Money Talks:

Foreign Investment and Bribery in Vietnam, a Survey Experiment

Online Appendix

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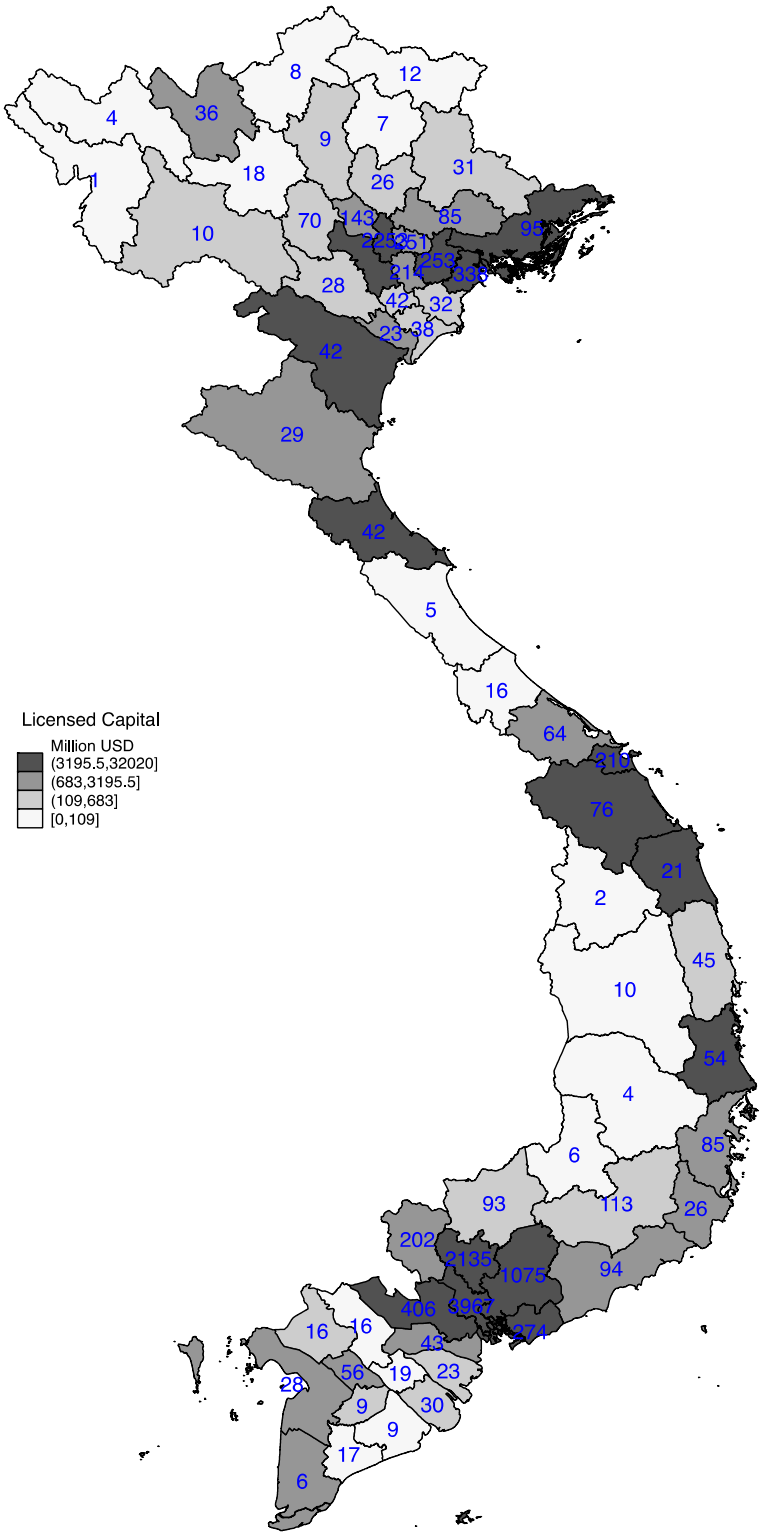
Appendix 1: Foreign Investment in Vietnam (Capital & Projects 1988-2012)



Appendix 2: Group A Sectors Allowing Investment but Requiring Special Licensing Procedures

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	RA	RA	RA	RA	RA
Mining of metal ores	RA	RA	RA	RA	RA
Mining and quarrying clay, stone	RA	RA	RA	RA	RA
Manufacture of sugar and alcohol	R	R	R	R	R
Manufacture of tobacco	R	R	R	R	R
Publishing and Journalism	RA	RA	RA	RA	RA
Manufacture of chemicals	R	R	R	R	OPEN
Manufacture of pharmaceuticals	R	R	R	R	R
Manufacture of cement	R	R	OPEN	OPEN	OPEN
Manufacture of refined petroleum	R	R	R	R	R
Production of electricity	R	R	R	R	R
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
Tourism	R	R	R	R	OPEN
Financial intermediation (banks)	R	R	R	R	R
Insurance and pension funding	R	R	R	OPEN	OPEN
Auxiliary financial activities	R	R	R	OPEN	OPEN
Real Estate	RA	RA	RA	RA	RA
Research and development	R	R	R	OPEN	OPEN
Legal, accounting, and auditing	R	R	R	R	R
Public security and defense	RA	RA	RA	RA	RA
Higher Education	RA	RA	RA	RA	RA
Health services	R	R	R	R	OPEN
Sewage and refuse disposal	R	R	R	R	R
Motion picture, TV, entertainment	R	R	R	R	R

R=Restricted to Foreign Investors, RA= Restricted to all Investors, OPEN= Open to all Investors

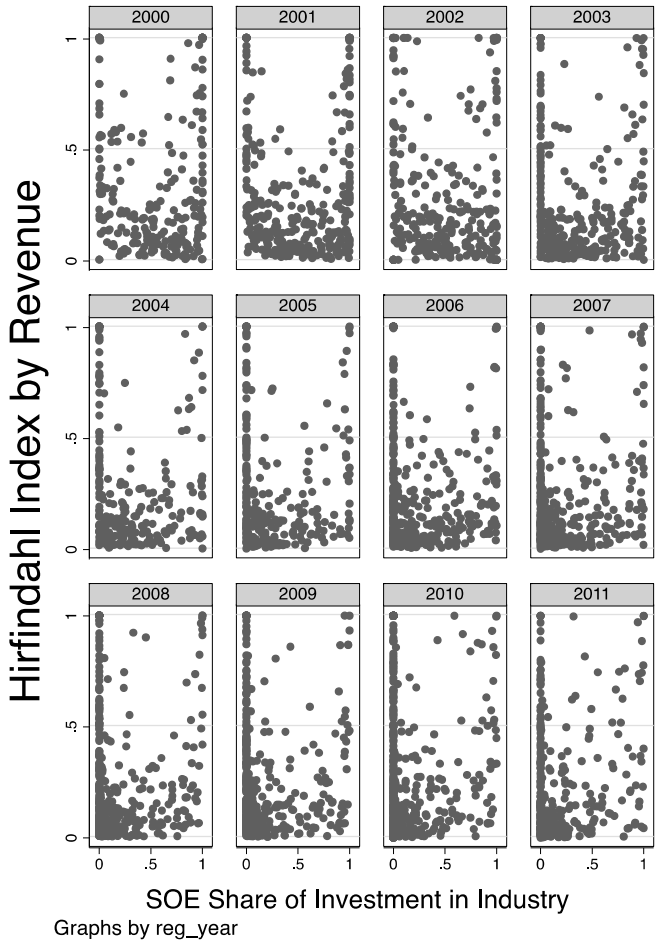
USBTA = United States Bilateral Trade Agreement

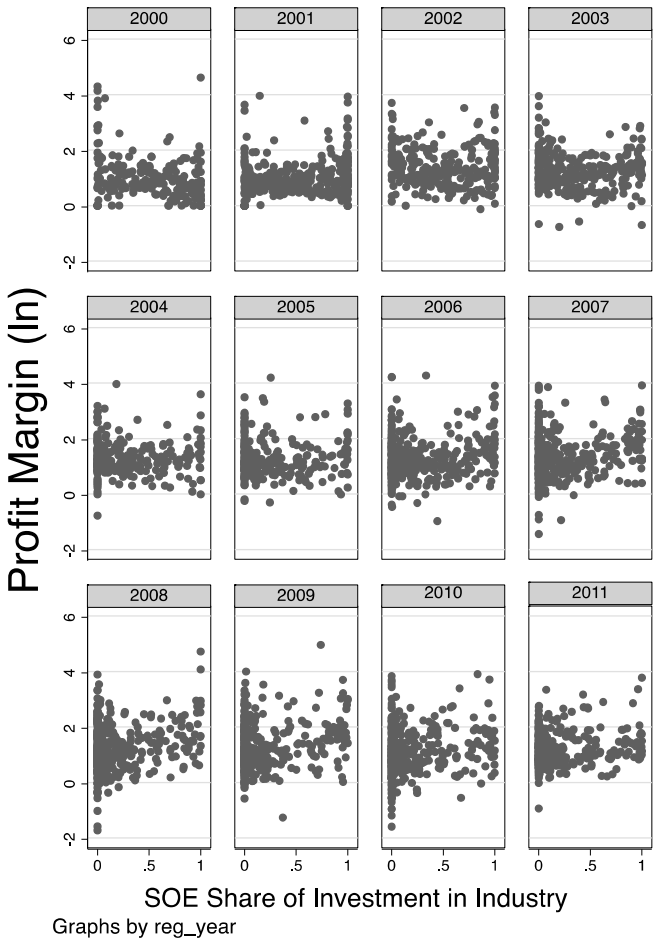
ISIC = International Standard Industrial Classification

WTO = World Trade Organization

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

Appendix 3: Correlation between SOE Investment and Rents





Appendix 4: Characteristics of Provincial Competitiveness Index Sample and Census Data in 2010

Foreign invested (3,888)			Domestic enterprises (19,363)		
Legal form of investment	**Weighted PCI**	**GSO**	**Legal form of investment**	**Weighted PCI**	**Tax**
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**	**GSO**	**Size of labor force**	**Weighted PCI**	**GSO**
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**	**GSO**	**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 weighted sample of domestic and foreign firms from the PCI to the data collected from the National Tax Authority (Tax) and 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 (GSO) Data 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 5a: Balance Test for Domestic Operations

(N = 19,363)						
	Mean		Std. Deviation			
	Treated	Control	Treated	Control	p-value	T-stat
Sector						
(Services=1, Manf & other=0)	0.606	0.599	0.489	0.490	0.269	1.105
Province Attributes						
GDP	55098	56327	94847	95871	0.371	-0.895
Population (10,000)	1726.2	1726.9	1697.4	1709.8	0.978	-0.027
Paved Roads (%)	0.629	0.631	0.234	0.232	0.592	-0.536
Telephones Per Capita (%)	0.230	0.230	0.076	0.076	0.666	-0.432
Firms with Email Address	0.349	0.353	0.127	0.129	0.073	-1.790
Industrial Zone*	0.074	0.072	0.262	0.259	0.677	0.417
Region [nominal]	3.800	3.815	2.195	2.196	0.652	-0.452
National Level City*	0.167	0.168	0.373	0.373	0.982	-0.022
Distance to Hanoi/HCMC (km)	238.9	236.1	230.0	229.6	0.391	0.858
Firm Attributes						
Year Registered	2007	2007	2.851	2.833	0.482	-0.703
Time to Register (days)	15	15	16	16	0.915	0.106
Employment [1-8]	2.267	2.254	1.025	1.048	0.442	0.768
Equity [1-8]	2.522	2.520	1.143	1.129	0.906	0.118
Joint Stock*	0.129	0.129	0.336	0.335	0.890	0.138
Limited Liability Company*	0.429	0.440	0.495	0.496	0.112	-1.591
Private Enterprise*	0.269	0.261	0.443	0.439	0.254	1.141
Former SOE*	0.034	0.036	0.181	0.186	0.440	-0.773
Land Rights*	0.560	0.553	0.496	0.497	0.330	0.974
Business Burden						
Bribe Size [1-8]	6.253	6.233	1.609	1.643	0.473	0.717
Bribe Perception [1-4]	2.496	2.502	0.704	0.707	0.617	-0.500
Bureaucracy Time Burden [1-6]	4.832	4.827	1.243	1.262	0.823	0.223
Tax Negotiation Perception [1-4]	2.593	2.612	0.765	0.761	0.133	-1.503
Document Burden*	0.148	0.149	0.355	0.356	0.892	-0.136
Political Connection*	0.243	0.256	0.462	0.459	0.055	-1.921
Former Household Business*	0.469	0.482	0.499	0.500	0.082	-1.740
Annual Inspections [count]	1.732	1.711	2.128	4.069	0.690	0.399
Performance [y-on-y]	3.553	3.547	0.945	0.942	0.635	0.475
Governance						
Weighted PCI [0-100]	58.236	58.336	4.522	4.466	0.120	-1.553
Service Provision [1-5]	3.617	3.593	0.926	0.929	0.149	1.445
Proactiveness [0-10]	4.812	4.829	1.403	1.410	0.421	-0.805
Transparency [0-10]	5.823	5.840	0.676	0.644	0.070	-1.812

*binary variable

Appendix 5b: Balance Test for Foreign Invested Enterprises

(N = 3,888)						
	Mean		Std. Deviation			
	Treated	Control	Treated	Control	p-value	T-stat
Sectors						
(Services=1, Manf & other=0)	0.243	0.255	0.429	0.436	0.395	-0.851
Province Attributes						
GDP	112320	111594	121737	125454	0.859	0.178
Population (10,000)	2789.5	2798.3	2357.2	2386.5	0.911	-0.112
Paved Roads (%)	0.774	0.763	0.172	0.176	0.074	1.787
Telephones Per Capita (%)	0.276	0.274	0.081	0.080	0.588	0.541
Industrial Zone*	0.523	0.499	0.500	0.500	0.170	1.372
Region [nominal]	3.843	3.868	2.368	2.358	0.748	-0.321
National Level City*	0.360	0.364	0.480	0.481	0.822	-0.225
Distance to Hanoi/HCMC (km)	80.5	86.2	164.8	166.9	0.295	-1.046
Firm Attributes						
Year Registered	2006	2006	2.715	2.651	0.125	1.537
Time to Register (days)	46	59	81	226	0.089	-1.701
Employment [1-8]	3.606	3.592	1.605	1.654	0.805	0.247
Equity [1-8]	4.635	4.602	1.728	1.811	0.629	0.484
Joint Venture*	0.076	0.080	0.264	0.271	0.649	-0.455
Fully Owned*	0.840	0.853	0.367	0.354	0.269	-1.105
Land Rights*	2.252	2.260	0.508	0.521	0.639	-0.469
Business Burden						
Bribe Size [1-8]	6.640	6.701	1.311	1.230	0.221	-1.225
Bureaucracy Time Burden [1-6]	4.791	4.795	1.214	1.188	0.942	-0.073
Document Burden*	0.232	0.326	0.422	0.469	0.000	-5.548
Annual Inspections	2.190	2.479	2.973	2.731	0.005	-2.800
Performance (y-on-y)	-58.825	-44.557	63.924	57.132	0.000	-5.305
Governance						
Weighted PCI [0-100]	60.181	59.941	4.146	4.207	0.083	1.735
Service Provision [1-5]	3.351	3.526	1.120	0.963	0.000	-4.286
Proactiveness [0-10]	4.737	4.803	1.455	1.474	0.176	-1.354
Transparency [0-10]	6.110	6.100	0.535	0.538	0.585	0.546

*binary variable

Appendix 5c: Balance Test using Multiple Regression

	Firm Attributes		Province Attributes		Previous Governance	
Dependent Variable=Treatment	**Domestic**	**Foreign**	**Domestic**	**Foreign**	**Domestic**	**Foreign**
	(1)	(2)	(4)	(5)	(6)	(7)
Employment [1-8]	-0.007	0.005	-0.007	0.005	-0.007	0.006
	(0.225)	(0.337)	(0.213)	(0.307)	(0.224)	(0.301)
Equity [1-8]	0.002	-0.006	0.002	-0.007	0.002	-0.007
	(0.607)	(0.345)	(0.670)	(0.301)	(0.677)	(0.295)
Services=1, Manf & other=0	-0.010	0.039*	-0.010	0.038	-0.009	0.038
	(0.318)	(0.055)	(0.344)	(0.105)	(0.366)	(0.111)
Industrial Zone (0,1)	0.010	-0.027	0.009	-0.030	0.008	-0.029
	(0.545)	(0.175)	(0.560)	(0.176)	(0.633)	(0.196)
Sole Proprietorship	0.001		0.001		0.002	
	(0.943)		(0.954)		(0.874)	
Limited Liability Co.	0.016*		0.017		0.017*	
	(0.097)		(0.103)		(0.090)	
Fully Owned FIE		-0.028		-0.021		-0.023
		(0.408)		(0.550)		(0.537)
Firm Age	-0.001	0.005	-0.001	0.007	-0.001	0.006
	(0.648)	(0.120)	(0.666)	(0.152)	(0.681)	(0.158)
Distance to Hanoi/HCMC			-0.000*	0.000	-0.000**	0.000
			(0.054)	(0.337)	(0.039)	(0.291)
Region (nominal)			-0.000	-0.005	-0.002	-0.003
			(0.862)	(0.418)	(0.455)	(0.729)
National Level City (0,1)			-0.007	0.002	-0.007	-0.012
			(0.627)	(0.978)	(0.624)	(0.863)
Paved Roads (%)			0.005	-0.190**	-0.006	-0.186**
			(0.770)	(0.037)	(0.751)	(0.041)
Telephones Per Capita (%)			-0.032	0.160	-0.064	0.239
			(0.690)	(0.692)	(0.440)	(0.588)
GDP			0.000	-0.000	0.000	-0.000
			(0.776)	(0.682)	(0.868)	(0.758)
Previous Econ Governance (PCI)					0.003**	-0.003
					(0.019)	(0.537)
Previous Informal Charges					-0.008	0.005
					(0.342)	(0.801)
Survey Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13,997	2,137	13,930	2,137	13,930	2,137
Pseudo R-Squared	0.000458	0.0400	0.000680	0.0429	0.000963	0.0431
Log Likelihood	-9689	-1414	-9641	-1410	-9638	-1410

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 6: Correlates of Private Sector Entry into Restricted Sectors

Dependent Variable: Firm is in restricted sector= 1	**Correlates**	**Connections**
	(1)	(2)
Capital Size at Establishment	0.012***	0.012***
	(0.003)	(0.003)
Labor Size at Establishment	0.037***	0.038***
	(0.004)	(0.004)
Manager has university degree	0.017***	0.012*
	(0.006)	(0.007)
Manager has MBA	0.028	0.023
	(0.024)	(0.024)
Political Connections	0.035***	
	(0.009)	
Government Connections		0.069***
		(0.019)
Military Connections		0.050***
		(0.018)
SOE Connections		0.025***
		(0.009)
Observations	17,274	17,274
Provincial Clusters	63	63
X-bar	-0.890	-0.890
Psuedo R-Squared	0.0190	0.0195
Log-Likelihood	-8268	-8263

Note: Estimates derives from a probit model estimating the likelihood of investing into Special Group A restricted sector. Model 1 includes firm characteristics as well as managerial background such education and variable that captures any political connection. Model 2 disaggregates the political connections variable into: government, military, or state owned enterprise connections. Marginal probabilities with robust standard errors, clustered at province level, in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Appendix 7a: 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 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 Appendix 7b, 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 5). Moreover, the size of the coefficients on restrictions and the R^2 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.

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

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 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.

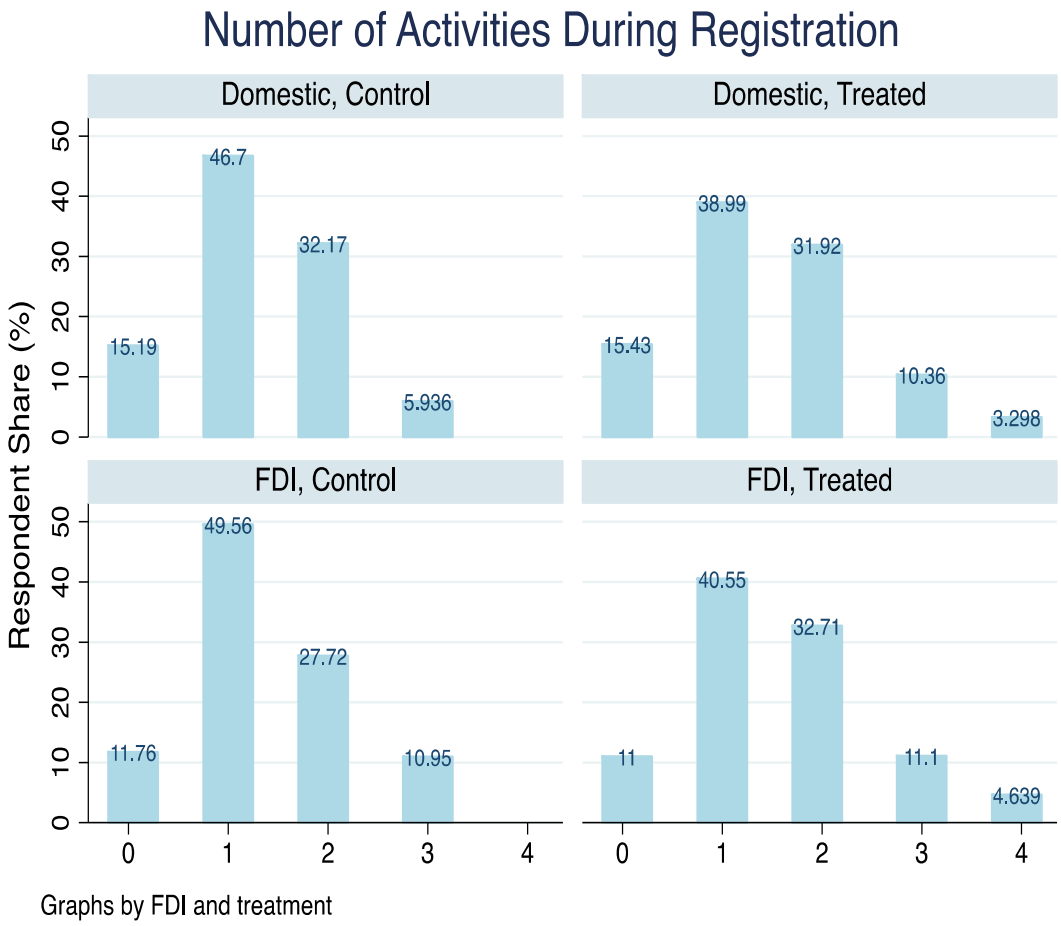
Appendix 7b: Relationship between Restrictions and Monopoly Rents

(Multiple and Two-Stage Regression)

Dependent variables/ independent variables	**HHI**		**Profit Margin (ln)**		**First stages**
	(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 predicted probability emerging from the second stage is not dichotomous and ranges between 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 8: Floor and Ceiling Effects in List Question



Appendix 9: 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 A9a and A9b. Beginning with Table A9a, 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 2.

Model 3 applies the piecewise estimator suggested by Glynn (2013). 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 (2013). 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 (2013) 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 remains sizable and significant.

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 Appendix 7 but using 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 7b 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 2. 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.

Finally, we address the possibility that our results are driven by high profit margins in the restricted sectors, and not the restrictions themselves. While this possibility is consistent with our results it is theoretically inconsistent with our claim that protection through investment restrictions encourages bribes from investors seeking to gain access. Our challenge is that our theory argues, and our empirics corroborate, that restricted sectors have high profit margins, precisely because they are protected from competition. In order to assess the confounding relationship between profits and restrictions we employ a three-stage model in which we profitability (measured as the natural log of profit margin at the four-digit ISIC level) using only Group A restrictions, registration year fixed effects, and survey fixed effects in the first stage to account for trending and potential year-specific economic shocks. We then feed these predictions, and their residuals, in the second and third stages of the estimation, substituting both of these variables for our measure of restrictions in the fully-specified model. If we are correct in arguing that restrictions, not profits per se, are driving bribe offers, then we should observe an effect when substituting with predicted estimates of profitability, but not when substituting with residuals. We perform this analysis by replicating Model 7 from Table 2 in the final two models in Table A9a, but with predicted profits substituting for actual profits in Model 6 and residual profits substituting in Model 7.

The results show that, indeed, predicted values of restrictions produce a positive and significant coefficient on the interactions term. Replicating the same model using residuals from the first stage produces a much smaller and

negative coefficient. These results provide strong evidence that firms offer bribes, not simply because they seek to enter high profit margin sectors, but because they expect those profits margins to remain high due to institutional restrictions on further investment.

Appendix Table A9a: Robustness of Main Results (Determinants of Bribery)

Dependent variable: difference between the activities reported by treatment group and predicted number of nonsensitive activities of control group.	**Province FE**	**Year FE**	**Glynn Piecewise**	**Truncated**	**IV-2SLS**	**Predicted Profits**	**Residual Profits**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Foreign enterprise	0.011	0.013	-0.053***	0.007	-0.286	-0.265	0.203*
	(0.092)	(0.092)	(0.005)	(0.057)	(0.225)	(0.182)	(0.117)
Restricted industry	-0.039	-0.040	-0.064***	-0.021	-0.014		
	(0.036)	(0.035)	(0.001)	(0.026)	(0.032)		
Foreign*Restricted	0.270***	0.277***	0.162***	0.142**	0.129*		
	(0.090)	(0.090)	(0.005)	(0.062)	(0.069)		
Profit Margin (ln)						-0.079	0.006
						(0.066)	(0.046)
FDI*Profit Margin (ln)						0.272*	-0.424**
						(0.159)	(0.168)
Capital Size at Establishment	0.007	0.007	0.006***	0.015	-0.000	0.015	-0.024
	(0.013)	(0.013)	(0.000)	(0.009)	(0.013)	(0.011)	(0.017)
CEO is former SOE Manager	0.125***	0.122***	0.076***	0.087***	0.022	0.023	0.043
	(0.032)	(0.031)	(0.001)	(0.025)	(0.033)	(0.018)	(0.034)
Plan to expand business	-0.032***	-0.033***	-0.021***	-0.022**	-0.002	-0.002	-0.003
	(0.011)	(0.011)	(0.001)	(0.009)	(0.003)	(0.001)	(0.003)
Time since registration	0.016		0.044***	0.012	0.109***	0.131***	0.139***
	(0.022)		(0.001)	(0.016)	(0.041)	(0.033)	(0.053)
Time squared	-0.001		-0.003***	-0.001	-0.041***	-0.038***	-0.032*
	(0.001)		(0.000)	(0.001)	(0.013)	(0.014)	(0.019)
Constant	0.189*	-0.045	-0.074***	0.418***	0.245***	0.238**	0.186***
	(0.101)	(0.308)	(0.004)	(0.070)	(0.123)	(0.085)	(0.010)
Survey Year 2011	-0.014	-0.017	0.078***	0.012	-0.003	-0.026	-0.020
	(0.045)	(0.043)	(0.002)	(0.027)	(0.046)	(0.032)	(0.044)
Survey Year 2012	0.034	0.038	0.120***	0.088***	0.048	0.026	0.016
	(0.039)	(0.040)	(0.004)	(0.032)	(0.041)	(0.043)	(0.049)
Province FE	Yes	Yes	No	No	No	No	No
Registration Year FE	No	Yes	No	No	No	No	No
Observations	7,335	7,335	17,996	7,335	4,929	6,777	2,761
Provincial Clusters	63	63	63	63	63	63	63
RMSE	0.941	0.941	0.0304	0.680	0.967	0.956	0.950
Log likelihood	-9925	-9918	37342	-7575	-6824	-9309	-3772
LR Test	6663.2***	6676.8***	101198***	11363***	128656***	6342.6***	8199.7***
BIC	19948.3	20023.7	-74576.7	15248.1	13741.2	20268.9	18410.6

Note: These results test the robustness of Model 7 (Table 2) to changes in specification. Models 1 and 2 add provincial and year fixed effects, using OLS rather than NLS in the second stage. Models 3 and 4 use alternative piecewise and truncated estimators suggested by Glynn (2010). Model 5 employs a three-stage estimation strategy, where Restrict is instrument by the lagged share of state owned enterprise (SOE) investment in the sector. 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. First stages are shown in Model 5 of Appendix 7b. Note that the number of observations (N) is smaller than Table 2, because SOE share data was not available for every four-digit sector represented in the PCI. Models 6 and 7 account for the possibility that profits, not restrictions, are driving our results by employing a three-stage model in which profits are predicted using restrictions and year fixed effects, these predicted values and residuals are then fed back into stages 2 and 3 to estimate bribe propensity. Model 6 presents the estimates of the predicted values from stage 1 and Model 7 presents the estimates from the residuals from stage 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 for Models 1 to 5 and four digit sector level for Models 6 and 7. (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.

N

Next, in Appendix A9b, we re-estimate our core analyses using multiple imputation. One of the basic assumptions required for implementing the Blaire and Imai (2012) 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 1a through 9b (numbered to correspond with Table 2) replicate the main analysis with all firms from Table 2.

Appendix Table 9b: Robustness of Results to Multiple Imputation

Dependent variable: difference between the activities reported by treatment group and predicted number of nonsensitive activities of control group.	**Diff-in-means**		**Optimism**		**Sector FE**		**Restrictions Dom. & For. Firms**	
	(1a)	(1b)	(7a)	(7b)	(8a)	(8b)	(9a)	(9b)
	Non-Imputed	*Imputed*	*Non-Imputed*	*Imputed*	*Non-Imputed*	*Imputed*	*Non-Imputed*	*Imputed*
Foreign enterprise			0.006	0.008	0.047	0.046	0.028	-0.021
			(0.075)	(0.071)	(0.071)	(0.053)	(0.070)	(0.072)
Restricted			-0.052	-0.030	-0.171**	-0.110	-0.075	-0.073
			(0.041)	(0.040)	(0.078)	(0.069)	(0.063)	(0.063)
Foreign*Restricted			0.263***	0.236***	0.234**	0.218**	0.568***	0.553***
			(0.060)	(0.078)	(0.089)	(0.099)	(0.151)	(0.133)
Capital Size at Establishment			0.010	0.010	0.015	0.016*	0.009	0.011
			(0.012)	(0.011)	(0.013)	(0.009)	(0.013)	(0.012)
Time since registration			0.019	0.003	0.025	0.008	0.017	0.010
			(0.017)	(0.025)	(0.026)	(0.018)	(0.025)	(0.025)
Time squared			-0.002*	-0.001	-0.002	-0.001	-0.002	-0.001
			(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
CEO is former SOE Manager			0.134***	0.101***	0.135***	0.104***	0.131***	0.091**
			(0.034)	(0.036)	(0.035)	(0.036)	(0.035)	(0.035)
Plan to expand business			-0.034**	-0.033***	-0.033***	-0.032***	-0.033***	-0.029**
			(0.015)	(0.012)	(0.012)	(0.011)	(0.011)	(0.012)
Constant	0.194***	0.199***	0.196***	0.276**	0.184*	0.257***	0.190**	0.304***
	(0.030)	(0.028)	(0 .070)	(0.106)	(0.107)	(0.074)	(0.105)	(0.109)
Survey Year 2011			-0.030	-0.072	-0.043	-0.083**	-0.024	-0.115**
			(0.030)	(0.049)	(0.050)	(0.034)	(0.046)	(0.049)
Survey Year 2012			0.027	-0.030	0.012	-0.042	0.030	-0.072
			(0.030)	(0.048)	(0.043)	(0.036)	(0.045)	(0.044)
Observations	9,449	10,905	7,335	8,791	7,335	8,791	7,349	7,349
Provincial Clusters	63	63	63	63			63	63
RMSE	0.984	0.984	0.958		0.954		0.958	
Log likelihood	-13257	-13256.8	-10088		-10016		-10108	
Imputed Datasets		5		5		5		5

Note: These results replicate the difference-in-means estimator and core models in Tables 2 using data generated by Multiple Imputation with 5 datasets (using STATA's MI function). Models 1a through 8b include focus on restrictions for foriegn investment only. Models 9a and 9b limit restrictions to sectors closed to both foreign and domestic investors. (*** 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.

Appendix 10: Political Connections and Bribery

To examine the respective contributions of capacity and political connections, we limit our analysis to just domestic firms, comparing those with and without connections to local and national leaders.

In addition to whether the firm is an SOE, we include a new measure of political connections, which takes the value of 1 if the current manager of the operation is a former government official, army officer, and SOE director or manager (Model 2). We interact this variable with the blanket version of the restrictions variable that applies to domestic firms as well as foreign in order to capture the differential effect of having political connections depending on whether or not a sector is restricted. Next, we introduce additional measures of size and technical capacity, including the number of employees at establishment, and whether the manager holds a university or MBA degree (Model 3). In Models 4 through 6, we disaggregate connections into each of the components in order to identify which type of relationship is generating the results. If our theory about politically motivated bribe waivers is correct, then we should observe a negative relationship between political connections and bribe propensity only in restricted sectors.

We find that connected firms are about 11 percentage points more likely to pay bribes for entry than other domestic firms entering unrestricted sectors. In contrast, connected firms entering restricted sectors are on average 49 percentage points less likely to bribe than their unconnected peers! The disaggregation, however, shows that this behavior is entirely driven by the subset of firms that are run by former SOE directors and managers.

Such relationships are exclusive to select domestic firms, further increasing the liability of foreignness and helping to explain why FIEs are feel obligated bribe with such high frequency in these special sectors.

Appendix 10: Political Connections and Corruption

Dependent variable: difference between the activities reported by treatment group and predicted number of nonsensitive activities of control group.	**Diff-in-means**	**All Connections**	**w/Additional Controls**	**w/Gov't Connections**	**w/Military Connections**	**w/SOE Connections**
	(1)	(2)	(3)	(4)	(5)	(6)
Manager w/Political Connections		0.106***	0.117***	-0.121	-0.046	0.148***
		(0.033)	(0.032)	(0.086)	(0.070)	(0.035)
Restricted (Foreign and Domestic)		0.006	0.032	-0.079	-0.077	0.009
		(0.073)	(0.073)	(0.066)	(0.064)	(0.067)
Restricted*Connections		-0.446***	-0.495***	-0.113	-0.436	-0.787***
		(0.164)	(0.165)	(0.373)	(0.588)	(0.172)
Capital Size at Establishment		0.015	0.012	0.010	0.011	0.015
		(0.016)	(0.016)	(0.016)	(0.015)	(0.015)
Time since registration		0.030	0.030	0.030	0.031	0.028
		(0.023)	(0.024)	(0.024)	(0.025)	(0.024)
Time squared		-0.002	-0.002	-0.002	-0.002	-0.002
		(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Plan to expand business			-0.047***	-0.049***	-0.050***	-0.046***
			(0.015)	(0.015)	(0.016)	(0.016)
Labor Size at Establishment			-0.017	-0.016	-0.016	-0.010
			(0.017)	(0.017)	(0.017)	(0.017)
Manager holds university degree			0.212*	0.210*	0.199	0.190
			(0.123)	(0.126)	(0.125)	(0.126)
Constant	0.189***	0.049578	0.162177	0.2257645	0.2234607	0.1251546
	(0.036)	.0701904	.1040411	.1105009	.1131747	.1114225
Survey Year 2011		-0.029	-0.000	-0.027	-0.029	0.003
		(0.045)	(0.050)	(0.048)	(0.050)	(0.052)
Survey Year 2012		0.009	0.063	0.029	0.028	0.086*
		(0.042)	(0.044)	(0.045)	(0.045)	(0.047)
Observations	7,724	6,208	6,013	6,013	6,013	6,013
Provincial Clusters	63	63	63	63	63	63
Share of Firms with Connection	NA	24.0%	24.0%	2.8%	3.8%	18.2%
RMSE	0.985	0.963	0.952	0.957	0.957	0.953
Log likelihood	-10843	-8569	-8232	-8263	-8264	-8239
LR Test	NA	4547.2***	5221.6***	5160.6***	5158.7***	5208.4***
BIC	21695.0	17217.2	16563.5	16621.1	16622.7	16582.1

Note: This table is limited to only private, domestic firms. 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. Because the dependent variable is an estimate, standard errors are calculated are through bootstrapping procedure with 1000 repetitions. Errors are clustered at the province level, which is the main interface for business registration. Model 1 provides the difference in means, Model 2 introduces political connections, Model 3 controls for other firm-level characteristics, Models 4 through 6 disaggregate by the specific political connection of the current manager (government, military, state owned enterprise). (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. (*** p<0.01, ** p<0.05, * p<0.1)

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