Monopoly Money:

Foreign Investment and Bribery in Vietnam, a Survey Experiment

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Abstract: Prevailing work argues that foreign investment reduces corruption, either by competing down monopoly rents or diffusing best practices of corporate governance. We argue that this theory is too broad-brush and that the empirical work testing it is too heavily drawn from aggregations of total foreign investment entering an economy. Alternatively, we suggest that openness to foreign investment has differential effects on corruption even within the same country and under the same domestic institutions over time. Rather than interpreting bribes solely as a coercive "tax" imposed on business, we argue that foreign firms use bribes to enter protected sectors in search of rents. Thus, we expect variation in bribe propensity across sectors according to expected profitability. We test this effect using a list experiment embedded in three waves of a nationally representative survey of 27,000 foreign and domestic businesses in Vietnam, finding that the effect of economic openness on the probability to engage in bribes is conditional on polices that restrict investment.

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In a series of hard-hitting investigative articles, the *New York Times* demonstrated that *Walmart* paid over \$24 million in bribes to Mexican officials between 2002 and 2005. The bribes were predominantly used to obtain investment permits from local officials, which allowed the company's Mexican subsidiary, *Walmex*, to get a head start on their competition. "Permits that typically took months to process magically materialized in days" (Barstow 2012: A1). Follow-up investigations demonstrated that Mexico was not an isolated incident, similar transgressions were found in Brazil, India, and China (Clifford and Barstow 2012). In 2008, Siemans AG, the German multinational settled a case with European and American regulators after admitting to paying over \$1.4 billion in bribes around the world (Lichtblau and Dougherty 2008). The behavior of these iconic corporations in developing countries raises troubling questions for the International Political Economy (IPE) literature, where the dominant perspective is that opening a country to Foreign Direct Investment (FDI) should reduce corruption by either driving down monopoly rents or by diffusing best practices of corporate governance to domestic firms.

We challenge this extant scholarship, arguing that in spite of FDI's ameliorating effects on corruption, under certain conditions, offering bribes to local officials is an attractive strategy for foreign firms. Our theoretical logic is straightforward – money talks. Sectors where foreign investment is restricted by licensing or regulatory barriers afford artificial monopoly rents to any firm that is able to enter. As such, a foreign firm's bribe for entering a restricted sector is significantly more valuable than under normal circumstances, especially if a host government's intention to maintain restrictions well into the future is credible. Although each successive bribe within an individual sector provides diminishing returns for all entrants, the opportunity cost of not bribing early can be substantial, particularly in emerging markets. For some potential entrants, even the risk of punishment under international and home country laws such as the OECD Anti-Bribery Convention or the Foreign Corrupt Practices Act (FCPA), is well worth taking. *Walmex* quickly amassed a dramatic 62% market share (100% share in some localities) in the lucrative retail food market, contributing to net profits of \$12 billion by 2011 (Jones 2012), 500 times the reported bribe amount.

In this paper, we argue that the relationship identified between FDI inflows and reduced corruption in the literature is largely correct, but the inferences drawn from it are misleading. It is not FDI, in itself, that leads to reductions in corruption; rather, it is the erosion of monopoly rents, primarily through the removal of FDI restrictions which lowers the value for bribing by allowing more foreign firms to enter. Viewing the relationship in this way, suggests a clear-cut observable implication – in markets not fully open to foreign investment, reductions in corruption should be concentrated within those sectors that are exposed to foreign competition, not throughout the country generally.

Our paper makes two further contributions. Rather than viewing bribes solely as an additional "tax" imposed on businesses engaging in activities such as obtaining business licenses, moving goods through ports, or passing regular (or irregular) business inspections (Wei 2000), we follow Kaufman et al. (2000) and Kolstad and Søreide (2009) in allowing for the possibility that foreign firms are strategic and complicit in using bribes to gain access to rents in protected domestic sectors. While our empirical analysis cannot differentiate who initiates the bribe, our theory predicts that foreign firms are more likely to pay bribes in protected sectors.

Second, we test our theory through original, firm-level survey experiments conducted in three waves of an annual survey in Vietnam, where our dependent variable is designed to measure, as accurately as possible, the level of corruption experienced by an individual firm when registering its business. We employ a specialized survey experiment (known as the Unmatched Count Technique (UCT) or LIST question) in surveys of 22,275 domestic, private enterprises (DPEs) and 4,821 foreign–invested enterprises (FIEs) conducted during the Summer of 2010 to construct of propensity to bribe during registration.

As we highlight in Section 2, Vietnam offers a useful test for a link between openness and bribery due to a relatively high rate of corruption and because of a series of liberalizing reforms, namely the signing of several bilateral trade agreements, including one with the United States (USBTA) in 2000, and World Trade Organization (WTO) accession in 2006. Critical for our test, these reforms were not implemented uniformly across all sectors. Investment in certain sectors (Group A sectors) required special government approval for many years after the signing of trade agreements, and in some cases still does. Focusing on the one-way removal of Group A investment

restrictions rather than other metrics of economic integration, such as exposure to trade and FDI, ameliorates the threat of reverse causality that plagues most studies of FDI flows and corruption.

We find that Group A projects were far more lucrative than projects in nonrestricted industries. After addressing endogeneity bias, in a given year, restricted sectors average 2.4% greater industrial concentration and 13% higher profit margins. Further, we find that 18.9% of operations in Vietnam paid bribes during the registration period. While foreign firms are no more likely than domestic firms to bribe overall, MNCs attempting to enter restricted sectors have a 39.4% predicted probability of engaging in bribery, 18% higher than their domestic competitors in restricted sectors and 14% more likely to bribe than foreign firms in nonrestricted sectors.

1. The International Political Economy (IPE) of Corruption

The prevailing prediction in the IPE literature is that opening a country to FDI or trade flows should reduce petty corruption by lowering monopoly rents and bribe schedules (Rose-Ackerman 1978; Larrain and Tavares 2004; Sandholtz and Gray 2003; Bohara, Mitchell, and Mittendorff 2004). Treisman (2000) also identified a relationship between corruption and openness (measured by imports/GDP), but concluded that the effect was substantively small. An alternative mechanism is that competition for capital could "discipline" governments, pushing governments to lower levels of corruption in order to attract multinational enterprises. Others argue that the adoption of Western business practices and international preferences for transparency has an equally positive effect on how governments do business (Sandholtz and Koetzle 2000; Gerring and Thacker 2005). Kwok and Tadesse (2006) articulate three pathways for diffusion: 1) regulatory pressure to reduce corruption from individual foreigninvested enterprises (FIEs) and their home governments; 2) demonstration of the fact that corruption is not a normal way of doing business; and 3) professionalization, as young workers leave FIEs to start their own businesses, carrying the positive business practices acquired from working in the FIEs with them.

Some scholars have disputed the notion that openness reduces corruption, arguing that FIEs can actually exacerbate corruption in some environments (Manzetti and Blake 1996). Using survey data drawn from transition economies, scholars have found that foreign firms are just as likely to engage in corruption as their domestic

counterparts, and significantly more likely to engage in corruption in economies where the policymaking process is captured by large domestic operations with local connections and knowledge (Hellman et al. 2002; Søreide 2006, Pinto and Zhu 2008). Others go further, arguing that FIEs face higher incentives to bribe for two reasons. First, they need to overcome the liability of foreignness in competing against domestic firms with deeper market knowledge and better local connections. Second, relatively small transactions from the perspective of MNCs have a sizable impact on the living standards of local officials, and therefore can be more persuasive (Tanzi and Davoodi 1997).

The economic and business literature has highlighted how excessively high profit margins have been thought to indicate insufficient competition, which can incentivize corruption by investors. Several recent studies offer evidence suggesting that corruption is closely associated with natural monopolies, such as extractable resources (Bjorvatn, Kjetil & Søreide 2012, Kolstad and Søreide 2009), utilities (Bo and Rossi 2007), and infrastructure (Kenny et al. 2011). It is the attractiveness of high profit margins associated with such monopolies that provide venal bureaucrats and officials with authority over the respective economic activity with the opportunities to demand bribes and kickbacks (Ades and Di Tella 1999; Svensson 2003; Clarke and Xu 2004).

Less well documented is the fact that a similar pattern exists when the lack of competition is a consequence of artificial state controls over certain economic activities, which raise costs to entry (Djankov et al. 2002). Heterogeneity across regulatory barriers allows for wide variation in the level of economic rents available across sectors. As a result of these regulatory protections, service sectors (such as insurance provision, healthcare, and banking) can sustain artificial monopolies and therefore provide the same types of opportunities for corruption as natural monopoly sectors, such as resource extraction and utilities (Weeke et al. 2009). In markets restricted by statute, ensuring economic rents by obtaining first-mover advantages, or queue jumping, can be a very tempting strategy for incoming investors (Lui 1985). This activity has been called "rent creation," a process during which firms seek access to rents created by state policy (Krueger 1974, Bhagwati 1983).

Consequently, we argue that bribing one's way into a high-margin sector is a two-way street. Businesses are motivated to bribe their way in, and gatekeeper bureaucrats are in turn motivated to demand bribes and keep access constrained (Shleifer and Vishny 1993; Bliss and Di Tella 1997; Djankov et al. 2002).¹ The literature on state capture (Kaufmann et al. 2000, Hellman et al. 2000) has explored this two-way street in a different context, demonstrating that incumbent firms play a role in shaping the regulations by bribing bureaucrats and capturing the policy making process. However, as Frye (2010) points out, the relationship is still in the hands of bureaucrats or politicians who can renege or renegotiate the contract, in our case - by removing barriers to entry. However, to maintain rent streams, gatekeepers must continue to limit entry (Shleifer and Vishny 2003, Rajan and Zingales 2003; Benmelech and Moskowitz 2010). Thus, there is a tension between accepting bribes to allow firms to gain entry to protected markets and allowing too much entry, such that it increases competition and dissipates rents.

Testable Hypothesis

The above discussion reveals a clear conditional empirical prediction that we analyze below. Foreign firms faced with the prospect of paying a bribe in low-margin sector, such as garment manufacturing, will simply decide to produce in another country if the bribe price equals or exceeds the expected marginal profit. Similarly, bureaucrats serving as gatekeepers are savvy enough not to demand bribes in these sectors, for fear that they will end up being responsible for losing valuable FDI projects. All this changes, however, in sectors where entry is restricted by licensing requirements or business permits. Foreign firms have a significant incentive to offer bribes to enter these sectors, because of the high rents available post-entry. Similarly, local gatekeepers can demand greater compensation for allowing entry.² We argue that foreign firms attempting to enter restricted sectors that offer higher economic rents are far more likely to bribe during entry. The restriction provides a credible commitment

¹ Dreher and Siemers (2009) find similar cross-national evidence suggesting that restrictions on capital flows incentivize bribe payments.

² This logic is consistent with existing theories of endogenous harassment on the part of overzealous bureaucrats (Myrdal 1968). In either scenario the propensity that a bribe will be expected and provided is parameterized by the rents available in a particular sector.

that the rents are protected for the foreseeable future, as the bureaucrat has no power to change national legislation necessary to remove them, thereby further incentivizing the investor. Thus, we hypothesize that:

H1: The propensity of foreign firms to bribe at entry is higher in restricted sectors

Firms are willing to pay bribes for entry into these sectors, but only as long as politicians continue to limit entry and preserve the economic rents. The removal of restrictions leads to a dissipation of these rents, limiting the ability of politicians to charge for entry into lucrative sectors. As countries sign investment arrangements as part of economic integration, restrictions to entry, and consequently the expected benefits of corruption, fall. We expect bribery propensity to decrease as well.

We remain agnostic on the relationship between investment restrictions and domestic firms, which offers countervailing hypotheses. While restrictions on domestic entry should have the same effect for domestic firms as specified in H1, the impact of restrictions on foreign entry into strategic sectors is predominantly based on the existing economic competition in that sector. In most emerging markets, very few firms have the size and scale necessary to provide telecommunications, banking, or insurance services. As a result, logic suggests that the government does not need to limit domestic entry into these arenas. In these cases, foreign investment restrictions serve to protect these favored, domestic producers, and are likely unrelated to the decisions of domestic firms to bribe.

2. FDI in Vietnam

Analysts of the Vietnamese economy often highlight the important contributions FDI has made to economic growth, trade, employment growth, and poverty alleviation throughout the country (Tran 2007). Indeed, over the past two decades, Vietnam has benefited tremendously from FDI inflows. Even before entry into the WTO, Vietnam was among the most attractive developing countries for FDI projects. After WTO entry in 2006, however, FDI inflows exploded to 10% of GDP (World Bank 2010).

While recognizing the importance of FDI attraction, many prominent Vietnamese observers have also argued that Vietnam's increasing exposure to global economic forces is exacerbating corruption, not reducing it. In the summer before the 2011 Communist Party Congress, Vu Quang Viet, a Vietnamese-American economist and close adviser to leading Vietnamese reform figures in the 1980s and 1990s, surveyed the policies of economic openness and decentralization, concluding, "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, 17).

Restrictions on FDI Entry in Vietnam

Although the role of FDI in Vietnam's development story has been well documented, systematic restrictions on FDI, some of which have remained in place since the very first iteration of the Foreign Investment Law (FIL) in 1987, have not. Under the FIL in 1996, Vietnam liberalized FDI entry dramatically across many of sectors. A few sectors, however, were only partially liberalized according to the law. These sectors, known as "Group A" projects, require special approval from the Prime Minister's Office to receive an investment entry license. The stark difference between Group A and other projects became clearer after Vietnam decentralized FDI registration to the provincial level in the late 1990s. While provinces could now register any FDI investment up to a specified amount locally, Group A projects still required central approval and a Prime Ministerial signature (Malesky 2008). Leading up to the USBTA in 2000, over thirty different economic sectors were protected by restrictive conditions on foreign investment. In addition to the restrictions typical of any non-democratic economy, such as those of the press and national defense, Vietnamese restrictions also extended to finance sectors, retail distribution, and even some cash crops like sugar and tobacco. Several sectors remain restricted throughout our period of observation, but Vietnam's 2007 WTO entry did result in the liberalization of a large number of these conditional sectors (See Table 1).

1	8	1	81	8	
Restricted sectors As of 1996	Pre-2000	2000-2005 (USBTA era)	2005-2007 (Common investment law)	2007-2009 (WTO era)	Post-2009 (WTO phase-in)
Catching aquaculture	R	R	R	OPEN	OPEN
Logging and silviculture	R	R	R	R	R
Extraction of crude and gas	R	R	R	R	R
Mining coal and ignite	R	R	R	R	R
Mining of metal ores	R	R	R	R	R
Mining and quarrying clay, stone	R	R	R	R	OPEN
Manufacture of sugar and alcohol	R	R	R	R	OPEN
Manufacture of tobacco	R	R	R	R	R
Publishing of newspapers, journals	R	R	R	R	R
Manufacture of chemicals	R	R	R	R	OPEN
Manufacture of pharmaceuticals	R	R	R	R	OPEN
Manufacture of cement	R	R	OPEN	OPEN	OPEN
Manufacture of refined petroleum	R	R	R	R	R
Production of electricity	R	R	OPEN	OPEN	OPEN
Infrastructure construction	R	R	R	OPEN	OPEN
Land transport and railways	R	R	R	R	R
Sea and inland water transport	R	R	R	R	OPEN
Air transport	R	R	R	R	R
Transport and travel activities	R	R	R	R	R
Post and telecomm	R	R	R	R	R
Financial intermediation (banks)	R	R	R	R	OPEN
Insurance and pension funding	R	R	R	OPEN	OPEN
Auxiliary financial activities	R	R	R	OPEN	OPEN
Real Estate *buying/selling	R	R	R	R	R
Real Estate *lease/fee	R	R	R	R	OPEN
Research and development	R	R	R	OPEN	OPEN
Legal, accounting, and auditing	R	R	R	R	OPEN
Public security and defense	R	R	R	R	R
Adult and other education	R	R	R	R	R
Health services	R	R	R	R	R
Sewage and refuse disposal	R	R	R	R	OPEN
Motion picture, TV, entertainment	R	R	R	R	R
USBTA = United States Bilateral Trade Agr	eement				
ISIC = International Standard Industrial Cla	assification				

Table 1: Group A Sectors Allowing Investment but Requiring Special Licensing Procedures

WTO = World Trade Organization

Source: Authors' coding referencing various years of Vietnamese Foreign Investment Law available at <http://www.vietnamlaws.com/>

This is not to say that foreign capital did not find its way into sectors while they were restricted. Our data shows foreign entry into almost all restricted sectors over the period of observation. Nevertheless, the additional restrictions served to dampen competition and generate high rents for those lucky enough to enter them. To demonstrate this point we gathered annual information on restrictions from revisions to Vietnam's Law on Foreign Investment and other legal documents related to foreign investment. Although restrictions exist within multiple dimensions, which at times vary depending on location and license size, the most apparent is the blanket sectorlevel restriction which we code as a dichotomous variable during each year the sector was classified as a "Group A" restricted sector.

Analyzing the Impact of Restrictions on Market Concentration and Rents

To analyze the effect of these restrictions, we operationalized rents at the ISIC four-digit level, based on financial disclosures collected during Vietnam's Enterprise Census (General Statistical Office 2000 to 2011). To assess sector-level variation in rents, we utilize two common measures of rents from the economics literature; a Herfindahl-Hirschman Index (HHI)³ of market share (Rosenbluth, 1955); and profit margins (Boone 2005).

Figure 1 studies the average HHI and natural log of profit margin experienced in Vietnam in a given year in both restricted and unrestricted four-digit ISIC sectors. Clearly, Group A sectors have become significantly more concentrated than nonrestricted sectors overtime. For the entire time period under observation, restricted sectors averaged well above the 0.25 HHI that signifies severe market concentration, the potential for anticompetitive behavior, and the availability of monopoly rents. Beginning in about 2003, however, restricted sectors became increasingly more concentrated, crossing 0.35 HHI in 2010. By contrast, nonrestricted sectors started off similarly concentrated, but have steadily inched downwards to below a 0.2 HHI, as domestic and foreign business entry has increased competition in these sectors. The pattern is even starker when it comes to profit margins. Non-restricted sectors have seen their margins decrease steadily over time with increased competition; while restricted sectors have seen their margins explode, particularly after WTO entry in 2007, which opened up lucrative opportunities for export, while creating temporary entry barriers at home through the phase-in of domestic treatment requirements.

³ Herfindahl-Hirschman Index ($HHI = \sum_{i=1}^{N} S_i^2$), where S represents a particular firm's share of sector-level revenue, HHIs range from 0 to 100.





While not perfectly correlated with HHI, the proportion of economic sectors subject to Group A investment restrictions has also declined from about 40% of all four-digit sectors, observed in our sample, to 19% today. Although the correlations between restrictions and potential economic rents appears strong, there is reason to be suspicious that the apparent relationship could be spurious, caused by omitted firm-level features driving both variables. We test the robustness of the relationship using HHI and the average profit margin of firms (ln(Profit/Revenue)) at the ISIC four-digit level as our dependent variables, and regress them on a dichotomous measure of whether a particular sector is listed as being Group A. These results are presented in Table 2, where the unit of analysis is the sector-year, between 2000 and 2011 for all sectors operating in Vietnam during that time. Models 1 and 6 display the bivariate regressions and Models 2 and 7 add controls for the capital/labor ratio and labor size of the industry, allowing us to separate the impact of restrictions from the cost structure of the industry. Models 3 and 8 add year dummies to make sure that our results are not simply capturing over-time trending in both the dependent and independent variable. With year-fixed effects, this model essentially provides the HHI observed by survey respondents in the year they chose to invest in a given sector in Vietnam.

Table 2: Restrictions on Investment Entry and Monopoly Rents

Dependent variables/ independent	Н	erfindah	l-Hirsch	man Inde	ex		Prof	it margin	(ln)		First s	stages
variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Restricted sector	0.059***	0.047***	0.044***	0.024***	0.013	0.364***	0.130***	0.120***	.129***	.211***		
	(0.010)	(0.010)	(0.010)	(0.08)	(0.010)	(0.035)	(0.026)	(0.026)	(0.025)	(0.038)		
Avg. Labor Size (1000s)		0.041**	0.039**	0.028	0.033		0.089**	0.094**	-0.028	-0.095*	0.043***	0.042***
		(0.019)	(0.019)	(0.021)	(0.023)		(0.037)	(0.038)	(0.050)	(0.057)	(0.011)	(0.011)
Avg. Capital/Labor (ln)		-0.004	0.001	-0.008	-0.005		0.065***	0.060***	0.045**	0.026	0.007	0.009
		(0.005)	(0.006)	(0.006)	(0.007)		(0.015)	(0.018)	(0.018)	(0.025)	(0.007)	(0.008)
Avg. State-owned investment share (lag)											0.274***	0.268***
											(0.024)	(0.026)
Constant	0.250***	0.261***	0.285***	0.207***	0.203***	1.169***	0.879***	0.731***	0.682***	0.720***	0.157***	0.150***
	(0.005)	(0.025)	(0.027)	(0.038)	(0.037)	(0.017)	(0.071)	(0.079)	(0.118)	(0.136)	(0.039)	(0.040)
Year FE	No	No	Yes	No	Yes	No	No	Yes	No	Yes	No	Yes
Observations	4,313	4,247	4,247	3,354	3,354	2,478	4,104	4,104	3,273	3,273	3,324	3,324
R-squared	0.008	0.015	0.025	-0.085	0.002	0.045	0.021	0.045	-0.495	-1.488	0.052	0.062
RMSE	0.291	0.282	0.280	0.272	0.261	0.738	0.728	0.719	0.862	1.111	0.436	0.435
Kleibergen-Paap rk LM statistic											63.38***	43.72***
Cragg Donald F-statistic											84.189	63.24

Note: Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1).

Source: Authors' estimates compiled using data from Vietnamese General Statistical Office Enterprise Census (2000 to 2012) available at (www.gso.gov.vn).

The final models for each dependent variable (Models 4, 5, 9, and 10) address the possible threat that endogenous regulation poses to our analysis. There is a first-mover benefit to early investors, who may lobby for regulations to protect their market share (Rajan and Zingales 2003; Benmelech and Moskowitz 2010; Weymouth 2011). According to this theory, MNCs may be complicit in establishing the regulatory framework, using corruption to influence host-country officials. If this is the case, the causal relationship could be reversed, meaning corruption might pre-date investment restrictions and available rents (Bandyopadhyay and Roy 2007). Thankfully, the registry of Group A restrictions has only moved in one direction over time; restrictions have been removed and never added, limiting the threat that new restrictions emerged to protect early investors. Nevertheless, there remains a legitimate concern that the removal of restrictions and the length that they are in place, especially those that result from international agreements, may have been negotiated with an eye to entry by particular MNCs.

To account for these concerns, we employ a two-stage instrumental variables model, where we instrument for restrictions by the share of State-Owned Enterprises (SOEs) in the particular four-digit sector. This variable is lagged one year to account for the SOE share at the time policymakers were negotiating restrictions. We present our results of the first stage without year fixed effects (Model 11) and with year fixed effects (Model 12). Models 4 and 9 present our IV results using Model 11 as our first stage, while Models 5 and 10 uses Model 12 for the first stage.

SOE investment share picks up the legacy effect of Vietnam's former command economy. As Vietnam is still transitioning from a centrally planned system and has not undergone full-scale privatization, large, state-owned conglomerates are still active in many sectors. There is strong reason to suspect that Group A restrictions were aimed predominantly at protecting their market share (See Stigler 1971; Grossman and Helpman 1994). Indeed, Abuza (2002) points out that SOEs were the primary opponents of the USBTA, specifically fearing the loss of their market position. Even after USBTA entry, the trade and investment regime still favored SOEs, allowing cheap entry of inputs that SOEs relied upon, while maintaining formal and informal barriers to entry in the sectors SOEs dominated. As Auffret (2003, 5) put it, describing the bifurcated nature of Vietnam's commitment to international openness, "Vietnam has so far been able to liberalize the trade regime while maintaining a policy bias in favor of domestic-market-oriented industries, particularly those dominated by state-owned enterprises (SOEs)".

The IV strategy confirms this. Each 10% increase in SOE share, increases the probability of Group A restrictions by 4.3% in the first stage (Model 12). Moreover, the size of the coefficients on restrictions and the R^2 in both the HHI and profit models fall dramatically, indicating that our approach has removed a portion of the endogeneity bias.

One fear is that lagged SOE share may violate the exclusion restriction by being correlated with HHI through channels other than investment restrictions, but this does not appear to be the case. The bivariate correlation between SOE share and the two dependent variables is a weak (r=0.06 for HHI and r=0.07 for profit).⁴ Indeed, Pincus et al. (2012) demonstrate that SOEs, especially large conglomerates, are highly unproductive and unprofitable, despite the protections afforded them. Finally, the Cragg-Donaldson F-Statistic is extremely large (84) and statistically significant (it is far greater than the Stock and Yogo 10% critical value of 16.38), indicating that the strength of the identification in the first-stage model is sufficient to proceed with IV-2SLS. Thus, by instrumenting

⁴ Visual verification of these weak relationships of the weak relationship can be found in Online Appendix 2.

with SOE share, our estimates should be interpreted as the impact of regulations that are determined by the legacy of central planning, after the regulations possibly demanded by early entrants have been removed.

After ensuring exogenous regulation, accounting for market structure in Models 4 and 8, we find that restricted sectors lead to 2.4% greater industrial concentration and 13% larger profit margins. Models 5 and 10, with year fixed effects, find 1.3% higher HHI and 21% greater profit margins, although the HHI result is shy of statistical significance. In short, exogenous barriers to investment have important effects on foreign firms' expected profitably. A foreign enterprise lucky enough to enter a restricted sector can be assured of extraordinary market power and economic rents. Given our theory, we expect that foreign firms attempting to start Group A projects are far more likely to pay more for this privilege.

3. Data and Research Design

To test the relationship between FDI and corruption, we take advantage of the annual Vietnam Provincial Competitiveness Index (PCI) survey.⁵ Our experiment was repeated in three subsequent years in order to ensure that our findings were consistent and durable, as single-shot surveys have been criticized for potential contamination by both other questions in the survey and real world events outside of the control of researchers (Gaines, Kuklinski, and Quirk 2007).

Our final sample is comprised of 22,275 domestic firms and 4,821 FIEs, which are located throughout country's 63 provinces, although many of the provinces have only one or two active FIEs. In all three years, the sample frame for selection was the list of registered domestic firms and FIEs in the General Tax Authority database of registered operations. The survey response rate was about 30% for domestic operations and 25% for FIEs, much higher than rates commonly reported in the international business literature (White and Luo 2006), but still large enough to create concerns about reliability (Dillman et al. 2002). As a result, it is reasonable to ask whether nonresponse creates selection bias that might affect our conclusions (Jensen et al. 2010). In Online Appendix 3, we compare the PCI data to available information from the General Statistical Office's Enterprise Census and Tax

⁵ Please see <u>www.pcivietnam.org</u> for methodological details and background on the survey.

Authority Databases, showing that PCI data reflects observable characteristics of the national population and therefore offers a highly accurate depiction of foreign and domestic investors in Vietnam.

There are currently 10,437 active FIEs in Vietnam, which includes 8,687 entirely foreign owned operations and 1,750 joint ventures (JVs).⁶ By this metric, the PCI accounts for 46% of the entire population of foreign investors found in the enterprise census!⁷ The five largest investors by country origin in the PCI are all East Asian. Together, Taiwan (23.2%), South Korea (20.2%), Japan (18.3%), China (7.2%), and Singapore (4.2%) account for 73% of the active businesses surveyed. Nevertheless, respectable numbers exist for Western investors as well. The PCI-FDI sample contains 370 investors from the European Union, 144 investors from the United States, and 70 from Australian addition to a host of others from Western Europe, Russia and Eastern Europe, and Latin America.

78% of the FIEs in Vietnam are 100 percent foreign owned. This proportion is remarkable, because early in the Vietnamese investment history (1987–1991), FDI came primarily in the form of joint ventures with state-owned enterprises, accounting for 75% of registered foreign capital between 1988 and 1996 (Freeman and Nestor 2004). It was not until the 1996 revision of the FIL that 100% foreign owned investment was first permitted.

Addressing Measurement Error with a List Experiment

Contributors to the FDI-corruption literature come to the debate with strong theory and very poor data, which contributes to a confusing array of empirical support for all arguments, whether pro, con, or conditional. The current approaches to studying openness and corruption are prone to five types of well-known biases: 1) normal perception biases in responses to Likert scales; 2) anchoring bias in the way corruption and bribes are understood (King et al. 2004); 3) sensitivity bias and preference falsification when revealing potentially incriminating information (Coutts and Jann 2011); 4) attribution bias in which respondents answer about others' experience with corruption and not their own (Ahart and Sackett 2004); 5) aggregation bias, whereby several measures of

⁶ General Statistical Office Enterprise Census (2012).

⁷ A map of FDI investment by province is provided in Online Appendix 2.

corruption, which may be completely unrelated to one another and the topic under investigation (i.e. bribery for marriage licenses when studying investment decisions), are blended together (Tanzi 1998).

The core problem faced by researchers is that all of the current approaches used to analyze the relationship between openness (particularly FDI flows) 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 (Bound and Krueger 1991, Duncan and Hill 1985).

To put a finer point on this critique: variables, such as political institutions, socioeconomic factors, and social capital, are likely to influence the level of bias in a respondent's answer (Treisman 2007, Olken 2009). Indeed, Treisman (2007) 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 2007). Unfortunately, the factors that drive the measurement error in international indices of corruption will also be associated with the level of investment into and trade with a particular locality. Consequently, we can never be sure of the true implications of greater openness.

We attempt to correct for measurement error in perceptions of corruption by measuring corruption experience directly with respect to both foreign and domestic firms in one sociocultural setting but across different entry environments. To do this, PCI survey instruments exploit an approach known as the Unmatched Count Technique (UCT). Informally known as a "List question" (Coutts and Jann 2011, Ahart and Sackett 2004), the technique has been used widely by researchers across many disciplines to explore different kinds of sensitive topics. List questions are extremely easy to administer, as the respondent is 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 (2011) have shown in a series of experimental trials that UCT out performs all other techniques at eliciting sensitive information and 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, non-sensitive activities. The second group, however, receives an additional sensitive item in the list. Respondents are only asked to tell the interviewer how many of the listed items they have either engaged in, and are specifically instructed NOT to identify which items they specifically engaged in. Respondent culpability is concealed, because neither the interviewer nor the researcher can interpret whether or not a treated respondent's answer included a sensitive item.

Below is the UCT question included in the 2010-2012 PCI surveys regarding bribery during business registration and licensing. An important feature of the question is that it is 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 artificial, which might damage their confidence in the question. The survey question was administered in both Vietnamese and English.

<u>UCT Question 1</u>: 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/registration certificate. How many of the activities did you engage in when fulfilling any of the business registration activities listed previously?

- 1. Followed procedures for business license on website.
- 2. Hired a local consulting/law firm to obtain the license the firm for you.⁸
- 3. Paid informal charge to expedite procedures (Only Available on Form B of the Survey)⁹
- 4. Looked for a domestic partner who was already registered

⁸ This item is added, as firms can avoid direct culpability for bribes by hiring a facilitator. By including this as nonsensitive item, we seek to only capture direct experience and conservatively estimate a lower bound on bribe frequency. Because FIEs are more likely to hire facilitators, they have a slightly higher share of total activities in both control and treatment averages, but there is no bias in bribery estimates, which are the differences in means between control and treatment within a group.

⁹ Note informal charges (*chi phi khong chinh thuc*) is the common Vietnamese and English term to describe this type of bribery.

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.¹⁰ One concern is that respondents may feel trapped by the set of nonsensitive items. If the activities are too frequent, a respondent in treatment may feel forced to answer the maximum number of activities (including the sensitive item), thereby revealing their complicity directly. Alternatively, nonsensitive items that are too rare would have the opposite effect, allowing the respondent to believe that the sensitive item was the only reasonable option. In either case, the UCT would have failed and respondents would still be obligated to conceal their behavior. Our data did not appear to demonstrate such a tendency, as very few respondents in the control group answered the maximum number or zero nonsensitive questions.¹¹ In addition, pilot testing demonstrated a low correlation between nonsensitive items, providing us further confidence that respondents were able to answer honestly.

It is important to keep in mind that our survey question relies on the ability of the respondent to recall the activities they engaged in during the last time they completed registration procedures. For the majority of operations, this was not a challenge – 53% of FIEs and 63% of domestic firms registered within five years of receiving the survey, leading to very little recall bias. Nevertheless, a small subset of operations completed registration procedures as long as 15 years before the survey. Although we could have chosen more proximate events for our survey experiment, the year a firm entered is critically important for our results, as we aim to take advantage of the changes in investment restrictions over time, paying special attention to the restrictions that were in place at the time a firm chose to enter the Vietnamese market. To mitigate, we chose our activity items carefully, so that each represented an obvious action and was easy to remember. Nevertheless, such questions in firm-level surveys pose two dangers. First, data is likely to be noisier at early years of registration, which tends to reduce significance of results. Second, changes in firm management over time may mean that the respondent is different

¹⁰ Online Appendix 4 provides evidence for balance across all important covariates

¹¹ See Online Appendix 5 for histograms of the share of responses to each value in the respective questions.

from the owner or manager who actually completed the procedures.¹² Indeed follow-up interviews with respondents revealed that some of the item nonresponse to the question comes from new managers unable to answer the question. Once again, this problem most likely will lead to noise and insignificant findings rather than biased coefficients. In fact, our substantive conclusions remain (and actually strengthen) when we restrict the analysis to firms registered within five years and even two years of the survey.

Once a survey is completed, a simple difference-in-means test between the treatment and control groups can reveal a population proportion equal to the prevalence of the sensitive behavior or belief. These results are shown in Figure 2. Diamonds and squares identify the average number of activities for treatment and control groups respectively. The range bars around the mean scores are 95 percent confidence intervals. The first thing to notice is that the range bars do not overlap in any of the survey years, 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 (1.49 and 1.3 respectively in the case of business registration for all investors). The difference between these means is 0.19 (when rounded to the nearest hundredth), indicating that 19% of businesses pay bribes at registration.¹³

¹² The PCI requires general managers or owners to complete the survey, although there is no way to formally guarantee that the task was not delegated to a subordinate. The name and position of the respondent are maintained in the dataset, giving us confidence that delegation is not a major threat to our analysis.

¹³ The drop in average activities between the surveys completed in 2010 and the others was the result of a very minor change in the questionnaire. In 2010, a blank space was provided for respondents to record the number of activities in which they engaged. Very few respondents (0.34%) wrote-in zero activities into the space following the question. In 2011, however, all values between zero and three (or four for the treatment group) were provided, and respondents could check the appropriate value. A small share (14% checked zero). Although, this change should not affect calculation of bribes, calculated as the difference between treatment and control within a given year, it does influence the total number of activities. To make sure our results are not an artifact of this innocuous change in survey design, we run our analysis with survey year fixed effects.





In Figure 3, we repeat the analysis, disaggregating by ownership (foreign versus domestic operations) and registration period (1) Before US-BTA; 2) Before WTO; 3) After WTO). Figure 3 demonstrates clearly that bribery among private, domestic firms has remained fairly constant over time, and even declined slightly in recent years to about 17% for firms registering in 2012. By contrast, bribery among FIEs started off low but has increased dramatically over the same period, reaching 32% for all firms registered after 2007. As we argue, it is not a coincidence that bribery upon registration increases for foreign firms after 2006, about the same time that HHI and profit margins diverged between restricted and unrestricted sectors.

Figure 3: Propensity to Bribe during Registration, Over Time



Additional circumstantial evidence for our theory can be found in Table 3. Here, we provide difference-inmeans tests of number of activities engaged in during registration for domestic and foreign firms in restricted and unrestricted sectors. Once again, calculating the difference between treatment and control groups provides the share of firms engaging in bribery during entry procedures. Consistent with our hypothesis, there is very little difference between foreign and domestic firms in unrestricted sectors, which bribe at about the same level (19%). Foreign firms, operating in restricted sectors, however, have a substantially greater bribe frequency (23%) than their foreign peers in nonrestricted sectors and 8% greater bribe frequency than their domestic competitors, which have the lowest bribery levels of the four groups.

able 5. Difference in Means of Number of Activities Completed un ing Registration														
Postrict	<u>Control (w/o Sensitive Item)</u>				1	Treatment (w/ Sensitive Item)					Bribe Frequency (Treatment-Control)			
Restrict	N	<u>Mean</u>	<u>SE</u>	<u>95%</u>	<u>6 CI</u>	N	<u>Mean</u>	<u>SE</u>	<u>959</u>	<u>6 CI</u>	Mean	<u>SE</u>	<u>T-Stat</u>	P-Value
No	6394	1.27	0.01	1.25	1.29	6962	1.46	0.01	1.44	1.48	18.8%	1.6%	12.1	0.000
Yes	1288	1.37	0.02	1.32	1.41	1529	1.52	0.02	1.47	1.57	15.2%	3.4%	4.5	0.000
No	1201	1.38	0.02	1.33	1.42	1738	1.57	0.02	1.52	1.62	19.4%	3.4%	5.6	0.000
Yes	265	1.40	0.05	1.29	1.51	343	1.63	0.05	1.53	1.74	23.3%	7.8%	3.0	0.001
	Restrict No Yes No Yes	Restrict N No 6394 Yes 1288 No 1201 Yes 265	Control (w Restrict Control (w No 6394 1.27 Yes 1288 1.37 No 1201 1.38 Yes 265 1.40	Control (w/o Sensit) Restrict Control (w/o Sensit) No 6394 1.27 0.01 Yes 1288 1.37 0.02 No 1201 1.38 0.02 Yes 265 1.40 0.05	No 6394 1.27 0.01 1.25 Yes 1288 1.37 0.02 1.32 No 1201 1.38 0.02 1.33 Yes 265 1.40 0.05 1.29	No 6394 1.27 0.01 1.25 1.29 Yes 1288 1.37 0.02 1.32 1.41 No 1201 1.38 0.02 1.33 1.42 Yes 265 1.40 0.05 1.29 1.51	Difference in Means of Number of Activities Co Restrict Control (w/o Sensitive Item) D No 6394 1.27 0.01 1.25 1.29 6962 Yes 1288 1.37 0.02 1.32 1.41 1529 No 1201 1.38 0.02 1.33 1.42 1738 Yes 265 1.40 0.05 1.29 1.51 343	Difference in Means of Number of Activities Complete Restrict Control (w/o Sensitive Item) Treatment No 6394 1.27 0.01 1.25 1.29 6962 1.46 Yes 1288 1.37 0.02 1.32 1.41 1529 1.52 No 1201 1.38 0.02 1.33 1.42 1738 1.57 Yes 265 1.40 0.05 1.29 1.51 343 1.63	Difference in Means of Number of Activities completed during for Activities completed during frequencies and the sensitive item. Treatment (w/ Sensitive item) Restrict No Mean SE 95% CI N Mean SE No 6394 1.27 0.01 1.25 1.29 6962 1.46 0.01 Yes 1288 1.37 0.02 1.32 1.41 1529 1.52 0.02 No 1201 1.38 0.02 1.33 1.42 1738 1.57 0.02 Yes 265 1.40 0.05 1.29 1.51 343 1.63 0.05	Difference in viewing of Number of Activities Completed until Kegn Restrict Control (w/o Sensitive Item) Treatment (w/ Sensitive Item) No 6394 1.27 0.01 1.25 1.29 6962 1.46 0.01 1.44 Yes 1288 1.37 0.02 1.32 1.41 1529 1.52 0.02 1.47 No 1201 1.38 0.02 1.33 1.42 1738 1.57 0.02 1.52 Yes 265 1.40 0.05 1.29 1.51 343 1.63 0.05 1.53	Difference in Means of Number of Activities completed during Registrate Restrict Control (w/o Sensitive Item) No Mean SE 95% Cl N Mean SE 95% Cl No 6394 1.27 0.01 1.25 1.29 6962 1.46 0.01 1.44 1.48 Yes 1288 1.37 0.02 1.32 1.41 1529 1.52 0.02 1.47 1.57 No 1201 1.38 0.02 1.33 1.42 1738 1.57 0.02 1.52 1.62 Yes 265 1.40 0.05 1.29 1.51 343 1.63 0.05 1.53 1.74	Note: Control (w/o Sensitive Item) Sensitive Item) Bribe Free Restrict Mean SE 95% CI N Mean SE 95% CI Mean Mean Mean SE 95% CI SE 95% CI SE <td>None control (w/o Sensitive Item) Treatment (w/ Sensitive Item) Bribe Frequency (" No 6394 1.27 0.01 1.25 1.29 6962 1.46 0.01 1.44 1.48 18.8% 1.6% Yes 1288 1.37 0.02 1.32 1.41 1529 1.52 0.02 1.47 1.57 15.2% 3.4% No 1201 1.38 0.02 1.33 1.42 1738 1.57 0.02 1.52 1.62 19.4% 3.4% Yes 265 1.40 0.05 1.29 1.51 343 1.63 0.05 1.53 1.74 23.3% 7.8%</td> <td>Note in the first of registration No 6394 1.27 0.01 1.25 1.29 6962 1.46 0.01 1.44 1.48 18.8% 1.6% 12.1 Yes 1288 1.37 0.02 1.32 1.41 1529 1.52 0.02 1.47 1.57 15.2% 3.4% 4.5 No 1201 1.38 0.02 1.33 1.42 1738 1.57 0.02 1.52 1.62 19.4% 3.4% 5.6 Yes 265 1.40 0.05 1.29 1.51 343 1.63 0.05 1.53 1.74 23.3% 7.8% 3.0</td>	None control (w/o Sensitive Item) Treatment (w/ Sensitive Item) Bribe Frequency (" No 6394 1.27 0.01 1.25 1.29 6962 1.46 0.01 1.44 1.48 18.8% 1.6% Yes 1288 1.37 0.02 1.32 1.41 1529 1.52 0.02 1.47 1.57 15.2% 3.4% No 1201 1.38 0.02 1.33 1.42 1738 1.57 0.02 1.52 1.62 19.4% 3.4% Yes 265 1.40 0.05 1.29 1.51 343 1.63 0.05 1.53 1.74 23.3% 7.8%	Note in the first of registration No 6394 1.27 0.01 1.25 1.29 6962 1.46 0.01 1.44 1.48 18.8% 1.6% 12.1 Yes 1288 1.37 0.02 1.32 1.41 1529 1.52 0.02 1.47 1.57 15.2% 3.4% 4.5 No 1201 1.38 0.02 1.33 1.42 1738 1.57 0.02 1.52 1.62 19.4% 3.4% 5.6 Yes 265 1.40 0.05 1.29 1.51 343 1.63 0.05 1.53 1.74 23.3% 7.8% 3.0

Table 3: Difference in Means of Number of Activities Completed during Registration

T-Stat and P-Value are one-tailed tests of whether difference in means between treatment and control (e.g. bribe frequency) is significantly different from zero.

4. Firm-Level Empirical Analysis

In this section, we adapt a two-stage non-linear least squares (NLS) estimation model developed by Imai (2011) which extends the difference-in-means approach used above to multivariate estimation.¹⁴ 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 estimators for each variable included in the following model:

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

 $\cdot Y_i$: response variable (total number of activities),

 T_i : treatment variable (received survey with sensitive item),

 $\cdot X_i$: matrix of covariates,

 $f(X_i\gamma)$: model for non-sensitive items (negative binomal regression),

 $g(X_i\delta)$: model for sensitive items (non-linear least squares).

In the first stage of the adapted 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 nonsensitive 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 $\hat{\delta}$, the relationship 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 1,000 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 4, which replicates the difference-in-means estimator from above. Note that the constant is .189,

¹⁴ Imai also develops a maximum likelihood estimator, which is more efficient, but we prefer the NLS estimation, because it is able to recover the difference-in-means estimate when no controls are added.

indicating 19% of respondents engage in bribery (just as in Figure 2). Also note that the number of observations

(10,612) is about half of the true sample of firms, as the second stage is only performed on the treatment group.¹⁵

Dependent variable: difference								
hetween the activities reported	Diff-in-	Survey Year						Recent
by treatment aroup and	means	FE	<u>Baseline</u>	<u>Interaction</u>	<u>Time Trend</u>	<u>Connections</u>	<u>Optimism</u>	Registration
predicted number of nonsensitive								
activities of control aroun.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Foreign enterprise	(1)	(2)	-0.058	-0.079	-0.074	-0.051	0.008	0.044
i oreign enterprise			(0.050)	(0.056)	(0.070)	(0.068)	(0.080)	(0.077)
Restricted industry			-0.022	-0.040	-0.062**	-0.046	-0.034	-0.049
Resulted musery			(0.022)	(0.029)	(0.031)	(0.030)	(0.029)	(0.034)
Capital Size at Establishment			0.013	0.027	0.012	0.011	0.025	-0.001
Capital Size at Establishment			(0.013	(0.013	(0.012)	(0.011)	(0.011)	(0.001)
EDI*Postricted			(0.010)	0.110*	0.192**	0.156**	0.172**	0.245***
I'DI Restricteu				(0.064)	(0.102)	(0.063)	(0.069)	(0.076)
Time since registration				(0.004)	0.004	-0.004	-0.009	0.030
Time since registration					(0.004)	(0.004	(0.013)	(0.020)
Time squared					0.014)	0.000	0.013)	0.027
Time squareu					-0.000	(0.000	(0.000	-0.003
Equitized SOF					(0.001)	0.165***	0.161***	0.170***
Equiuzeu SOE						(0.103)	(0.061)	(0.069)
Managan w (Daliti al Commontion						(0.001)	0.001	(0.000)
Manager w/Pollucal Confinection						(0.077^{-10})	(0.078	0.069**
						(0.029)	(0.029)	(0.030)
Plan to expand business							-0.020^{*}	-0.038***
Constant	0.100***	0 0 0 0 2 2 * * *	0 101***	0 10 5***	0 10/***	0 107**	(0.011)	0.201*
Constant	0.189	0.223	0.181	0.185	0.194	$(0.187^{\circ\circ})$	(0.094)	0.201°
C	(0.030)	(0.021)	(0.039)	(0.041)	(0.072)	(0.078)	(0.084)	(0.116)
Survey Year 2011		-0.084**	-0.070*	-0.070*	-0.060	-0.055	-0.058	-0.017
a v 0040		(0.033)	(0.038)	(0.036)	(0.045)	(0.042)	(0.045)	(0.044)
Survey Year 2012		-0.047	-0.032	-0.032	-0.043	-0.017	-0.012	0.040
¥7	10 (10	(0.035)	(0.035)	(0.036)	(0.042)	(0.041)	(0.044)	(0.044)
N	10,612	10,612	8,878	8,878	7,398	8,484	8,338	7,027
KZ	-0.000	0.001	0.001	0.002	0.002	0.004	0.005	0.007
RMSE	0.982	0.962	0.963	0.963	0.956	0.955	0.952	0.957
Log likelihood	-14869	-14648	-12255	-12256	-10164	-11645	-11418	-9653

Table 4: Correlates of Corruption During Business Entry

Note: These results are derived from a two-stage model. In the first stage, the number of nonsensitive activities is regressed on the covariates for the control group using a negative binomial specification. The predicted number of nonsensitive 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. Note that the number of observations (N) is the number of respondents in the treatment group. As Models 1 and 2 show the process correctly delivers the difference-in-means estimator for the whole sample and by year, indicating that the two-stage procedures yields unbiased estimates. Because the dependent variable is an estimate, standard errors are calculated are through bootstrapping procedure with 1000 repetitions (*** p<0.01, ** p<0.05, * p<0.1). Errors are clustered at the province level, which is the main interface for business registration.

Model Specification

Our first theoretical expectation is that prevalence of registration bribery is likely to be higher when foreign

firms seek to enter sectors that are designated as Group A projects. Thus, we expect that g, the predicted

proportion of firms paying bribes is determined by the following equation, where *i* is an index of firms and *t* indexes

the year they completed registration activities. FDI is simply a dummy variable for whether a firm is an FIE instead

available upon request and are documented in our replication materials.

¹⁵ Due to space considerations, first stage estimations of nonsensitive items are not reported in the paper, but are

of a domestic operation, and *Restricted* is a dichotomous variable gauging whether a sector listed as a Group A sector at the time the firm entered the market, C is a matrix of both time variant and invariant control variables:

$$g = \hat{\delta}_0 + \hat{\delta}_1 FDI_{it} + \hat{\delta}_2 \text{ Re } stricted_{it} + \hat{\delta}_3 FDI_{it} * Restricted_{it} + C_{it} + \varepsilon_{it}$$

We begin our analysis in Model 3 of Table 4 by assessing the component effects of FDI and Restricted Sectors. We control for *Capital Size*, as Harstad and Svensson (2011) argue that large and important firms are less likely to bribe, because they can rely on lobbying to circumvent difficult regulations. Since FIEs are generally bigger than their domestic counterparts in the same sector, it is critical control for initial size to avoid omitted variable bias. To do this, we use an eight-point categorical variable representing the amount of registered capital for domestic firms or the operating license size for foreign firms at the time of entry (1: <\$25,0000 to 8: >\$25 million).

Model 4 then provides the interaction between FDI and restrictions that serves as the core test of our theory. Model 5 adds a quadratic time trend, measuring years since registration, to ensure that the relationship is not a function of trending in both corruption and restrictions over time. To address further omitted variable bias, we add a series of control variables for firm and provincial level characteristics in Model 6. About 6% of the domestic firms in the sample are formerly state-owned enterprises that have been privatized according to Vietnamese law (*Equitized SOEs*). In many cases, these formally state-owned firms have maintained the same directors and top managers and therefore have a far different relationship with bureaucrats, especially with local registration officers, than greenfield private investment. We might expect that these firms are less likely to bribe, because they can rely on their close relationships with officials instead. A further test of political connections as a substitute for corruption is supplied by whether the current manager is a former government official, SOE manager, or army officer. Finally, bribery may be a function of general optimism on the part of an entrepreneur, rather than the rents associated with a particular sector. Because we want to isolate the generalizable aspects of corruption, we control for firm-level optimism in Model 7, by including a variable called *Expand*, which measures whether the business has plans to expand its production, investment, labor force, or add to its product lines over the next two years.

To ensure that our results are not caused by recall bias resulting from firms that registered many years earlier or from a particular era of regulatory development, we restrict the sample to firms that registered after 2001 in Model 8. This has two additional benefits. First, it addresses the fact that registration procedures changed dramatically for private firms with the 2000 Enterprise Law, which reduced the number of licenses and put a cap on waiting periods to receive registration approval (Perkins and Vu 2010). Second, it accounts for legal changes which altered registration for FIEs after the US-BTA (Weeke et al. 2009).

Results

The results offer strong evidence for our hypothesis that FIEs are more likely to bribe in restricted sectors. In the fully specified Model 7, when competing in nonrestricted sectors, FIEs are not significantly more likely than domestic firms to pay bribes during business entry. The coefficient on restricted is negative and also insignificant, indicating that domestic firms in restricted sectors are only marginally less likely to pay bribes than domestic firms in nonrestricted sectors. Finally, the coefficient on the interaction is substantively large and highly significant (0.173). This means that, when all variables are held constant at their mean, foreign firms attempting to enter restricted sectors in restricted sectors and 14% more likely to bribe than foreign firms in nonrestricted sectors. These differences can be observed graphically in Figure 4.

After removing early registrations in Model 8, the confirmation for our theory is further strengthened (as seen in Figure 4). In the first panel, we compare the difference in coefficients between FIEs in restricted and nonrestricted sectors for the full sample and post-2000 registrations. In the second panel, we compare coefficients between foreign and domestic firms within the same Group A categories. In both cases, the differences are significantly above zero (marked with a dashed lines), providing strong confirmation for our first hypothesis. For the late registrations, FIEs entering restricted sectors were about 20% more likely to bribe upon entry than foreign counterparts in nonrestricted sectors. After WTO entry, the marginal difference in bribery between foreign and domestic firms in restricted sectors increases from 18% to 29%, substantially larger but not significantly different.

Once again, this rise in the latter registration years tracks very closely with the rises in HHI and profit margins in the restricted sectors.

Looking at the control variables we learn that capital size has very little effect, but relationships are critically important, albeit in a surprising direction. In the fully-specified Model 7, former SOEs are 16% more likely to bribe while managers with political connections are 8% more likely to bribe. Thus, it appears that relationships do not necessarily offer a substitute for bribery; rather, they exacerbate it. Although highly speculative, one explanation for this behavior is that firms endowed with relationships have better information about how corruption can be used most effectively, knowing who to bribe, when payment will be most effective, and how much to pay.





In Online Appendix 6a and 6b we provide a number of additional robustness tests, including provincial fixed effects, year fixed effects and multiple imputation to address missing values. Our substantive results are unchanged. Our results are also consistent using an alternative estimator as suggested by Glynn (2010) and when utilizing SOE share as an instrument for restrictions. We document all robustness tests at length in Appendix 6a and present the results in a Table in 6b, but we note that the results presented in this paper are robust to these alternative specifications.

7. Concluding thoughts on FDI and Corruption

In this paper, we contribute to the literature on foreign capital flows and corruption, both methodologically and theoretically, by employing an unbiased empirical strategy to demonstrate how artificial constraints on foreign investment create incentives of entry bribes. We point out that previous findings linking openness to less corruption are difficult to interpret, as the merits often attributed to openness may simply result from the fact that FDI and trade are attracted to the same types of institutions that produce lower levels of corruption. Using the UCT technique, we present 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 openness has an independent effect on corruption or simply adjusts to local norms and bribe schedules. We find that over the entire period of investigation, 19% of operations in Vietnam paid bribes during the registration period.

Our within-country firm-level design allows us to eliminate sociocultural factors and institutional differences as the source of corruption, as these factors did not vary dramatically over the period and changed very little upon Vietnam's WTO accession. Our focus on actual firm behavior specific to entry further removes the possibility that results are derived from inaccurate perceptions or idiosyncratic acts of malfeasance. Consequently, this study demonstrates that corruption is a nuanced activity that, like other business activities, is a two-way street where behavior is dictated by the expected gains from the activity for both parties. It is not simply an additional tax on doing business. Most importantly, we demonstrate the nefarious impact of entry restrictions on corruption, providing clear evidence that entry barriers provide strong incentives for investors to buy entry and for government officials to sell access to these sectors.

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WEB APPENDIX

Pages A through K are not intended for publication, but will be made available on our websites if the article is selected for publication

Appendix 1: Map of Vietnam Appendix 2: Correlations between State Ownership and Rents Appendix 3: Representativeness of Sample Appendix 4a to 4c: Balance between Control and Treatment Group Appendix 5: Floor and Ceiling Effects in List Question Appendix 6: Robustness Tests of Main Results

Appendix 1: Foreign Investment in Vietnam (Capital & Projects 1988-2012)



Appendix 2: Correlation between SOE Investment and Rents



Appendix 3: Characteristics of Provincial Competitiveness Index Sample

Foreign invested (4	.821)		Domestic enterprises (22,275)					
Legal form of investment	Weighted PCI	GSO	Legal form of investment	Weighted PCI	Тах			
100% Foreign-directed enterprise	84.35%	82.95%	Sole proprietorship	16.2%	19.4%			
Joint venture with a Vietnamese private	4.84%	16.36%	Limited liability	54.5%	59.1%			
Joint venture with a Vietnamese SOE	4.55%		Joint stock	27.6%	21.4%			
Registered as a domestic company	2.52%	0.46%	Joint stock with shared listed on stock exchange	1.1%	NA			
Domestic company w/overseas VN capital	0.61%		Partnership and other	0.7%	0.0%			
Other	3.13%	0.23%						
Sector	Weighted PCI	GSO	Sector	Weighted PCI	Tax			
Industry/manufacturing	64.59%	59.44%	Industry/manufacturing	30.2%	34.5%			
Construction/infrastructure investment	4.09%	4.72%	Construction/infrastructure investment*					
Service/commerce/finance	29.33%	28.94%	Service/commerce/finance	64.6%	62.2%			
Agriculture/forestry/aquaculture	2.36%	5.87%	Agriculture/forestry/aquaculture	4.0%	1.9%			
Mining/natural resource exploitation	0.86%	1.03%	Mining/natural resource exploitation	1.2%	1.4%			
Size of labor force	Weighted PCI	<u>GSO</u>	Size of labor force	Weighted PCI	<u>GSO</u>			
Less than 5	2.92%	4.18%	Under 5	12.1%	23.36%			
5 to 9	5.99%	6.79%	5 to 9	24.1%	35.63%			
10 to 49	31.79%	29.67%	10 to 49	41.9%	33.22%			
50 to 299	31.35%	30.95%	50 to 200	14.9%	6.11%			
300 to 399	6.38%	7.64%	Over 200	7.1%	1.7%			
400 to 499	7.26%	7.09%						
500 to 999	7.17%	6.88%						
1000 and over	7.13%	7.81%						
Licensed investment size	Weighted PCI	GSO	Licensed investment size (Total assets, BVND)	Weighted PCI	GSO			
Under 0.5 BVND (\$25,000 USD)	2.52%	2.25%	Under 0.5 BVND (\$25,000 USD)	10.9%	8.9%			
From 0.5 to under 1 BVND (\$50,000 USD)	1.39%	2.17%	From 0.5 to under 1 BVND (\$50,000 USD)	17.0%	13.5%			
From 1 to under 5 BVND (\$250,000 USD)	15.85%	12.75%	From 1 to under 5 BVND (\$250,000 USD)	42.8%	49.6%			
From 5 to under 10 BVND (\$500,000 USD)	8.75%	11.71%	From 5 to under 10 BVND (\$500,000 USD)	12.7%	13.4%			
From 10 to under 50 BVND (\$2.5 Million USD)	35.14%	36.04%	From 10 to under 50 BVND (\$2.5 Million USD)	11.9%	11.5%			
From 50 to under 200 BVND (\$10 Million USD)	23.13%	22.83%	From 50 to under 200 BVND (\$10 Million USD)	4.8%	3.2%			
From 200 to under 500 BVND (\$25 Million USD)	7.62%	7.29%	From 200 to under 500 BVND (\$25 Million USD)					
Above 500 BVND (\$25 Million USD)	5.61%	4.97%	Above 500 BVND (\$25 Million USD)					
<u>Major customer</u>	Weighted PCI	<u>GSO</u>	Major customer	Weighted PCI	GSO			
Export directly or indirectly	55.00%	66.8%	Export directly or indirectly	11.7%	NA			
Foreign individuals or companies in Vietnam	24.51%	16.2%	Foreign individuals or companies in Vietnam	9.9%	NA			
Sold domestically to SOE	3.52%	2.8%	Sold domestically to SOE	14.8%	NA			
Sold domestically to state agency	1.42%	0.9%	Sold domestically to state agency	20.3%	NA			
Sold domestically to private individuals	15.55%	13.0%	Sold domestically to private individuals	43.4%	NA			
Note: This table compares data on the nationally weighte	d sample of domestic ar	nd foreign firr	ns from the PCI to the data collected from the National Tax Au	thority (Tax) and General St	atistical Office			

(GSO) Enterprise Census. Weighted PCI is the PCI survey sample, but weighted by provincial share of enterprises to create a nationally representative sample. General Statistical Office (GSO) Enterprise Census. Weighted PCI is the PCI survey sample, but weighted by provincial share of enterprises to create a nationally representative sample. General Statistical Office available at (www.gso.gov.vn) and GSO Enterprise Census (2009) available at (http://www.gso.gov.vn/default_en.aspx?tabid=515&idmid=5&ItemID=9775). NA = Not Available for 2010. *Tax Authority data does not disaggregate construction firm from manufacturing. The PCI data records 15 percent construction.

PCI = Provincial Competitiveness Index

BVND = Billion Vietnamese Dollars

SOE = state-owned enterprise

VN = Vietnamese

Source: Survey data from Vietnam PCI 2010 Report (www.pcivietnam.org); and GSO Enterprise Census 2009 (www.gso.gov.vn)

Appendix 4a: Balance Test for Domestic Operations

	(N =	: 22,275)				
	Ме	an	Std. De	viation		
	Treated	Control	Treated	Control	p-value	t-stat
Sector						
(Services=1, Manf & other=0)	0.608	0.602	0.488	0.489	0.380	0.878
Province Attributes						
GDP	56861	57007	98543	97235	0.912	-0.110
Population (10,000)	1752.0	1741.6	1725.6	1719.5	0.651	0.452
Paved Roads (%)	0.631	0.632	0.233	0.232	0.686	-0.405
Telephones Per Capita (%)	0.229	0.229	0.076	0.076	0.648	-0.457
Firms with Email Address	0.349	0.351	0.128	0.129	0.204	-1.269
Industrial Zone*	0.077	0.075	0.267	0.263	0.550	0.598
Region [nominal]	3.914	3.910	2.221	2.217	0.892	0.136
National Level City*	0.173	0.171	0.378	0.376	0.675	0.419
Distance to Hanoi/HCMC (km)	234.0	233.7	227.4	227.3	0.911	0.112
Firm Attributes						
Year Registered	2005	2005	4.504	4.541	0.632	-0.479
Time to Register (days)	16	16	17	17	0.840	0.202
Employment [1-8]	2.290	2.285	1.076	1.100	0.757	0.310
Equity [1-8]	2.484	2.488	1.166	1.156	0.776	-0.284
Joint Stock*	0.123	0.125	0.329	0.331	0.648	-0.457
Limited Liability Company*	0.408	0.421	0.491	0.494	0.039	-2.069
Private Enterprise*	0.301	0.291	0.459	0.454	0.112	1.589
Former SOE*	0.040	0.043	0.197	0.202	0.405	-0.833
Land Rights*	0.589	0.583	0.492	0.493	0.402	0.838
Business Burden						
Bribe Size [1-8]	6.281	6.256	1.589	1.620	0.314	1.007
Bribe Perception [1-4]	2.348	2.341	0.775	0.780	0.504	0.668
Bureaucracy Rent Burden [1-4]	2.502	2.506	0.703	0.706	0.664	-0.435
Bureaucracy Time Burden [1-6]	4.854	4.839	1.233	1.255	0.460	0.738
Tax Negotiation Perception [1-4]	2.595	2.622	0.764	0.758	0.024	-2.258
Document Burden*	0.158	0.158	0.364	0.364	0.984	0.020
Political Connection*	0.251	0.260	0.466	0.463	0.161	-1.402
Former Household Business*	0.477	0.486	0.499	0.500	0.175	-1.358
Annual Inspections [count]	1.797	1.793	2.213	3.936	0.923	0.096
Performance [y-on-y]	3.583	3.582	0.938	0.935	0.891	0.137
Governance						
Weighted PCI [0-100]	58.355	58.413	4.491	4.449	0.331	-0.973
Service Provision [1-5]	3.612	3.595	0.926	0.928	0.259	1.130
Proactiveness [0-10]	4.826	4.831	1.413	1.423	0.774	-0.287
Informal Charges [0-10]	6.533	6.539	0.876	0.871	0.612	-0.507
Transparency [0-10]	5.837	5.848	0.667	0.639	0.209	-1.255

*binary variable

Appendix 4b:	Balance	Test for	Foreign	Invested	Enterprises
			()		

		(N =	4,821)			
	Mean Std. Deviation					
	Treated	Control	Treated	Control	p-value	t-stat
Sectors	-					
(Services=1, Manf & other=0)	0.252	0.260	0.434	0.439	0.505	-0.667
Province Attributes						
GDP	117276	118411	127688	132351	0.769	-0.294
Population (10,000)	2837.5	2890.0	2384.5	2429.8	0.462	-0.736
Paved Roads (%)	0.770	0.761	0.172	0.174	0.067	1.832
Telephones Per Capita (%)	0.278	0.277	0.081	0.080	0.535	0.620
Industrial Zone*	0.498	0.476	0.500	0.500	0.151	1.436
Region [nominal]	3.970	4.013	2.353	2.331	0.538	-0.616
National Level City*	0.380	0.385	0.486	0.487	0.749	-0.320
Distance to Hanoi/HCMC (km)	79.7	87.6	163.3	170.9	0.110	-1.598
Firm Attributes						
Year Registered	2004	2003	4.601	4.746	0.003	2.941
Time to Register (days)	49	61	82	211	0.059	-1.889
Employment [1-8]	3.748	3.746	1.629	1.662	0.962	0.047
Equity [1-8]	4.724	4.696	1.767	1.873	0.652	0.451
Joint Venture*	0.103	0.110	0.305	0.313	0.468	-0.725
Fully Owned*	0.813	0.814	0.390	0.389	0.977	-0.028
Land Rights*	2.275	2.272	0.525	0.538	0.879	0.153
Business Burden						
Bribe Size [1-8]	6.665	6.714	1.285	1.210	0.270	-1.103
Bureaucracy Rent Burden [1-4]	2.812	2.764	0.677	0.625	0.022	2.294
Bureaucracy Time Burden [1-6]	4.820	4.794	1.202	1.173	0.525	0.635
Document Burden*	0.234	0.312	0.424	0.463	0.000	-5.161
Annual Inspections	2.297	2.533	2.988	2.718	0.010	-2.569
Performance (y-on-y)	-56.390	-41.885	63.356	59.823	0.000	-5.879
Governance						
Weighted PCI [0-100]	60.221	59.997	4.145	4.169	0.069	1.820
Service Provision [1-5]	3.365	3.512	1.105	0.966	0.000	-4.038
Proactiveness [0-10]	4.722	4.768	1.460	1.460	0.293	-1.051
Informal Charges [0-10]	6.835	6.718	0.918	0.885	0.000	4.389
Transparency [0-10]	6.125	6.121	0.528	0.533	0.807	0.244

*binary variable

A mm and in 1 at	Dalamaa	\mathbf{T}_{a}		N/14:	-1-	Daam	
Appendix 4c:	Dalance	I est	lising	IVI I I I TI	nie	Reor	ession
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	Firm At	tributes	Province	Attributes	Previous G	overnance
Dependent	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign
variable=1reatment	(1)	(2)	(4)	(5)	(6)	(7)
Employment [1-8]	-0.006	0.005	-0.006	0.005	-0.006	0.006
	(0.222)	(0.438)	(0.198)	(0.334)	(0.206)	(0.329)
Equity [1-8]	0.002	-0.009	0.002	-0.009	0.002	-0.009
	(0.430)	(0.178)	(0.439)	(0.183)	(0.443)	(0.181)
Services=1, Manf & other=0	-0.007	0.030	-0.006	0.027	-0.006	0.027
	(0.452)	(0.159)	(0.502)	(0.218)	(0.523)	(0.229)
Industrial Zone (0,1)	0.005	-0.020	0.004	-0.018	0.003	-0.016
	(0.767)	(0.200)	(0.800)	(0.355)	(0.864)	(0.414)
Sole Propietorship	-0.007	. ,	-0.007		-0.006	
	(0.539)		(0.577)		(0.641)	
Limited Liability Co.	0.013		0.013		0.014	
,	(0.178)		(0.184)		(0.166)	
Fully Owned FIE		-0.028		-0.024		-0.024
2		(0.290)		(0.399)		(0.397)
Firm Age	0.000	0.006**	0.000	0.006*	0.000	0.006*
0	(0.705)	(0.027)	(0.595)	(0.061)	(0.587)	(0.063)
Distance to Hanoi/HCMC			-0.000	0.000	-0.000	0.000
,			(0.207)	(0.196)	(0.147)	(0.153)
Region (nominal)			-0.001	-0.004	-0.002	-0.001
0			(0.686)	(0.565)	(0.484)	(0.900)
National Level City (0,1)			-0.010	0.006	-0.011	-0.004
			(0.533)	(0.909)	(0.494)	(0.950)
Paved Roads (%)			0.000	-0.108	-0.008	-0.101
			(0.986)	(0.202)	(0.694)	(0.233)
Telephones Per Capita (%)			0.005	0.038	-0.018	0.088
			(0.956)	(0.907)	(0.833)	(0.796)
GDP			-0.000	0.000	-0.000	0.000
			(0.739)	(0.847)	(0.689)	(0.787)
Previous Economic Governance					0.002**	-0.003
					(0.037)	(0.463)
Previous Informal Charges					-0.008	0.003
0					(0.337)	(0.846)
Survey Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	16,461	2,738	16,390	2,738	16,390	2,738
Pseudo R-Squared	0.000478	0.0369	0.000602	0.0380	0.000781	0.0382
Log Likelihood	-11396	-1810	-11346	-1808	-11344	-1808

Treatment is regressed on covariates. Marginal probability from probit model displayed. Robust p-value in parentheses (*** p<0.01, ** p<0.05, * p<0.1)



Appendix 5: Floor and Ceiling Effects in List Question

Appendix 6: Description of Robustness Tests

To ensure that our results on the relationship between restrictions and corruption presented in Table 4 are not an artifact of modeling choices, we developed several sensitivity tests in Appendix Table 6. First, Model 1 addresses the fact that most business registration takes place at Departments of Planning and Investment (DPIs) located in Vietnam's 63 provinces. Because it is possible that corruption may be associated with specific provincial activities that are correlated with firm-level features, such as size or industry type, we add provincial-fixed effects in Model 1 to ensure that our results survive a within-province comparison. Second, Model 2 replaces the quadratic time trend with year fixed effects, knocking out all over-time variation and allowing us to simply compare restricted and unrestricted sectors within a given year. Both of these fixed-effect estimators are calculated using OLS, as fixed effects can lead to bias in maximum likelihood estimation (Greene 2004). In both cases, the substantive effects of FDI, restrictions, and the interaction are nearly identical to the fully specified Model 7 in Table 4.

Next, in Model 3 and 4, we re-estimate our analysis using multiple imputation. 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 nonsensitive choices within the experiment (the independence of irrelevant alternatives assumption). 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. The factors behind these choices are likely to be correlated with other features of the respondents' backgrounds (Jensen et al. 2010). As a result, dropping these nonresponses could lead to bias. In our case, respondents' attempts to hide culpability will likely lead to an underestimation of the overall level of bribery.

To address the concern, we employ multiple imputation using the MI procedure in STATA, creating five datasets of imputed answers to activities engaged in during registration. 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. The imputed dataset, (both domestic and foreign) includes 64,200 observations for the question concerning corruption during registration and licensing. Comparing the non-imputed results in 3a and 4a to the imputed results in 3b and 4b, respectively, it is clear that the primary coefficients of interest remain almost exactly the same as with the non-imputed data, giving us further confidence in our results.

Model 5 applies the piecewise estimator suggested by Glynn (2010: 13). This approach yields similar marginal effects, but offers somewhat stronger support for our theory. Bribe propensity among FIEs in nonrestricted sectors and among domestic firms in restricted sectors is actually a bit lower, while the coefficient on the interaction term remains roughly the same size. Standard errors, however, are uncomfortably small, leading to nearly universal statistical significance of the covariates.

Finally, Model 6 returns to the question of endogenous regulatory barriers. If Group A restrictions were put in place to induce corruption, the correlation we observe may be due to reverse causality. To address this concern, we employ the same identification strategy as in Table 2 in a three-stage procedure. First, we regress restrictions on the SOE share of investment in a sector, controlling for capital labor ratio, firm size, and year fixed effects (exactly as in Table 3). From that regression, we calculate the predicted restrictions resulting from protection of SOEs. Next, we feed these predicted restrictions into the two-stage LIST estimation from Model 7 of Table 4. Although the propensity to bribe by FIEs in restricted sectors is somewhat smaller and slightly less significant, the general ultimate conclusion is upheld. Even after addressing endogenous regulatory barriers, FIEs in restricted sectors are significantly more likely than other foreign firms and domestic competitors.

Dependent variable: difference between								
the activities reported by treatment aroup and predicted number of	Province FE	<u>Year FE</u>	Diff-in-means	Diff-in-means	<u>Optimism</u>	<u>Optimism</u>	<u>Glynn Piecewise</u>	<u>IV-2SLS</u>
nonsensitive activities of control group.	(1)	(2)	(3a)	(3b)	(4a)	(4b)	(5)	(6)
			Non-Imputed	Imputed	Non-Imputed	Imputed		
Foreign enterprise	0.016	0.021			0.008	-0.036	-0.066***	-0.025
	(0.094)	(0.095)			(0.080)	(0.081)	(0.004)	(0.225)
Restricted industry	-0.020	-0.022			-0.034	-0.030	-0.060***	-0.012
	(0.031)	(0.031)			(0.029)	(0.030)	(0.001)	(0.309)
Capital Size at Establishment	0.007	0.006			0.011	0.012	0.009***	-0.005
	(0.010)	(0.011)			(0.010)	(0.010)	(0.000)	(0.013)
FDI*Restricted	0.151**	0.150**			0.173**	0.164**	0.120***	0.121*
	(0.076)	(0.074)			(0.069)	(0.066)	(0.003)	(0.689)
Time since registration	0.124**				-0.008	-0.005	0.010***	0.021
	(0.060)				(0.013)	(0.014)	(0.000)	(0.032)
Time squared	0.070***				0.000	0.000	-0.000***	-0.002
	(0.027)				(0.001)	(0.001)	(0.000)	(0.003)
Equitized SOE	-0.021**	0.134**			0.161***	0.145**	0.152***	0.292***
	(0.010)	(0.059)			(0.061)	(0.060)	(0.001)	(0.076)
Manager w/Political Connnection	-0.005	0.069**			0.078***	0.070**	0.027***	0.045
	(0.012)	(0.028)			(0.029)	(0.029)	(0.001)	(0.033)
Plan to expand business	0.000	-0.022**			-0.020*	-0.015	-0.016***	-0.040***
	(0.001)	(0.010)			(0.011)	(0.011)	(0.001)	(0.013)
Constant	0.235***	0.137	0.189***	0.206***	0.246***	0.317***	0.002	0.256**
	(0.080)	(0.088)	(0.030)	(0.030)	(0.084)	(0.084)	(0.003)	(0.120)
Surevy Year 2011	-0.044	-0.046			-0.058	-0.136***	0.058***	-0.009
	(0.042)	(0.041)			(0.045)	(0.044)	(0.002)	(0.048)
Survey Year 2012	-0.007	0.002			-0.012	-0.092**	0.091***	0.041
	(0.039)	(0.041)			(0.044)	(0.045)	(0.004)	(0.042)
Province FE	Yes	Yes	No	No	No	No	No	4,929
Registraion Year FE	No	Yes	No	No	No	No	No	0.007
4-Digit ISIC FE	No	No	No	No	No	No	No	0.966
True N	8,338	8,338	10,612	10,612	8,338	8,338	20,433	4,929
R2	0.046	0.049	-0.000	0.000	0.005	0.008	0.875	0.007
RMSE	0.936	0.935	0.982	0.982	0.952	0.952	0.0226	0.966
Log likelihood	-11239	-11226	-14869	-14869	-11418	-11418	27203	
Imputed N				84,546		64,200		
Imputed Datasets				5		5		

Appendix Table 6: Robustness of Main Results (Determinants of Bribery)

Note: These results test the robustness of Model 7 (Table 4) to changes in specification. Models 1 and 2 add provincial and year fixed effects, using OLS rather than NLS in the second stage. Models 3b and 4b replicate the difference-in-means estimator and core model using data generated by Multiple Imputation with 5 datasets (using STATA's MI function). Model 5 uses the alternative piecewise estimator suggested by Glynn (2008). Model 6 employs a three-stage estimation strategy, where *Restrict* is instrument by the lagged share of state owned enterprise (SOE) investment in the sector. First stages are shown in Models 11 and 12 of Table 3. Note that the number of observations (N) is smaller than Table 4, because SOE share data was not available for every four-digit sector represented in the PCI. The coefficient on restricted sector, FDI, and the interaction in the IV-2SLS model are re-scaled to address the fact that predicted probability emerging from the second stage is not dichotomous and ranges between 0 and 1. Because the dependent variable is an estimate, standard errors in the second stage of every model and third stage of the IV-2SLS are calculated through bootstrapping procedure with 1000 repetitions (*** p<0.01, ** p<0.05, * p<0.1). Errors are clustered at the province level, which is the main interface for business registration. FDI = foreign direct investment; FE = fixed effect.

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Online APPENDIX

Pages A through Q are not intended for publication, but will be made available on our websites if the article is selected for publication

Appendix 1: Map of Vietnam Appendix 2: Correlations between State Ownership and Rents Appendix 3: Representativeness of Sample Appendix 4a to 4c: Balance between Control and Treatment Group Appendix 5: Correlates of Private Entry into Group A Sectors Appendix 6a: Relationship between Restrictions and Monopoly Rents Appendix 6a: Multiple and Two-Stage Regression Appendix 7: Floor and Ceiling Effects in List Question Appendix 8: Robustness Tests of Main Results Appendix 8a: Description Appendix 8b: Sensitivity Tests

Appendix 8c: Robust to Multiple Imputation

А

Appendix 1: Foreign Investment in Vietnam (Capital & Projects 1988-2012)





Appendix 2: Correlation between SOE Investment and Rents

Appendix 3: Characteristics of Provincial Competitiveness Index Sample

Foreign invested (3	.888)		Domestic enterprises (19.363)				
Legal form of investment	Weighted PCI	GSO	Legal form of investment	Weighted PCI	Тах		
100% Foreign-directed enterprise	84.35%	82.95%	Sole proprietorship	16.2%	19.4%		
Joint venture with a Vietnamese private	4.84%	16.36%	Limited liability	54.5%	59.1%		
Joint venture with a Vietnamese SOE	4.55%		Joint stock	27.6%	21.4%		
Registered as a domestic company	2.52%	0.46%	Joint stock with shared listed on stock exchange	1.1%	NA		
Domestic company w/overseas VN capital	0.61%		Partnership and other	0.7%	0.0%		
Other	3.13%	0.23%					
Sector	Weighted PCI	<u>GSO</u>	Sector	Weighted PCI	Tax		
Industry/manufacturing	64.59%	59.44%	Industry/manufacturing	30.2%	34.5%		
Construction/infrastructure investment	4.09%	4.72%	Construction/infrastructure investment*				
Service/commerce/finance	29.33%	28.94%	Service/commerce/finance	64.6%	62.2%		
Agriculture/forestry/aquaculture	2.36%	5.87%	Agriculture/forestry/aquaculture	4.0%	1.9%		
Mining/natural resource exploitation	0.86%	1.03%	Mining/natural resource exploitation	1.2%	1.4%		
Size of labor force	Weighted PCI	<u>GSO</u>	Size of labor force	Weighted PCI	<u>GSO</u>		
Less than 5	2.92%	4.18%	Under 5	12.1%	23.36%		
5 to 9	5.99%	6.79%	5 to 9	24.1%	35.63%		
10 to 49	31.79%	29.67%	10 to 49	41.9%	33.22%		
50 to 299	31.35%	30.95%	50 to 200	14.9%	6.11%		
300 to 399	6.38%	7.64%	Over 200	7.1%	1.7%		
400 to 499	7.26%	7.09%					
500 to 999	7.17%	6.88%					
1000 and over	7.13%	7.81%					
Licensed investment size	Weighted PCI	GSO	Licensed investment size (Total assets, BVND)	Weighted PCI	GSO		
Under 0.5 BVND (\$25,000 USD)	2.52%	2.25%	Under 0.5 BVND (\$25,000 USD)	10.9%	8.9%		
From 0.5 to under 1 BVND (\$50,000 USD)	1.39%	2.17%	From 0.5 to under 1 BVND (\$50,000 USD)	17.0%	13.5%		
From 1 to under 5 BVND (\$250,000 USD)	15.85%	12.75%	From 1 to under 5 BVND (\$250,000 USD)	42.8%	49.6%		
From 5 to under 10 BVND (\$500,000 USD)	8.75%	11.71%	From 5 to under 10 BVND (\$500,000 USD)	12.7%	13.4%		
From 10 to under 50 BVND (\$2.5 Million USD)	35.14%	36.04%	From 10 to under 50 BVND (\$2.5 Million USD)	11.9%	11.5%		
From 50 to under 200 BVND (\$10 Million USD)	23.13%	22.83%	From 50 to under 200 BVND (\$10 Million USD)	4.8%	3.2%		
From 200 to under 500 BVND (\$25 Million USD)	7.62%	7.29%	From 200 to under 500 BVND (\$25 Million USD)				
Above 500 BVND (\$25 Million USD)	5.61%	4.97%	Above 500 BVND (\$25 Million USD)				
Major customer	Weighted PCI	<u>GSO</u>	Major customer	Weighted PCI	<u>GSO</u>		
Export directly or indirectly	55.00%	66.8%	Export directly or indirectly	11.7%	NA		
Foreign individuals or companies in Vietnam	24.51%	16.2%	Foreign individuals or companies in Vietnam	9.9%	NA		
Sold domestically to SOE	3.52%	2.8%	Sold domestically to SOE	14.8%	NA		
Sold domestically to state agency	1.42%	0.9%	Sold domestically to state agency	20.3%	NA		
Sold domestically to private individuals	15.55%	13.0%	Sold domestically to private individuals	43.4%	NA		
Note: This table compares data on the nationally weighted	d sample of domestic an	d foreign firn	ns from the PCI to the data collected from the National Tax Aut	hority (Tax) and General St	atistical Office		

(GSO) Enterprise Census. Weighted PCI is the PCI survey sample, but weighted by provincial share of enterprises to create a nationally representative sample. General Statistical Office (GSO) Data available at (http://www.gso.gov.vn/default_en.aspx?tabid=515&idmid=5&ItemID=9775). NA = Not Available for 2010. *Tax Authority data does not disaggregate construction firm from manufacturing. The PCI data records 15 percent construction.

PCI = Provincial Competitiveness Index

BVND = Billion Vietnamese Dollars

SOE = state-owned enterprise

VN = Vietnamese

Source: Survey data from Vietnam PCI 2010 Report (www.pcivietnam.org); and GSO Enterprise Census 2009 (www.gso.gov.vn)

(N = 22,275)										
	Ме	ean	Std. De	viation						
	Treated	Control	Treated	Control	p-value	t-stat				
Sector										
(Services=1, Manf & other=0)	0.608	0.602	0.488	0.489	0.380	0.878				
Province Attributes										
GDP	56861	57007	98543	97235	0.912	-0.110				
Population (10,000)	1752.0	1741.6	1725.6	1719.5	0.651	0.452				
Paved Roads (%)	0.631	0.632	0.233	0.232	0.686	-0.405				
Telephones Per Capita (%)	0.229	0.229	0.076	0.076	0.648	-0.457				
Firms with Email Address	0.349	0.351	0.128	0.129	0.204	-1.269				
Industrial Zone*	0.077	0.075	0.267	0.263	0.550	0.598				
Region [nominal]	3.914	3.910	2.221	2.217	0.892	0.136				
National Level City*	0.173	0.171	0.378	0.376	0.675	0.419				
Distance to Hanoi/HCMC (km)	234.0	233.7	227.4	227.3	0.911	0.112				
Firm Attributes										
Year Registered	2005	2005	4.504	4.541	0.632	-0.479				
Time to Register (days)	16	16	17	17	0.840	0.202				
Employment [1-8]	2.290	2.285	1.076	1.100	0.757	0.310				
Equity [1-8]	2.484	2.488	1.166	1.156	0.776	-0.284				
Joint Stock*	0.123	0.125	0.329	0.331	0.648	-0.457				
Limited Liability Company*	0.408	0.421	0.491	0.494	0.039	-2.069				
Private Enterprise*	0.301	0.291	0.459	0.454	0.112	1.589				
Former SOE*	0.040	0.043	0.197	0.202	0.405	-0.833				
Land Rights*	0.589	0.583	0.492	0.493	0.402	0.838				
Business Burden										
Bribe Size [1-8]	6.281	6.256	1.589	1.620	0.314	1.007				
Bribe Perception [1-4]	2.348	2.341	0.775	0.780	0.504	0.668				
Bureaucracy Rent Burden [1-4]	2.502	2.506	0.703	0.706	0.664	-0.435				
Bureaucracy Time Burden [1-6]	4.854	4.839	1.233	1.255	0.460	0.738				
Tax Negotiation Perception [1-4]	2.595	2.622	0.764	0.758	0.024	-2.258				
Document Burden*	0.158	0.158	0.364	0.364	0.984	0.020				
Political Connection*	0.251	0.260	0.466	0.463	0.161	-1.402				
Former Household Business*	0.477	0.486	0.499	0.500	0.175	-1.358				
Annual Inspections [count]	1.797	1.793	2.213	3.936	0.923	0.096				
Performance [y-on-y]	3.583	3.582	0.938	0.935	0.891	0.137				
Governance										
Weighted PCI [0-100]	58.355	58.413	4.491	4.449	0.331	-0.973				
Service Provision [1-5]	3.612	3.595	0.926	0.928	0.259	1.130				
Proactiveness [0-10]	4.826	4.831	1.413	1.423	0.774	-0.287				
Informal Charges [0-10]	6.533	6.539	0.876	0.871	0.612	-0.507				
Transparency [0-10]	5.837	5.848	0.667	0.639	0.209	-1.255				

Appendix 4a: Balance Test for Domestic Operations

*binary variable

(N = 4,821)										
	Me	Mean Std. Deviation								
	Treated	Control	Treated	Control	p-value	t-stat				
Sectors										
(Services=1, Manf & other=0)	0.252	0.260	0.434	0.439	0.505	-0.667				
Province Attributes										
GDP	117276	118411	127688	132351	0.769	-0.294				
Population (10,000)	2837.5	2890.0	2384.5	2429.8	0.462	-0.736				
Paved Roads (%)	0.770	0.761	0.172	0.174	0.067	1.832				
Telephones Per Capita (%)	0.278	0.277	0.081	0.080	0.535	0.620				
Industrial Zone*	0.498	0.476	0.500	0.500	0.151	1.436				
Region [nominal]	3.970	4.013	2.353	2.331	0.538	-0.616				
National Level City*	0.380	0.385	0.486	0.487	0.749	-0.320				
Distance to Hanoi/HCMC (km)	79.7	87.6	163.3	170.9	0.110	-1.598				
Firm Attributes										
Year Registered	2004	2003	4.601	4.746	0.003	2.941				
Time to Register (days)	49	61	82	211	0.059	-1.889				
Employment [1-8]	3.748	3.746	1.629	1.662	0.962	0.047				
Equity [1-8]	4.724	4.696	1.767	1.873	0.652	0.451				
Joint Venture*	0.103	0.110	0.305	0.313	0.468	-0.725				
Fully Owned*	0.813	0.814	0.390	0.389	0.977	-0.028				
Land Rights*	2.275	2.272	0.525	0.538	0.879	0.153				
Business Burden										
Bribe Size [1-8]	6.665	6.714	1.285	1.210	0.270	-1.103				
Bureaucracy Rent Burden [1-4]	2.812	2.764	0.677	0.625	0.022	2.294				
Bureaucracy Time Burden [1-6]	4.820	4.794	1.202	1.173	0.525	0.635				
Document Burden*	0.234	0.312	0.424	0.463	0.000	-5.161				
Annual Inspections	2.297	2.533	2.988	2.718	0.010	-2.569				
Performance (y-on-y)	-56.390	-41.885	63.356	59.823	0.000	-5.879				
Governance										
Weighted PCI [0-100]	60.221	59.997	4.145	4.169	0.069	1.820				
Service Provision [1-5]	3.365	3.512	1.105	0.966	0.000	-4.038				
Proactiveness [0-10]	4.722	4.768	1.460	1.460	0.293	-1.051				
Informal Charges [0-10]	6.835	6.718	0.918	0.885	0.000	4.389				
Transparency [0-10]	6.125	6.121	0.528	0.533	0.807	0.244				

Appendix 4b: Balance Test for Foreign Invested Enterprises

*binary variable

	Firm At	tributes	Province A	Attributes	Previous G	Previous Governance		
Dependent Versiehle Treesterent	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign		
<i>Variable=1reatment</i>	(1)	(2)	(4)	(5)	(6)	(7)		
Employment [1-8]	-0.006	0.005	-0.006	0.005	-0.006	0.006		
	(0.222)	(0.438)	(0.198)	(0.334)	(0.206)	(0.329)		
Equity [1-8]	0.002	-0.009	0.002	-0.009	0.002	-0.009		
	(0.430)	(0.178)	(0.439)	(0.183)	(0.443)	(0.181)		
Services=1, Manf & other=0	-0.007	0.030	-0.006	0.027	-0.006	0.027		
,	(0.452)	(0.159)	(0.502)	(0.218)	(0.523)	(0.229)		
Industrial Zone (0.1)	0.005	-0.020	0.004	-0.018	0.003	-0.016		
	(0.767)	(0.200)	(0.800)	(0.355)	(0.864)	(0.414)		
Sole Propietorship	-0.007	(0.200)	-0.007	(0.000)	-0.006	(***==)		
onerropietoromp	(0.539)		(0.577)		(0.641)			
Limited Liability Co.	0.013		0.013		0.014			
	(0.178)		(0.184)		(0.166)			
Fully Owned FIE	(01270)	-0.028	(01201)	-0.024	(01200)	-0.024		
		(0.290)		(0.399)		(0.397)		
Firm Age	0.000	0.006**	0.000	0.006*	0.000	0.006*		
i i i i i i i i i i i i i i i i i i i	(0.705)	(0.027)	(0.595)	(0.061)	(0.587)	(0.063)		
Distance to Hanoi/HCMC	(0.700)	(0.027)	-0.000	0.000	-0.000	0.000		
			(0,207)	(0.196)	(0.147)	(0.153)		
Region (nominal)			-0.001	-0.004	-0.002	-0.001		
Region (noninal)			(0.686)	(0.565)	(0.484)	(0.900)		
National Level City (0.1)			-0.010	0.006	-0.011	-0.004		
Radional Devel City (0,1)			(0.533)	(0.000)	(0.494)	(0.950)		
Paved Roads (%)			0.000	-0.108	-0.008	-0.101		
raveu Roaus (70)			(0.986)	(0.202)	(0.694)	(0.233)		
Telephones Per Capita (%)			0.005	0.038	-0.018	0.088		
receptiones rel cupita (70)			(0.956)	(0.907)	(0.833)	(0.796)		
CDP			-0.000	0.000	-0.000	0.000		
UD1			(0.739)	(0.847)	(0.689)	(0.787)		
Previous Economic Covernance			(0.757)	(0.047)	0.007	-0.003		
revious Leononne dovernance					(0.002	(0.463)		
Previous Informal Charges					-0.008	0.003		
revious informat charges					(0.227)	(0.846)		
Survey Veer FF	Voc	Voc	Voc	Voc	<u>Voc</u>	<u>[0.040]</u> Voc		
Observations	16 161	2 720	16 200	2 720	16 200	2 720		
Decude D Covered	10,401	2,730	10,370	2,730	10,370	4,730		
rseudo K-Squared	0.000478	0.0369	0.000602	0.0380	0.000781	0.0382		
Log Likelihood	-11396	-1810	-11346	-1808	-11344	-1808		

Appendix 4c: Balance Test using Multiple Regression

Treatment is regressed on covariates. Marginal probability from probit model displayed. Robust p-value in parentheses (*** p<0.01, ** p<0.05, * p<0.1)

Dependent Variable: Firm is in restricted sector= 1	(1)
Capital Size at Establishment	0.012***
	(0.003)
Labor Size at Establishment	0.038***
	(0.004)
Manager has university degree	0.012*
	(0.007)
Manager has MBA	0.024
	(0.023)
Observations	17,274
Cluster	64
xbar	-0.888
r2_p	0.0176
11	-8279
11_0	-8428
N_clust	63
Marginal probabilities with robust standar	d errors,

Appendix 5: Correlates of Private Sector Entry into Restricted Sectors

clustered at province level, in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Appendix 6: Relationship between Restrictions and Monopoly Rents

Although the correlations between restrictions and potential economic rents presented in Figure 2 appear strong, there is reason to be suspicious that the apparent relationship could be spurious, caused by omitted firmlevel features driving both variables. We test the robustness of the relationship using HHI and the average profit margin of firms (ln(Profit/Revenue)) at the ISIC four-digit level as our dependent variables, and regress them on a dichotomous measure of whether a particular sector is listed as being Group A. These results are presented in Appendix 6a, where the unit of analysis is the sector-year, between 2000 and 2011 for all sectors operating in Vietnam during that time. Models 1 and 3 display the naïve regression, controlling for the capital/labor ratio and labor size of the industry, allowing us to separate the impact of restrictions from the cost structure of the industry.

Models 2 and 4 address the possible threat that endogenous regulation poses to our analysis. There is a first-mover benefit to early investors, who may lobby for regulations to protect their market share (Rajan and Zingales 2003; Benmelech and Moskowitz 2010; Weymouth 2011). According to this theory, MNCs may be complicit in establishing the regulatory framework, using corruption to influence host-country officials. If this is the case, the causal relationship could be reversed, meaning corruption might pre-date investment restrictions and available rents (Bandyopadhyay and Roy 2007). Thankfully, the registry of Group A restrictions has only moved in one direction over time; restrictions have been removed and never added, limiting the threat that new restrictions emerged to protect early investors. Nevertheless, there remains a legitimate concern that the removal of restrictions and the length that they are in place, especially those that result from international agreements, may have been negotiated with an eye to entry by particular MNCs.

To account for these concerns, we employ a two-stage instrumental variables model, where we instrument for restrictions by the share of State-Owned Enterprises (SOEs) in the particular four-digit sector. This variable is lagged one year to account for the SOE share at the time policymakers were negotiating restrictions. We present our results of the first stage without year fixed effects (Model 5). SOE investment share picks up the legacy effect of Vietnam's former command economy. As Vietnam is still transitioning from a centrally planned system and has not undergone full-scale privatization, large, state-owned conglomerates are still active in many sectors. There is strong reason to suspect that Group A restrictions were aimed predominantly at protecting their market share (See Stigler 1971; Grossman and Helpman 1994). Indeed, Abuza (2002) points out that SOEs were the primary opponents of the USBTA, specifically fearing the loss of their market position. Even after USBTA entry, the trade and investment regime still favored SOEs, allowing cheap entry of inputs that SOEs relied upon, while maintaining formal and informal barriers to entry in the sectors SOEs dominated.

The IV strategy confirms this. Each 10% increase in SOE share, increases the probability of Group A restrictions by 8.7% in the first stage (Model 12). Moreover, the size of the coefficients on restrictions and the R² in both the HHI and profit models fall, indicating that our approach has removed a portion of the endogeneity bias.

One fear is that lagged SOE share may violate the exclusion restriction by being correlated with HHI through channels other than investment restrictions, but this does not appear to be the case. The bivariate correlation between SOE share and the two dependent variables is a weak (r=0.06 for HHI and r=0.07 for profit).¹ Indeed, Pincus et al. (2012) demonstrate that SOEs, especially large conglomerates, are highly unproductive and unprofitable, despite the protections afforded them. Finally, the Cragg-Donaldson F-Statistic is extremely large (84) and statistically significant (it is far greater than the Stock and Yogo 10% critical value of 16.38), indicating that the strength of the identification in the first-stage model is sufficient to proceed with IV-2SLS. Thus, by instrumenting with SOE share, our estimates should be interpreted as the impact of regulations that are determined by the legacy of central planning, after the regulations possibly demanded by early entrants have been removed.

After ensuring exogenous regulation and accounting for market structure in Models 2 and 4, we find that restricted sectors lead to 2.4% greater industrial concentration and 13% larger profit margins. In short, exogenous barriers to investment have important effects on foreign firms' expected profitably. A foreign enterprise lucky

¹ Visual verification of these weak relationships of the weak relationship can be found in Online Appendix 2.

enough to enter a restricted sector can be assured of extraordinary market power and economic rents. Given our theory, we expect that foreign firms attempting to start Group A projects are far more likely to pay more for this privilege.

Appendix 6a: Relationship between Restrictions and Monopoly Rents (Multiple and Two-Stage Regression)

Dependent variables/ independent	H	HI	Profit Ma	First stages	
variables	(1)	(2)	(3)	(4)	(5)
Restricted sector	0.047***	0.023***	0.130***	.129***	
	(0.010)	(0.079)	(0.026)	(0.253)	
Labor Size (ln)	0.041**	0.028	0.089**	-0.028	0.010*
	(0.019)	(0.021)	(0.037)	(0.050)	(0.006)
Capital/Labor Ratio	-0.004	-0.008	0.065***	0.045**	-0.017***
	(0.005)	(0.006)	(0.015)	(0.018)	(0.005)
Avg. State-owned investment share (lag)					0.087***
					(0.015)
Constant	0.261***	0.207***	0.879***	0.682***	0.362***
	(0.025)	(0.038)	(0.071)	(0.118)	(0.030)
Observations	4,247	3,354	4,104	3,273	3,324
Uncentered R-squared	0.015	0.013	0.021	0.017	0.0516
RMSE	0.282	0.272	0.728	0.862	0.157
Kleibergen-Paap rk LM statistic					63.38***
Cragg Donald F-statistic					84.189

Note: Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1). The two dependent variables are average Herfindal score and the natural log of profit margin reported at the four-digit level. Models 1 and 3 are simple OLS models controlling for market structure. Models 2 and 4 employ two-stage least squares where restrictions are instruments by state-owned investment share. The coefficient on restricted sector is re-scaled to address the fact that prediced probability emerging from the second stage is not dichotomous and ranges betwene 0 and 1. Model 5 displays the first stage models. RMSE = root mean square error. Source: Authors' estimates compiled using data from the Vietnamese General Statistical Office (GSO) Enterprise Census (2005 to 2011) available at (www.gso.gov.vn).



Appendix 7: Floor and Ceiling Effects in List Question

Appendix 8: Description of Robustness Tests

To ensure that our results on the relationship between restrictions and corruption presented in Table 4 and Table 5 are not an artifact of modeling choices, we developed several sensitivity tests in Appendix Tables 6a and 6b. Beginning with Table 6a, Model 1 addresses the fact that most business registration takes place at Departments of Planning and Investment (DPIs) located in Vietnam's 63 provinces. Because it is possible that corruption may be associated with specific provincial activities that are correlated with firm-level features, such as size or industry type, we add provincial-fixed effects in Model 1 to ensure that our results survive a within-province comparison. Second, Model 2 replaces the quadratic time trend with year fixed effects, knocking out all over-time variation and allowing us to simply compare restricted and unrestricted sectors within a given year. Both of these fixed-effect estimators are calculated using OLS, as fixed effects can lead to bias in maximum likelihood estimation (Greene 2004). In both cases, the substantive effects of FDI, restrictions, and the interaction are nearly identical to the fully specified Model 7 in Table 4.

Model 3 applies the piecewise estimator suggested by Glynn (2010: 13). This approach yields similar marginal effects. Bribe propensity among FIEs in nonrestricted sectors and among domestic firms in restricted sectors is actually a bit lower, while the coefficient on the interaction term remains roughly the same size. Standard errors, however, are uncomfortably small, leading to nearly universal statistical significance of the covariates. Model 4 applies the truncated two-stage estimator also suggested by Glynn (2010). In some case, the two-stage Blaire and Imai (2011) estimator yields bribe probabilities that are less than zero, because the predicted number of non-sensitive items for a given treated firm is actually greater than the number of activities actually completed. Glynn (2010) suggests rounding these negative numbers to zero. This tends to bias the overall predicted values (i.e. the constant is .45, meaning 45% of domestic firms in non-restricted industries pay bribers, but Glynn argues may lead to more correct marginal effects. Once again, the coefficient on our core interaction hardly budges.

Finally, Model 5 returns to the question of endogenous regulatory barriers. If Group A restrictions were put in place to induce corruption, the correlation we observe may be due to reverse causality. To address this concern, we employ the same identification strategy as in Table 2 in a three-stage procedure. First, we regress restrictions on the SOE share of investment in a sector, controlling for capital labor ratio, firm size, and year fixed effects (exactly as in Appendix 6 above (see Model 5)). From that regression, we calculate the predicted restrictions resulting from protection of SOEs. Next, we feed these predicted restrictions into the two-stage LIST estimation from Model 7 of Table 4. Although the propensity to bribe by FIEs in restricted sectors is somewhat smaller and slightly less significant, the general ultimate conclusion is upheld. Even after addressing endogenous regulatory barriers, FIEs in restricted sectors are significantly more likely than other foreign firms and domestic competitors.

Dependent variable: difference between the activities reported by treatment aroup and predicted number of	<u>Province</u> <u>FE</u>	<u>Year FE</u>	<u>Glynn</u> <u>Piecewise</u>	<u>Truncated</u>	<u>IV-2SLS</u>
nonsensitive activities of control group.	(1)	(2)	(3)	(4)	(5)
Foreign enterprise	0.002	0.005	-0.056***	-0.004	-0.027
	(0.091)	(0.094)	(0.005)	(0.056)	-0.0215
Restricted industry	-0.042	-0.043	-0.066***	-0.023	-0.083
	(0.035)	(0.036)	(0.001)	(0.026)	(0.303)
FDI*Restricted	0.273***	0.281***	0.163***	0.143**	0.120*
	(0.089)	(0.084)	(0.004)	(0.060)	-0.066
Capital Size at Establishment	0.003	0.003	0.004***	0.013	-0.004
	(0.013)	(0.013)	(0.000)	(0.009)	(0.012)
Time since registration	0.171***	0.172***	0.148***	0.112**	0.018
	(0.062)	(0.062)	(0.001)	(0.048)	(0.032)
Time squared	-0.034***	-0.035***	-0.022***	-0.022**	-0.002
	(0.011)	(0.011)	(0.001)	(0.009)	(0.003)
Equitized SOE	0.016		0.044***	0.012	0.303***
	(0.022)		(0.001)	(0.017)	(0.074)
Plan to expand business	-0.001		-0.003***	-0.001	-0.041***
	(0.001)		(0.000)	(0.001)	(0.013)
Constant	0.237**	0.007	-0.052***	0.452**	0.272**
	(0.099)	(0.330)	(0.003)	(0.069)	(0.116)
Surevy Year 2011	-0.029	-0.032	0.071***	0.002	-0.012
	(0.043)	(0.044)	(0.002)	(0.026)	(0.044)
Survey Year 2012	0.014	0.020	0.111***	0.074**	0.035
	(0.037)	(0.037)	(0.004)	(0.030)	(0.036)
Province FE	Yes	Yes	No	No	No
Registraion Year FE	No	Yes	No	No	No
Ν	7,335	7,335	7,335	7,335	4,929
Clusters	63	63	63	63	0.007
RMSE	0.943	0.943	0.0281	0.681	0.966
Log likelihood	-9943.6	-993597.1	38725.5	-7589.4	6830.7
LR Test	4945.9***	4961.1***	102284.1***	9654.3***	11171.5***
BIC	19985.1	20058.9	-77343.3	15276.6	13755.0

Appendix Table 8b: Robustness of Main Results (Determinants of Bribery)

Note: These results test the robustness of Model 7 (Table 4) to changes in specification. Models 1 and 2 add provincial and year fixed effects, using OLS rather than NLS in the second stage. Model 4 & Model 5 use the alternative piecewise and truncated estimators suggested by Glynn (2010). Model 6 employs a three-stage estimation strategy, where *Restrict* is instrument by the lagged share of state owned enterprise (SOE) investment in the sector. First stages are shown in Model 5 of Appendix 6. Note that the number of observations (N) is smaller than Table 4, because SOE share data was not available for every four-digit sector represented in the PCI. The coefficient on restricted sector, FDI, and the interaction in the IV-2SLS model are re-scaled to address the fact that predicted probability emerging from the second stage is not dichotomous and ranges between 0 and 1. Because the dependent variable is an estimate, standard errors in the second stage of every model and third stage of the IV-2SLS are calculated through bootstrapping procedure with 1000 repetitions. Errors are clustered at the province level, which is the main interface for business registration. (FE: Fixed Effects; RMSE: Root Mean Squared Error; LR Test: Likelihood Ratio Test ; BIC: Bayesian Information Criterion). LR tests compare each new model to Model 1, where the null hypothesis is that the two models are not significantly different in the goodness of fit to the data.

Next, in Appendix 8b, we re-estimate our core analyses using multiple imputation. One of the basic assumptions required for implementing the Blaire and Imai method is that there is a finite set of respondent types based on the number of nonsensitive choices within the experiment (the independence of irrelevant alternatives assumption). 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. The factors behind these choices are likely to be correlated with other features of the respondents' backgrounds (Jensen et al. 2010). As a result, dropping these nonresponses could lead to bias. In our case, respondents' attempts to hide culpability will likely lead to an underestimation of the overall level of bribery.

To address the concern, we employ multiple imputation using the MI procedure in STATA, creating five datasets of imputed answers to activities engaged in during registration. 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. The imputed dataset, (both domestic and foreign) includes 62,590 observations for the question concerning corruption during registration and licensing. Models 1 through 4 replicate the main analysis with all firms from Table 4. Models 5 through 7 replicate the analysis of private firms from Table 5. Comparing the non-imputed in the shaded column (i.e. 1a) to the imputed results in the white column (i.e. 1b), it is clear that the primary coefficients of interest are slightly smaller but remain significant and in the same directions, giving us further confidence in our results.

Dependent variable: difference between		Private and Foreign Restrictions										
the activities reported by treatment group and predicted number of	<u>Diff-in-</u> means	<u>Diff-in-</u> <u>means</u>	<u>Optimism</u>	<u>Optimism</u>	Sector FE	Sector FE	<u>Diff-in-</u> means	<u>Diff-in-</u> <u>means</u>	<u>All</u> Connections	<u>All</u> Connections	<u>SOE</u> Connections	<u>SOE</u> Connections
nonsensitive activities of control group.	(1a)	(1b)	(2a)	(3b)	(4a)	(4b)	(5a)	(5b)	(6a)	(6b)	(7a)	(7b)
	Non-Imputed	Imputed	Non-Imputed	Imputed	Non-Imputed	Imputed	Non-Imputed	Imputed	Non-Imputed	Imputed	Non-Imputed	Imputed
Foreign enterprise			-0.005	0.024	0.038	0.048						
			(0.073)	(0.063)	(0.070)	(0.041)						
Restricted industry			-0.056	-0.031	-0.187**	-0.114**						
			(0.037)	(0.027)	(0.081)	(0.056)						
FDI*Restricted			0.267***	0.186***	0.238***	0.156**						
			(0.081)	(0.067)	(0.088)	(0.074)						
Capital Size at Establishment			0.006	0.007	0.010	0.011			-0.009	-0.016	-0.012	-0.012
			(0.012)	(0.010)	(0.014)	(0.007)			(0.060)	(0.049)	(0.062)	(0.063)
Time since registration			0.018	0.008	0.024	0.012			0.048	0.046	0.042	0.042
			(0.026)	(0.020)	(0.026)	(0.013)			(0.097)	(0.076)	(0.100)	(0.098)
Time squared			-0.002	-0.001	-0.002	-0.001			-0.005	-0.004	-0.004	-0.004
			(0.002)	(0.001)	(0.002)	(0.001)			(0.007)	(0.006)	(0.007)	(0.007)
Equitized SOE			0.187***	0.144***	0.226***	0.171***			-0.115	-0.046	-0.170	-0.170
			(0.061)	(0.049)	(0.068)	(0.051)			(0.296)	(0.273)	(0.284)	(0.305)
Plan to expand business			-0.036***	-0.028***	-0.035***	-0.028***			0.004	0.011	0.006	0.006
			(0.012)	(0.010)	(0.012)	(0.009)			(0.072)	(0.056)	(0.069)	(0.073)
Manager w/Political Connectiosn									-0.413**	-0.331**	-0.388**	-0.388**
									(0.172)	(0.145)	(0.184)	(0.197)
Labor Size at Establishment									0.139*	0.101	0.151**	0.151**
									(0.075)	(0.062)	(0.073)	(0.074)
Manager holds university degree									-0.518	-0.505	-0.474	-0.474
									(0.433)	(0.357)	(0.425)	(0.398)
Constant	0.194***	0.196***	0.250***	0.254***	0.240**	0.250**	0.060	0.090*	-0.154	0.066	-0.184	-0.056
	(0.031)	(0.023)	(0.110)	(0.087)	(0.109)	(0.050)	(0.063)	(0.048)	(0.443)	(0.277)	(0.146)	(0.358)
Surevy Year 2011			-0.047	-0.048	-0.062	-0.062***			0.103	0.039	0.107	0.107
-			(0.047)	(0.039)	(0.050)	(0.023)			(0.195)	(0.146)	(0.199)	(0.195)
Survey Year 2012			0.005	-0.008	-0.011	-0.023			-0.036	-0.050	-0.028	-0.028
-			(0.043)	(0.038)	(0.043)	(0.023)			(0.175)	(0.131)	(0.174)	(0.172)
N	9,449	12,518	7,335	9,371	7,335	9,371	273	349	209	266	209	209
Provincial Clusters	63	63	63	63	63	63	63	63	63	63	63	63
R2	0.000	0.000	0.006	0.004	0.025	0.021	0.000	-0.000	0.060	0.047	0.056	0.056
RMSE	0.984	0.867	0.960	0.853	0.956	0.853	1.008	0.900	1.030	0.915	1.032	1.032
Log likelihood	-13257	-15974	-10105	-11802	-10034	-11760	-389.0	-457.9	-297.1	-348.3	-297.4	-297.4
Imputed Datasets		5		5		5		5		5		5

Appendix Table 8b: Robustness of Results to Multiple Imputation

Note: These results replicate the difference-in-means estimator and core models using data generated by Multiple Imputation with 5 datasets (using STATA's MI function). Because the dependent variable is an estimate, standard errors in the second stage of every model and third stage of the IV-2SLS are calculated through bootstrapping procedure with 1000 repetitions (*** p<0.01, ** p<0.05, * p<0.1). Errors are clustered at the province level, which is the main interface for business registration. FDI = foreign direct investment; FE = fixed effect.