directly or indirectly. Even the output sold within Vietnam is primarily sold to foreigners, as 16.2% of FIEs list foreign individuals or companies in Vietnam, as their primary market. Once again, the contrast between FIEs and domestic firms is dramatic. Only 6.3% of domestic firms (18.7% of manufacturing firms) rely on exports for their primary sales and only 7.5% (5.2% of manufacturers) sell their product to foreigners in Vietnam.[3]

FIEs in Vietnam are not very large by international standards, but they are much bigger on average than businesses in the domestic sector. The median FIE in Vietnam has over 50 employees and $500,000 in capital, but there are several sizable operations as well. Over 14% of FIEs have at least 500 employees and 13% currently have over $10 million in invested capital. Domestic firms in Vietnam are much smaller by comparison. The median domestic firm has over ten employees and only $50,000 in capital. Moreover, there are very few sizable domestic firms. Less than 2% have over 500 employees and $10 million in invested capital.

[3] Survey instruments, firm-level, and provincial-level data are available at A detailed summary of the PCI sample is provided in the Appendix.

5. Our empirical strategy

To address the problems discussed in measuring corruption above, the 2010 PCI survey instrument, exploits a cutting edge approach known as the Unmatched Count Technique (UCT). Informally known as the LIST question (Ahart & Sackett, 2004; Coutts & Jann, 2009), the technique has been used widely by researchers across many disciplines to explore many different kinds of sensitive topics but has only recently started gaining popularity as a method for studying corruption. List questions are extremely easy to administer, as a respondent is simply presented with a list of activities and must only answer how many of the activities they engaged in. They are not obligated to admit to engaging in a sensitive activity in any way. As a result, the respondent can reveal critical information without fear. Coutts and Jann (2009) have shown in a series of experimental trials that UCT outperforms all other techniques at eliciting sensitive information while maintaining the comfort level of respondents. The trick to the UCT approach is that the sample of respondents is randomly divided into two groups that are equal on all observable characteristics. One group of respondents is provided with a list of relatively infrequent, but not impossible activities, which are not sensitive in any way. The second group, however, receives an additional item, randomly placed in the list. This additional item is the sensitive activity. The 2010 PCI Survey includes two such questions, each aimed at evaluating the prevalence of two common forms of corruption: bribing officials during firm registration; and bribing officials in order to secure procurement deals. These questions allow us to explore vital issues, which include: (1) whether or not corruption is concentrated within a particular industry; (2) whether foreign firms originating from certain parts of the world are more/less prone to engaging in corruption; (3) whether institutional solutions, such as One-Stop-Shop (OSS) registration and licensing offices or the establishment of special industrial zones, reduce or exacerbate corruption; (4) whether or not a firm's history affects whether or not it engages in bribery.

Below are the two UCT questions included in the 2010 PCI report. One concerns bribing either during business registration and licensing or bribing as part of a firms bidding strategy for government contracts. An important feature of these questions is that they are highly targeted and context specific. All of the activities listed are well-known to businesses operating in Vietnam and would not be perceived as impossible or contrived, which might damage their confidence in the question. Other UCTs which employ highly abstract activities often fall prey to this problem. Moreover, the UCTs in this survey were specifically designed to differentiate modes of corruption, as FDI should not be expected to affect all bribery equally. It is important to note that the second UCT was limited to the 2889 domestic firms and 129 FIEs that actually bid for government contracts in the past year.

> *UCT Question 1*: Please take a look at the following list of common activities that firms engage in to expedite the steps needed to receive their investment license. How many of the activities did you engage in when fulfilling any of the business registration activities listed previously?

- Followed procedures for business license on website of provincial government.
- Hired a local consulting/law firm to obtain the license the firm for you.
- *Paid informal charge to provincial official to expedite procedures* (only available on Form B of the survey).
- Looked for a domestic partner who was already registered.

> *UCT Question 2*: If your firm competed for business with a government official, please look at the following list of common activities firms engage in to make their goods or services more attractive to government clients. How many of the activities did you engage in win government business?

- Dropped off pamphlets or fliers at government offices advertising your goods or services.
- Opened your business or a branch of your business near government offices in order to be nearer to the decision-makers.
- Appealed to a friend or relative in the office to steer government business toward your enterprise.
- *Paid a "commission" to a government official to ensure that your business won the contract, he would receive a small percentage* (only available on Form A of the survey).
- Attended government functions or meetings in order to meet officials and make them aware of your goods or services.

Both questions were asked to representatives of domestic as well as foreign owned firms. Whether a firm received A or B was determined by random sampling, so the two groups of respondents are balanced on all important observable characteristics Table 1 demonstrates that the sampling process worked for both domestic and foreign firms. On key characteristics of operations, there are no statistically significant differences across possible covariates. These results are particularly compelling, because it is possible that firms receiving the sensitive item may decline completing the survey at higher rates, leading to a systematic bias that is correlated with our treatment. Table 1 demonstrates that this is not the case. As a result, the difference in responses between lists is determined entirely by the additional item in the list question and has nothing to do with features of firms or individual provinces.

Respondents were only asked to report on how many of the listed items they engaged in, and were specifically instructed *not* to identify which items they actually engaged in. UCT guarantees respondent anonymity because neither the interviewer nor the researcher can interpret whether or not a treated respondent's answer includes a sensitive item.

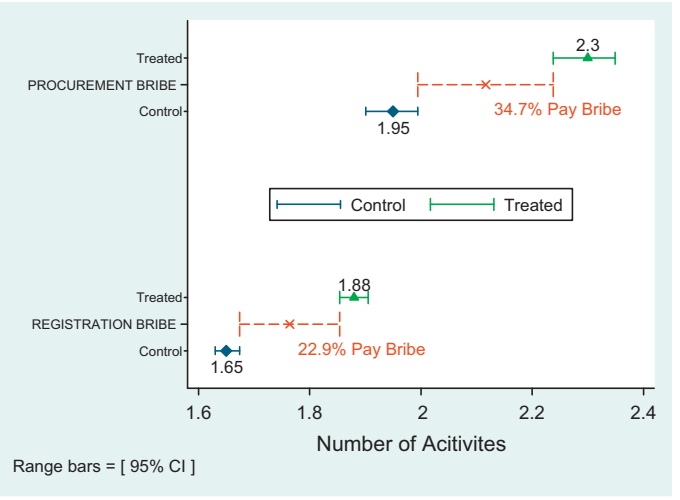
Table 1
Balance test of key indicators of control and treatment group.

A. Domestic private enterprises ($N = 7138$)									
Covariates	1. Control ($N = 3622$)		2. Treatment ($N = 3731$)		3. Difference in means		4. Treatment correlation ($N = 6074$)		
	Mean	Std. dev.	Mean	Std. dev.	p-Value	T-score	Coefficient	Std. err.	p-Value $> \|z\|$
Firm-level attributes									
Labor size category (1–8)	1.029	0.168	1.029	0.168	0.991	0.011	0.003	0.043	0.938
Capital_size category (1–8)	2.334	1.219	2.350	1.176	0.568	−0.571	0.003	0.006	0.665
SOE history (0–1)	0.062	0.241	0.069	0.254	0.224	−1.217	0.044	0.032	0.171
Household history (0–1)	0.642	0.479	0.646	0.479	0.701	−0.384	0.009	0.015	0.561
Owner history with state (0–1)	0.099	0.298	0.093	0.290	0.396	0.850	−0.018	0.022	0.420
Owner history with SOE (0–1)	0.266	0.442	0.293	0.455	0.010	−2.586	0.042	0.015	0.005
Sole proprietorship	0.332	0.471	0.331	0.471	0.978	0.028			
Joint stock company	0.189	0.391	0.191	0.393	0.257	0.872	−0.011	0.022	0.618
Limited liability company	0.467	0.499	0.464	0.499	0.801	0.252	−0.006	0.016	0.721
Other domestic company	0.004	0.064	0.007	0.083	0.104	−1.628	0.133	0.080	0.113
Sector-level attributes									
Sectoral profit margin	4.710	7.969	4.946	8.263	0.257	−1.134	0.001	0.001	0.425
Agriculture (0–1)	0.033	0.178	0.043	0.204	0.015	−2.429			
Mining (0–1)	0.017	0.128	0.016	0.124	0.728	0.348	−0.084	0.059	0.159
Manufacturing (0–1)	0.174	0.379	0.162	0.368	0.149	1.445	−0.112	0.038	0.004
Construction (0–1)	0.092	0.289	0.096	0.294	0.554	−0.592	−0.064	0.041	0.118
Services and trade (0–1)	0.685	0.465	0.684	0.465	0.908	0.115	−0.088	0.035	0.013
Spatial and infrastructure controls									
Telephones per capita	0.277	0.350	0.276	0.354	0.935	0.082	0.002	0.025	0.945
Logged distance from Hanoi and HCMC	4.780	1.647	4.685	1.741	0.017	2.392	−0.013	0.005	0.012
Regional position (1–5)	3.289	1.773	3.272	1.794	0.668	0.429	0.001	0.004	0.801
Industrial zone (0–1)	0.096	0.295	0.090	0.286	0.374	0.889	−0.006	0.023	0.792
1-Stop-Shop (0–1)	0.620	0.485	0.607	0.489	0.223	1.218	−0.022	0.013	0.106
National cities (0–1)	0.150	0.357	0.159	0.366	0.270	−1.103	−0.008	0.029	0.788

B. Foreign invested enterprises ($N = 1124$)

Covariates	1. Control ($N = 320$)		2. Treatment ($N = 841$)		3. Difference in means		4. Treatment correlation ($N = 6074$)		
	Mean	Std. dev.	Mean	Std. dev.	p-Value	T-score	Coefficient	Std. err.	p-Value $> \|z\|$
Firm-level attributes									
Labor size category (1–8)	3.909	2.286	3.697	2.129	0.137	1.489	−0.003	0.008	0.678
Capital_size category (1–8)	5.293	1.412	5.316	1.496	0.830	−0.215	0.003	0.012	0.816
100% foreign invested	0.819	0.386	0.829	0.377	0.688	−0.402			
Joint venture	0.106	0.309	0.108	0.311	0.924	−0.096	0.076	0.058	0.175
Other foreign invested company	0.075	0.264	0.063	0.243	0.464	0.733	0.070	0.073	0.376
Sector-level attributes									
Sectoral profit margin	4.419	7.591	4.384	7.250	0.948	0.065	−0.001	0.002	0.832
Agriculture (0–1)	0.047	0.212	0.029	0.167	0.122	1.550			
Mining (0–1)	0.003	0.056	0.011	0.103	0.212	−1.248	0.207	0.089	0.169
Manufacturing (0–1)	0.222	0.416	0.197	0.398	0.355	0.925	0.009	0.090	0.925
Construction (0–1)	0.063	0.242	0.073	0.260	0.549	−0.599	0.071	0.091	0.465
Services and trade (0–1)	0.666	0.473	0.691	0.462	0.409	−0.825	0.085	0.090	0.336
Spatial and infrastructure controls									
Telephones per capita	0.214	0.208	0.264	0.321	0.010	−2.569	0.127	0.100	0.203
Logged distance from Hanoi and HCMC	3.132	2.133	3.104	2.171	0.845	0.196	−0.003	0.015	0.835
Regional position (1–5)	3.247	1.893	3.247	1.899	0.258	1.132	−0.005	0.009	0.582
Industrial zone (0–1)	0.497	0.501	0.482	0.500	0.641	0.466	−0.047	0.035	0.176
1-Stop-Shop (0–1)	0.825	0.381	0.891	0.312	0.003	−3.004	0.168	0.054	0.001
National cities (0–1)	0.334	0.473	0.385	0.487	0.109	−1.604	0.035	0.072	0.632

Panel A asseses the balance of domestic enterprises, Panel B the balance of foreign firms. The first column depicts descriptive statistics of the control group, the second column depicts the treatment group. Column 3 tests whether there are significant differences in means on key covariates. Finally, the fourth column results from a probit regression of treatment on all covariates at once to assess the joint probability of selection.



Note: This figure provides difference-in-means testsfor the number of activities a firm participated in during registration and government procurement. The difference in the mean scores between the treatment group and control group is the proportion of firms participating in the sensitive activity, bribery. Range bars depict 95% confidence intervals, indicating that difference in means is statistically significant for both types of activities.Calculated by authors based on data from the 2010 Provincial Competiveness Index (PCI) Survey.

Fig. 2. Propensity to bribe during registration and procurement for all firms.

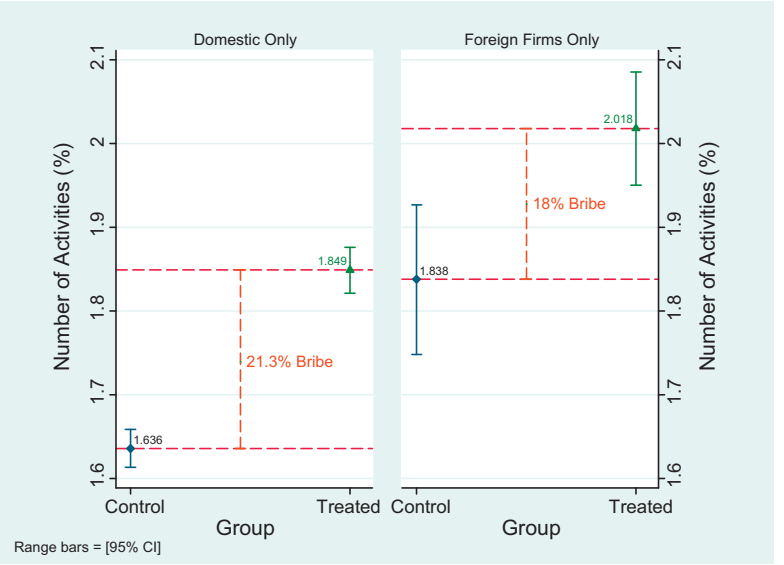
For these reasons we believe our findings represent genuine responses free of the bias that typically haunts alternative methods.

A simple difference-in-means test between the treatment and control groups reveals a population proportion equal to the prevalence of the sensitive activity. These results are shown in Fig. 2. Triangles depict the average number of activities that the treated group participates in, while diamonds illustrate the average activities of the control group. The range bars around the mean scores are 95% confidence intervals. The first thing to notice is that the range bars do not overlap in either the foreign or domestic cases, indicating the differences in means are statistically significant and therefore that the treatment was effective. To calculate the percentage, we must now only subtract the treatment average from the control average (1.879 and 1.652 respectively in the case of business registration). These difference between these means is .229 (when rounded to the nearest thousandth), indicating that 22.9% of businesses pay bribes at registration. A similar exercise for public procurement reveals that 34.7% of all operations paid bribes when seeking to acquire government contracts. Overall, the finding that bribing is more common during procurement than during registration is not surprising. Government contracts are extremely lucrative and rational investors may be willing to expend additional resources if they know procurement officers are willing. While corruption in procurement deals is undoubtedly endorsed and cultivated by the public official, the firm is most likely an active and voluntary participant.

Analyzing the domestic sample separately from the foreign invested sample in Fig. 3 reveals that domestic firms pay bribes slightly more often than foreign firms during registration (21% vs. 18%), though the 3% difference is not statistically significant. Because most foreign firms are export oriented and rarely engage in government contracting, a difference-in-means analysis with respect to procurement is problematic for FIEs. The finding that corruption is not statistically different across foreign and domestic firms can be interpreted in many ways. First, it suggests that foreign firms in Vietnam are not at a disadvantage with respect to native businesses that tend to have a better understanding of local customs and better access to local social and political networks (Hellman et al., 2002). Second, it suggests that international anti-corruption laws, such as the United States' Foreign Corrupt Practices Act (FCPA), may not be making a difference in curbing corruption by companies operating abroad in line with the assertions made by the renowned scholar of FDI, Moran (2006).

Registration processes have changed dramatically over time, especially after the introduction of the Enterprise Law in 1999, the Unified Enterprise in 2005, and One-Stop-Shop procedures in 2008. Streamlined procedures reduced the opportunities for bribe requests, while mandatory response periods lowered the need for grease payments to expedite the procedures. As a result, it is important to repeat the analysis by registration year to capture the effects of these policies. We do this in Fig. 4. Because there are not enough FIEs registered in each year to confidently perform statistically meaningful difference in means tests, we average over periods. The top panel shows the estimated proportion of respondents paying bribes during registration annually, while the two bottom panels smooth over five-year periods for domestic and foreign firms respectively.

Consistent with our above results, FIEs pay marginally fewer bribes than domestic operations over the entire period. In addition, the smoothed results show a decline in registration bribe payments that begins in 2000, the same time as the promulgation of the Enterprise Law and the US Bilateral Trade Agreement. For both foreign and domestic firms, there is an



Note: This figure re-calculates the difference-in-means for foreign invested enterprises and domestic enterprises separately. Range bars depict 95% confidence intervals, indicating that difference in means is statistically significant for both types of firms. FIEs pay marginally less bribes that domestic firms, but the difference is not statistically significant.Calculated by authors based on data from the 2010 Provincial Competiveness Index (PCI) Survey.

Fig. 3. Propensity to bribe during registration by ownership.

uptick that begins again after 2006. In the case of domestic firms, the uptick never reaches pre-2000 bribery levels and soon declines, but for foreign firms, the post-2006 surge partially reduces the advances made in previous periods.

The top panel of Fig. 3 provides a more fine-grained analysis of domestic investment that demonstrates large fluctuations within the five-year periods. The most dramatic change is the large reduction in registration bribery that occurred in 1996. Most likely, the decline signals a conscious response to economic downturn during that period and dissatisfaction festering at the times, although only archival research can determine whether this was organized from above or simply a decentralized response by local administrators.

6. Firm-level empirical analysis

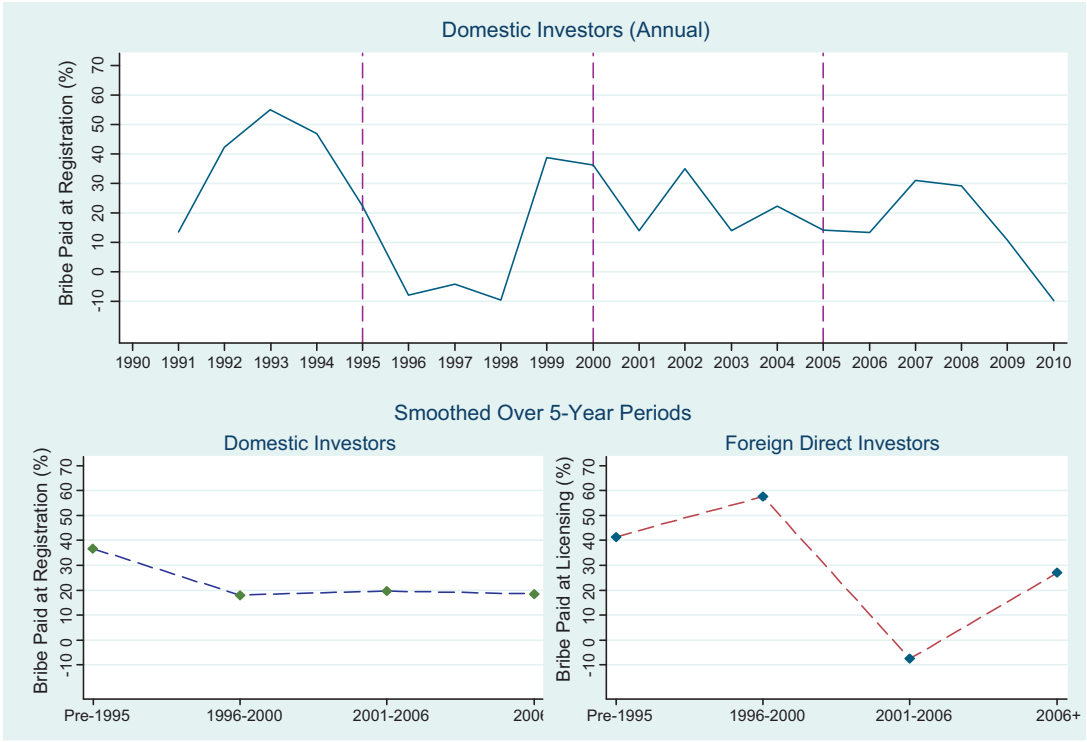
Although the difference-in-means interpretation provides a very powerful illustration of how prevalent corruption is, it is nevertheless a crude analysis that ignores a wealth of information within and outside the survey that may help differentiate between the types of firms or settings conducive to corruption and the factors that might reduce it. Using an ordinary least squares (OLS) analysis is possible but cumbersome, as it requires interacting each possible determinant of corruption with the treatment variable. This quickly leads to unwieldy models that are difficult to interpret.

We address this issue by adapting a two-stage maximum likelihood estimation model developed by Imai (2011) which extends the difference in means approach used above to multivariate estimation. This process allows for more complex evaluation and theory testing which makes use of the rich descriptive information available in the survey. The Imai process involves fitting a model to describe the control group, then using the estimated coefficients to predict new values for the treated group, and finally fitting the imputed values over the observed in the treated group through an expectation-algorithm to produce maximum-likelihood (ML) estimators for each variable included in the following model:

$$Y_i = f(X_i\gamma) + T_i(X_i\delta) + \varepsilon_i$$

where Y_i is response variable (total number of activities), T_i is treatment variable (received surgery with sensitive item), X_i is matrix of covariates, $f(X_i,\gamma)$ is model for non-sensitive items (negative binomial regression), and $g(X_i,\delta)$ is model for sensitive items (non-linear least squares).

In the first stage of the procedure, we fit the $f(X_i, \gamma)$ model to the control group via negative binomial estimation (to account for count-nature of the data and the over-dispersion caused by zero answers) and obtain $\hat{\gamma}$, which is the relationship between participating in the non-sensitive behavior and each independent variable. In the second stage, we fit the $g(X_i, \delta)$ model to treatment group via non-linear least squares (NLS), after subtracting $f(X_i, \hat{\gamma})$ from Y_i and obtain $\hat{\gamma}$, the relationship



Note:This figure depicts the difference-in-means calculations for foreign invested enterprises and domestic enterprises over time. The top panel depicts domestic enterprises for each year with red, dashed lines indicating five-year periods. The lower-right panel is for foreign firms. Because there are not enough FIEs to calculate on a yearly basis, we used five-year intervals. We duplicated this for domestic firms in the lower-left panel. The charts show a clear decline in corruption after the signing of the US-BTA.Calculated by authors based on data from the 2010 Provincial Competiveness Index (PCI) Survey.

Fig. 4. Propensity to bribe during registration by year.

between participating in the sensitive behavior and each independent variable. Because the dependent variable in the second stage is an estimate, standard errors are calculated using bootstrapping with 1000 replications. When there are no covariates (independent variables) introduced in the model, the estimator reduces to the difference-in-means estimator. This can be seen in Model 1 of Table 2, which replicates the difference-in-means estimator from above. Note that the constant is .228, indicating 22.8% of respondents engage in the activity. Also note that the number of observations (4544) is about half of the true sample of firms, as the second stage is only performed on the treatment group.[4]

One of the core assumptions required for implementing the Imai method is that there is a finite set of respondent types based on the number of non-sensitive choices within the experiment. This means that missing observations for the variable of interest (resulting in an undefined respondent type) necessitates either list-wise deletion of the observation or imputation. Beyond the statistical demands, there is a theoretical reason to impute missing data. Missing responses to sensitive questions, such as the ones evaluated here, are unlikely to be missing completely at random. Respondents do not simply flip coins and choose not to answer specific queries; rather, respondents do not answer questions that they do not understand or ones that make them uncomfortable, fear retribution, or believe that their answers may not remain confidential. The factors behind these choices are likely to be correlated with other features of the respondent's background. As a result, dropping these non-responses leads to bias. In our case, respondents' attempts to hide culpability will likely lead to an under-estimation of the overall level of bribery.

To resolve this problem, we employ multiple imputation using the AMELIA software program (Honaker, King, & Blackwell, 2009). Multiple imputation allows us to predict the missing observations, using the observed information we possess from the answers of other respondents and the questions that all respondents answered. As the authors of AMELIA put it, "Multiple imputation involves imputing *m* values for each missing cell in your data matrix and creating *m* "completed" data sets. Across these completed data sets, the observed values are the same, but the missing values are filled in with a

[4] Due to space considerations first stage estimations of non-sensitive items are not reported in the paper, but are available upon request and are documented in our replication materials.

Table 2
Corruption during business entry.

DV: Difference between # of activities from treatment group and predicted # of activities from control group	Main aggregate models						Domestic models		Foreign models		Non-imputed aggregate	
	Diff. in means	Baseline	Structural	Sectoral	Institutions	Political	Structural	Political	Structural	Origin	Sectoral	Political
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Foreign enterprises		−0.032	−0.034	−0.038	−0.016	−0.015					−0.057	−0.033
		(0.033)	(0.062)	(0.061)	(0.067)	(0.067)					(0.110)	(0.121)
USBTA			−0.129***	−0.128***	−0.130***	−0.136***	−0.099**	−0.091**	−0.311**	−0.390***	−0.123***	−0.146***
			(0.038)	(0.038)	(0.038)	(0.044)	(0.040)	(0.043)	(0.132)	(0.128)	(0.045)	(0.049)
WTO			0.040*	0.039	0.032	0.018	0.019	−0.005	0.178**	0.188	0.044	0.031
			(0.024)	(0.024)	(0.029)	(0.031)	(0.026)	(0.034)	(0.073)	(0.129)	(0.029)	(0.040)
Labor size			−0.037***	−0.033**	−0.033**	−0.033**	−0.212**	−0.214**	−0.014	−0.012	−0.009	−0.011
			(0.014)	(0.014)	(0.014)	(0.014)	(0.083)	(0.088)	(0.014)	(0.014)	(0.019)	(0.019)
Capital size			0.033***	0.035***	0.036***	0.036***	0.043***	0.044***	0.007	0.012	0.037***	0.035***
			(0.010)	(0.010)	(0.010)	(0.010)	(0.011)	(0.011)	(0.026)	(0.024)	(0.014)	(0.012)
National-level city			−0.029	−0.034	−0.036	−0.036	−0.023	−0.029	0.030	−0.127	0.012	0.011
			(0.036)	(0.035)	(0.033)	(0.033)	(0.050)	(0.049)	(0.123)	(0.141)	(0.055)	(0.051)
Distance from Hanoi or HCMC			0.006	0.004	0.004	0.004	0.012	0.011	−0.026	−0.019	0.015	0.015
			(0.010)	(0.009)	(0.009)	(0.010)	(0.011)	(0.011)	(0.032)	(0.036)	(0.014)	(0.013)
Manufacturing				−0.016	0.000	−0.001		0.011		−0.064	−0.036	−0.031
				(0.052)	(0.049)	(0.048)		(0.047)		(0.204)	(0.070)	(0.067)
Construction				0.012	0.013	0.015		−0.006		0.173	0.010	0.017
				(0.037)	(0.037)	(0.036)		(0.036)		(0.254)	(0.046)	(0.046)
Services				0.013	0.015	0.016		−0.011		0.147	0.029	0.033
				(0.039)	(0.037)	(0.039)		(0.045)		(0.133)	(0.049)	(0.048)
Natural resources				0.009	0.000	−0.000		−0.036		0.351	0.083	0.076
				(0.112)	(0.112)	(0.106)		(0.114)		(0.321)	(0.145)	(0.143)
Agriculture and forestry				−0.088	−0.074	−0.074		−0.080		−0.315	−0.096	−0.089
				(0.061)	(0.057)	(0.059)		(0.062)		(0.229)	(0.061)	(0.061)
Used One-Stop-Shop					0.010	0.012		−0.044		0.153		−0.023
					(0.052)	(0.051)		(0.058)		(0.147)		(0.061)
Located in industrial zone					−0.085*	−0.083*		−0.028		−0.164**		−0.022
					(0.047)	(0.047)		(0.054)		(0.075)		(0.051)
Party congress year						−0.043		−0.075*		0.055		−0.066*
						(0.035)		(0.039)		(0.115)		(0.038)
Year = 1997 (Thai Binh Riots)						−0.156*		−0.176		0.249		−0.270***
						(0.093)		(0.110)		(0.274)		(0.102)

Table 2 (*Continued*)

DV: Difference between # of activities from treatment group and predicted # of activities from control group	Main aggregate models						Domestic models		Foreign models		Non-imputed aggregate	
	Diff. in means	Baseline	Structural	Sectoral	Institutions	Political	Structural	Political	Structural	Origin	Sectoral	Political
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
OECD origin										0.022		
										(0.077)		
Constant	0.228***	0.213***	0.243***	0.238***	0.242***	0.261***	0.351***	0.390***	0.452**	0.474	0.120	0.167
	(0.016)	(0.016)	(0.068)	(0.079)	(0.076)	(0.085)	(0.105)	(0.126)	(0.230)	(0.355)	(0.118)	(0.114)
N	4544	4544	4371	4371	4371	4371	3704	3704	667	630	2733	2733
R^2	−0.000	0.000	0.006	0.007	0.007	0.008	0.006	0.008	0.022	0.058	0.008	0.010
Log likelihood	−5864	−5851	−5590	−5586	−5584	−5584	−4634	−4626	−937.2	−883.2	−3385	−3381
RMSE	0.880	0.877	0.870	0.870	0.870	0.870	0.846	0.846	0.991	0.997	0.837	0.836

These results are derived from a two-stage model. In the first stage, the number of non-sensitive activities is regressed on the covariates for the control group using a negative binomial specification. The predicted number of non-sensitive activities is then subtracted from the total number of registration activities for the treatment group. The difference becomes the dependent variable in the second stage, which is analyzed using a Non-Linear Least Squares (NL) specification in this model. As Model 1 shows the process correctly delivers the difference-in-means estimator, indicating that the two-stage procedures yields unbiased results. As the dependent variable is an estimate, standard errors are calculated using bootstrap procedure with 1000 repetitions. Models 11 and 12 replicate average corruption and fully specified models using non-imputed data.

* $p < 0.1$.

** $p < 0.05$.

*** $p < 0.01$.

distribution of imputations that reflect the uncertainty about the missing data," (p. 3). Thus, if we learn that former state owned enterprises are statistically more likely to report corruption among the firms that answered our question, AMELIA will likely impute a higher probability of corruption among former state owned enterprises that did respond. Because we have predicted the corruption five times and created five datasets, our estimates will allow us to include the estimation of the uncertainty of the predicted values in our future analyses. AMELIA also has the benefit of being able to predict count variables, so that our dependent variable remains simply a count of how many activities a respondent engaged in. The imputed and aggregate dataset (both domestic and foreign) includes 8455 (7300 domestic versus 1155 foreign) observations for the question concerning corruption during (registration/licensing) and 3128 observations concerning corruption when bidding for government contracts.[5] While our analysis primarily relies on the imputed data, we re-ran our core specifications to ensure that are results are not influenced by the imputation.[6]

In the following discussion, our dependent variable of interest is the probability of bribing when registering an enterprise in Vietnam. Model 2, of Table 2, presents a parsimonious model with just FDI, while each of the subsequent models adds additional variables and controls that may affect the number of activities that an enterprise engages in during registration. Model 3 includes two paramount liberalization commitments (the US-BTA and WTO), both of which contributed dramatically to capital openness and institutional practice in Vietnam and adds controls for firm size, with respect to labor and capital investment, as well as spatial controls. *Labor Size* is a categorical variable illustrating the employment size of the firm at the time they applied for registration. *Capital Size*, similarly, represents the amount of registered capital for domestic firms or the operating license size for foreign firms at the time of entry. *Log Distance from Ho Chi Minh and Hanoi* (Distance H/H) is included as an indicator for development and infrastructure. A variable called *National City* is included to capture the administrative and tax responsibility differences between national municipalities and provinces in Vietnam. Model 4 controls for the economic sector in which the business operates, including manufacturing, construction, services and retail, agriculture and aquaculture, and mining and natural resources exploitation.

Model 5 controls for other institutional features that may reduce the number of registration activities. First, we control for whether a firm registered used a *One-Stop-Shop*. The *One-Stop-Shop* initiative has been advocated by many in the Vietnamese MPI and by the United Nations Industry and Trade Organization (UNIDO) as an institutional solution to rent-seeking and administrative delay in the business licensing process. The *One-Stop-Shop* is thought to reduce corruption by reducing the number of nodes that an investor must pass through to legalize his or her business. If bribes are required at each node, consolidating should reduce the size. For domestic firms, *One-Stop-Shop* provides registration certificates, tax codes, and business seals concurrently. For foreign investors, *One-Stop-Shop* consists of concurrent issuance of the investment license and registration certificate. *Industrial Zones*, which are administrative regions that are specifically organized and incentivized to promote export-oriented industry and attract foreign investment, are authorized to assist businesses in their registration activities. As a result, they can play a similar role in reducing the number of nodes for prospective entrepreneurs. Finally, in Model 6 we control for registration years which overlap with session of the national Party Congress and a dummy variable for 1997 when massive riots swept the country. Some analysts have argued that corruption is restrained in the years of *Vietnamese Party Congresses*, as officials are wary of drawing attention that may affect their promotions. In addition, a large number of Vietnamese analysts have pointed to the 1997 *Thai Binh* riots as a catalyst for government crackdowns on corrupt activities (Xuan & Ha, 1997).

In Models 7 and 8 we limit our analysis to just domestic firms. In Models 9 and 10, we focus solely on foreign invested firms and add a dummy variable for OECD country of origin in Model 10. Models 11 and 12 provide robustness checks for our main regressions using non-imputed data. Table 3 reports summary results for procurement related kickbacks.

7. Results

The multivariate analysis in Table 2 reveals that foreign firms are not, under any model specification, associated with either higher or lower rates of corruption, meaning that we can confidently reject *Hypothesis 1*. This finding is robust to all model specifications and holds under imputed and non-imputed estimations. When looking at the aggregate models only, the key firm-level covariates driving corruption are capital size, measured by registered capital of the business at the time of registration, and labor size measured by the number of employees. Clearly, large firms appear to be targeted for corruption, but not large employers. Each one unit increase on the eight-point scale measuring capital size in the PCI survey increases the probability of corruption by 3.6%. Labor size, on the other hand, is significantly associated with lower bribe rates. In fact, labor size completely offsets the impact of capital size in the aggregate sample and nearly doubles this ameliorating effect in the domestic-only sample. These relationships are, however, not sustained in the foreign-only sample, suggesting that domestic firms are more selectively targeted for extortion during registration. This makes sense as local officials who serve as gatekeepers in the business registration process have both a political and social motives to reduce unemployment and

[5] Amelia was performed by carefully leveraging the richest portions of the dataset. Each imputed and reference variable was individually categorized as either 'ordinal' or 'nominal' in the AMELIA algorithm and variable priors, such as maximum and minimum number of activities, were included when known. Finally over-imputation diagnostics were conducted on each imputed variable for consistency.

[6] Non-imputed robustness analysis was conducted on each model; however, due to space constraints we provide only the aggregate non-imputed and procurement summary statistics in the included tables.

Table 3
Corruption during procurement.

DV: Difference between # of activities from treatment group and predicted # of activities from control group	Procurement aggregate				Non-imputed aggregate	
	Diff. in means	Structural	Sectoral	Political	Sectoral	Political
	(1)	(2)	(3)	(4)	(5)	(6)
USBTA		−0.005	−0.028	−0.080	−0.025	−0.003
		(0.086)	(0.085)	(0.093)	(0.104)	(0.110)
WTO		−0.042	−0.047	0.003	−0.067	−0.091
		(0.074)	(0.071)	(0.083)	(0.072)	(0.088)
Labor size		−0.177***	−0.130***	−0.129***	−0.079*	−0.069
		(0.038)	(0.039)	(0.038)	(0.047)	(0.046)
Capital size		−0.002	0.007	0.005	−0.002	−0.004
		(0.025)	(0.023)	(0.024)	(0.031)	(0.030)
National-level city		0.053	0.041	0.035	0.023	0.031
		(0.108)	(0.111)	(0.117)	(0.161)	(0.173)
Distance from Hanoi or HCMC		−0.000	0.004	0.004	0.001	0.003
		(0.023)	(0.024)	(0.025)	(0.036)	(0.037)
Manufacturing			−0.113	−0.125	−0.216**	−0.222**
			(0.080)	(0.076)	(0.087)	(0.096)
Construction			−0.050	−0.056	−0.065	−0.068
			(0.069)	(0.070)	(0.080)	(0.083)
Services			0.069	0.070	0.003	0.007
			(0.068)	(0.071)	(0.077)	(0.083)
Natural resources			−0.158	−0.139	−0.121	−0.095
			(0.228)	(0.225)	(0.273)	(0.277)
Agriculture and forestry			−0.331**	−0.341**	−0.770***	−0.775***
			(0.148)	(0.142)	(0.160)	(0.151)
Used One-Stop-Shop				−0.055		0.002
				(0.093)		(0.117)
Located in industrial zone				0.059		−0.001
				(0.082)		(0.109)
Party congress year				0.124		−0.076
				(0.085)		(0.101)
Year = 1997 (Thai Binh Riots)				−0.202		−0.031
				(0.232)		(0.289)
Constant	0.346***	0.577***	0.524***	0.543***	0.581***	0.560***
	(0.030)	(0.157)	(0.178)	(0.190)	(0.209)	(0.213)
N	1546	1534	1534	1534	1010	1010
R^2	0.000	0.017	0.021	0.023	0.039	0.040
Log likelihood	−2346	−2308	−2301	−2300	−1453	−1452
RMSE	1.104	1.092	1.089	1.089	1.026	1.027

Dependent variable is an estimate; standard errors calculated are through bootstrapping procedure with 1000 repetitions.
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

promote the local registration of large employers. Large capital size on the other hand may serve as a signal of ability and willingness to pay, which venal officials cue on.

Most importantly, we test to see whether the years after 2000 and 2006, the respective years of Vietnam's adoption of the US-BTA and the country's accession to the WTO, had a significant influence on corruption. The WTO accession extended many of the provisions provided to the United States under the US-BTA to other WTO members and precipitated large FDI inflows into the country. Adding the WTO dummy allows us to assess whether consecutive trade agreements provide additive restructuring effects or if the improvements generally accrue to the first major liberalizing agreement. Overall we find that reductions in corruption were most closely related to US-BTA and its impact on local institutional reforms. In each model, firms registered after the US-BTA were less likely to pay bribes during registration. In the fully specified aggregate model, firms registering after US-BTA commitment were about 13% less likely to bribe, all else equal. When disaggregating the sample into foreign and domestic investments we see that the US-BTA effect was significantly more pronounced among FIEs which experienced a 38% decrease in bribe rates. The corresponding value for domestic firms was roughly 9%.

This finding leads us to conclude that it was the international agreement, and the regulatory changes that ensured domestic treatment of foreign firms that reduced corruption, as opposed to the other domestic, institutional changes taking place in the Vietnamese economy. By contrast the WTO commitments did not have a significant independent effect on bribe propensity. Overall, these findings lend strong support to *Hypothesis 2* which argues that liberalization will reduce corruption particularly among foreign invested firms. Alternative policy initiatives, such as One-Stop Shops and Industrial Zones, offer mixed results. The One-Stop-Shop initiative appears to have no positive effect on bribe rates among foreign or domestic firms. Industrial Zones, however, do appear to have a robust effect on reducing bribery among foreign firms. In the fully specified foreign sample FIEs who invest in Industrial Zones are roughly 16% less likely to bribe than their counterparts.

Industry-level differences, with respect to domestic and foreign firms, are also explored. One common debate concerns whether or not foreign firms are drawn into offering bribes when investing abroad because they lack strong local business networks and relationships with government that native firms enjoy (Pinto & Zhu, 2008). In accordance with this perspective it is expected that foreign firms will have to bribe more often when entering industries which domestic firms have already cultivated; in Vietnam this suggests that industries such as manufacturing and agriculture will be most prone to corruption. Another argument is that foreign firms are more likely to bribe when entering industries which lack effective competition (Ades & Di Tella, 1999; Rose-Ackerman, 1978). Based on this framework, the mining and construction industries are ripe candidates for corruption, but also the heavily regulated service sector. As Weeke, Parker, and Malesky (2009), put it, "Critical service sectors are often subject to the most stringent government regulations because of social and public policy concerns, typically restricting the role of foreign providers. Balancing the need to facilitate the provision of services throughout the economy with adequate safeguards for these concerns poses a serious policy challenge." Because of these regulatory protections, services (such as insurance provision, healthcare, and banking) also provide the highest level of monopolistic rents, providing some evidence for the Ades and Di Tella hypothesis.

Our sector-level analysis, Models 4, shows that sector-level differences in bribe propensity prove to be insignificant. This is largely due to the broadness of the sector-level categories, which include everything from haircuts to insurance services, and strongly points to the need for a more detailed and narrower classification of sectors.[7] When we compare domestic and foreign firms along the sector-level dimension, Models 8 and 10, we are still left with insignificant results. Somewhat interesting is the sign of the sector category coefficients among domestic and foreign are almost diametrically opposed. While the signs on services, natural resources, and construction are all positive for foreign firms, meaning higher bribe rates, each of these sectors is negative for domestic firms. This suggests to us that there are more questions to be answered concerning the sector-level differences in bribe rates among foreign as opposed to domestic firms. Given the results, we cannot confidently confirm nor reject *Hypothesis 3* which argues that foreign investment in resource extraction and exploitation is most severe. Further analysis, using more detailed and precise sector-level classification will be explored in future work.

Moving on to our final set of controls, we find that neither National Party Congress years nor the Thai Binh Riot year (1997) significantly impact bribe rates in the imputed sample. Although the Thai Binh Riots seem to have a negative impact on corruption in the non-imputed sample, we suspect that this effect is driven by a higher non-response rate among firms who registered during the riots and cannot be attributed to an actual change in corruption patterns during this period. We also test whether foreign firms originating from OECD countries are less likely to bribe, given that they are potentially more constrained in their actions due to anti-corruption laws in their home countries. Looking at Model 10, we see no significant difference between the bribe rates among FIEs from OECD countries and their counterparts.[8]

In the procurement analysis in Table 3, we see that, as in registration, labor size is significantly associated with lower kickback rates during procurement. We propose a similar logic here as we did with respect to registration, i.e. that promoting large employers is politically and socially rationale for local officials. The procurement analysis does reveal one interesting result with respect to agriculture procurement, which is significantly less prone to any other type of procurement. The most likely explanation for this is a large portion of agricultural procurement is actually a component of national rural development programs which are more likely motivated by political concerns than profit. Again, the low proportion of

[7] This exercise will be pursued in subsequent study by coding individual firm output product categories.
[8] The reference category for FIE origin is a mixture of Asian countries, mainly coming from Taiwan (43%), China (16%), and Singapore (7%).

foreign invested firms in procurement activities preclude us from proceeding with a more detailed comparison of domestic and foreign corruption patterns when seeking government contracts.

8. Concluding thoughts on FDI and corruption

In this paper, we have sought to enhance the literature linking foreign capital flows to changes in corruption by addressing the major methodological shortcoming in the literature: measurement error in corruption, which is significantly correlated with the independent variables under investigation. We suggest that previous findings linking FDI to corruption are hard to interpret, as the merits often attributed to FDI may simply results from the fact that FDI is attracted to the same types of institutions that produce lower levels of perceived corruption. Using the UCT technique, we present the first empirical findings of this relationship that are divorced of such spurious correlation. In addition, our empirical design employs both foreign and domestic firms to address whether FDI has an independent effect on corruption or simply adjusts to local norms and bribe schedules.

Our findings demonstrate conclusively that FIEs are no more likely to pay bribes when registering their operations or competing for government contracts than domestic firms, and are actually marginally less likely to do so. Rather than the influence of FDI inflows themselves, we find that the strongest determinant of corruption is actually found in the role the US-BTA played in altering domestic legislation and reducing opportunities for corruption when dealing with foreign firms. The fact that the US-BTA had a particularly pronounced effect on FIEs, but not on domestic operations is a useful indication that it was the trade agreement and not other domestic reforms that reduced bribes at registration. We also find that certain types of domestic reforms, such as registration within industrial zones, can reduce bribery among foreign investors. In addition to these stimulating results, our analysis also supports conventional wisdom by showing bribes are much more concentrated among firms with thick capital portfolios and much less concentrated among firms who employee more workers.

There is one major caveat to our findings. Our measure of corruption only captures the act of corruption, but does not capture the size of the actual bribes. This means that, although we can confidently say that foreign invested firms are no more likely to pay bribes than domestic counterparts, we cannot say anything about the consequences of foreign bribes versus domestic bribes. By approaching our dependent variable, corruption, as a quantifiable activity we are to some extent agnostic as to the scale of that activity. While this approach prevents us from differentiating between the economic gravity of FDI related bribes from that of domestic bribes, it does not prevent us from estimating how these two types of investment impact rates of corruption. Future innovations in our design may offer opportunities for assessing differences in the size of bribes and their economic consequences, but in this study we are limited to analyzing only rates of corruption. To mitigate this limitation, our theoretical conceptualization assumes that bribe rates and bribe sizes are independent of one another, meaning that even if bribe sizes for foreign firms are greater/smaller than for domestic peers, this variation is not associated with the corresponding bribe rates being greater/smaller. This assumption is informed by a large literature on corruption that subsumes individual acts of corruption within a "corruption market" (Kreps, 1997; Shleifer & Vishny, 1993). Under the market hypothesis, the size and rates of bribing are independently parameterized by supply and demand. Therefore we should not expect that the size of bribes to affect bribe rate, nor vice versa. If, indeed, foreign bribes are much larger than domestic ones, then surely our findings do not paint a complete picture. However, our analytical approach and the core assumption that informs our conclusion are both well supported by economic theory and lend confidence to these preliminary results.

Our findings are less conclusive for government procurement. While we can definitely rule out the corrupting influence of foreign capital flows, most other determinants of corruption also prove insignificant. The only covariates which proved significant were labor size and procurement in the agricultural sector. Future work will be necessary to tease out the interaction between these factors and international capital flows definitively.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.asieco.2011.11.006.

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