



# Ownership, Enforcement, and the Effects of Business Environment

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## ABSTRACT

We investigate how the effects of the business environment depend on whether the measure is *de jure* or *de facto*, and how the business environment effects differ by ownership. Four aspects of the business environment are found to be relatively robust by multiple data sources: access to finance, electricity, internet, and human capital. The effects of *de jure* business environment indicators on firm performances depend on measures of contract enforcement. Foreign-owned firms benefit more from the maintenance of physical safety and ease in obtaining construction permits, and gain competitive advantage in productivity when domestic infrastructure or access to finance is worse.

## 1. Introduction

A sound business environment (BE) is increasingly<sup>1</sup> recognized as a key driver for economic development (Stern 2002; World Bank 2005; Xu 2011). Governments, international organizations and think tanks have invested heavily in collecting data and finding ways to measure critical elements of the BE. The World Bank has implemented the *Doing Business (DB)* surveys, an annual survey at the country level, and the *Enterprise Survey (ES)*, which cover around 130 countries at the firm level. The world economic forum (WEF) has its own *Global Competitiveness Indices (GC)*, based on the Executive Opinion Survey conducted by WEF in around 140 countries, in cooperation with its partner institutes in each country (and drawing on other external data sources). These three sources of data have been used in various capacity in the literature on the effects of the business environment on firm performance and other development outcomes.

The business environment literature based on *Enterprise Survey* data is relatively large (Dollar et al., 2005, 2006; Hallward-Dreimeier et al.,

2006; Cai, Fang, and Xu 2011, Xu 2011; Clarke et al., 2015; Reyes et al., 2017; Knack and Xu 2017). This literature has shown that firm performance depends critically on some basic elements in the business environment, such as limiting government expropriation, the provision of basic and modern infrastructure, access to finance, and agglomeration of sufficiently sized firms together. The literature based on the *Doing Business* data tends to examine specific elements of the business environment one at a time, or to include the aggregate DB index (Botero et al., 2004; Djankov et al., 2002, 2003; Djankov et al., 2007, and Pham 2010). There are relatively few studies based on Global Competitiveness indicators in the business environment literature, suggesting a research opportunity to exploit to yield further insights.

Each data source has its own merits and weaknesses. The *Enterprise Survey* indicators—often measured as the average of firms' responses in a locality (Xu 2011)—are collected every 4–5 years in a particular country and tend to capture more local variations and *de facto* (i.e., the actual) business environment. However, they could be correlated with other local omitted variables. The *Doing Business* indicators use a similar methodology for firms of comparable size, and are available on an annual basis. But they are largely *de jure* (i.e., based on official rules and regulations on the books) and do not capture differences in enforcement, which have been shown to vary widely across countries (Hallward-Dreimeier and Pritchett 2015), or within a country (Cai, Fang, and Xu 2011; Goldstein and Udry 2008). The *Global Competitiveness* indicators are comprehensive and rely on data from many important sources, and tend to be *de facto* measures, but the methodologies underlying their in-

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dicators are not uniform, and their sample of firms is not representative of a country's universe of firms.

Given the pros and cons of each data source, how robust are the business environment effects and what additional insights can be gained from using all three instead of only one? Are related indicators from different sources closely correlated? How can we explain why and how the estimated effects of the same business environment theme on firm performance differ for specific indicators, depending on whether those indicators are from *de facto* and *de jure* sources? Do performances of firms with different bargaining power (such as domestic vs foreign firms) depend on the business environment differently? While important, these questions have not been addressed by the existing literature. They are the focus of this paper.

This paper makes three contributions to the literature.

First, given that each series of the business environment measures has its own measurement errors, using all three data sources serves as robustness and soundness checks. We find that they offer independent sources of variations in explaining firm performance. The *Enterprise Survey* indicators seem to explain the largest share of variations in firm performances. Their qualitative results on the performance-BE relationship tend to be the most expected. For instance, they suggest that corruption depresses firm growth, while physical safety access to finance and ease in access to land enhance firm performance. These results, however, are either insignificant or have the opposite signs, when examined with the other two data sources.

Second, we offer novel evidence of the importance of contract enforcement in understanding the effects of *de jure* business environment indicators. Contract enforcement is a key element of (modern) state capacity of the government, enabling the government to support the basic functions of markets, and facilitate economic agents to specialize and therefore unleash the fundamental sources of growth (Besley and Persson 2009, 2010). Our analysis suggests that the *de jure Doing Business* indicators are more effective in improving firm performance in countries with better contract enforcement. In particular, in countries with better contract enforcement, *Doing Business* Get Electricity has more positive association with firm growth, and *Doing Business* Construction Permit has more positive association with productivity.

Third, we find substantially different effects of the business environment on firm performance by firm ownership. While domestic and foreign firms do not differ much in their sensitivity of firm *growth* to the business environment, they differ significantly in their sensitivity of firm *productivity*. Foreign-owned firms, i.e., firms with positive foreign owner share, benefit more in their productivity performance from the maintenance of physical safety and from the ease in obtaining construction permits, and gain a competitive advantage in productivity with respect to local firms when domestic infrastructure or access to finance is worse. Foreign firms are more able to withstand a weaker business environment in general, but need more help in day-to-day interactions with the government.

The main contributions of this paper are three. First, by using multiple sources of indicators of the business environment from three popular data sets, we are able to ascertain the robustness and the importance of various aspects of the business environment. Second, we offer novel evidence for the importance of contract enforcement in understanding the effects of *de jure* indicators of the business environment. Third, we offer evidence that the effects of the business environment differ greatly for domestic private and foreign firms, with the latter being better able to withstand a worse business environment in general, but need more help in day-to-day interactions with the government.

The rest of this paper is organized as follows. Section 2 describes our hypotheses. Section 3 discusses the data and measurements. Section 4 presents basic results of the effect of various aspects of the business environment on firm performance, and how these effects interact with contract enforcement. Section 5 investigates ownership-specific business environment effects. Section 6 concludes.

## 2. Hypotheses

As mentioned earlier, this analysis relies three groups of BE indicators to gauge their effects on firm performance. How should the three groups of BE indicators be associated with firm performance differently? Does it matter whether the indicators are *de jure* or *de facto*?

The DB indicators are *de jure* measures, and are designed to reflect what a typical small or medium-sized firm (by international standards) would do based on the official laws and regulations. The actual BE that a firm faces could differ systematically from what is implied by the DB measures based on varying enforcement by various branches and/or agents of the government, or by the same government officials with respect to different firms. The enforcement could reflect whether the firm is well connected to the government, and/or whether the firm has sufficient resources to "smooth things over." Indeed, Chinese firms are able to reduce their effective tax burdens and obtain better government services when they spend more money entertaining government officials (Cai, Fang, and Xu 2011). The reported enforcement of various government regulations such as the number of days to obtain various permits differs greatly among firms in the same country, according to the Enterprise Survey, and a significant share of firms in countries tend to enjoy much better government services than what is warranted under *de jure* regulations and laws (Hallward-Driemeier and Pritchett 2015). Thus, since enforcement is better controlled for in the case of *de facto* BE indicators, the *de facto* indicator of the same theme of the BE (say, access to finance) should have stronger predictive power for firm performance than *de jure* indicators.

Furthermore, the effects of the *de jure* DB indicators on firm performance likely depend on contract enforcement. DB indicators reflect what the laws say about proper procedures and implied costs. A good BE aspect on paper (as reflected in *Doing Business*), without strong enforcement, would not translate into real benefits to firms in terms of performance. Indeed, the recent literature on state capacity emphasizes that the same rules and regulations have vastly different effects depending on state capacity, including the key element of contract enforcement (Besley and Perssons 2009, 2010). As an example, when obtaining a title for urban land, Chinese firms that do not expect strong enforcement (that is, firms without political connections) did not actually increase investment, Miao et al. (2019) find. The BE effects would thus likely be effective only when enforcement is also strong. Of the three sets of BE measures, the *Doing Business* series are *de jure*, and their effectiveness thus depends crucially on contract enforcement. We expect that the *Doing Business* indicators should have stronger effects when contract enforcement is better, especially for those BE elements that require strong government enforcement.

Thus, our *enforcement hypothesis* is as follows: The *de facto* indicator of the same theme of the BE (say, access to finance) should have stronger predictive power for firm performance than *de jure* indicators. The influence of *de jure* indicators on firm performance depends on contract enforcement, and the influence is stronger in countries with better contract enforcement.

Does the BE exert the same influence on domestic firms and foreign firms? There are good reasons why they might respond to the same aspect of the BE differently. Foreign firms, for instance, have better access to finance (from headquarters or foreign owners) and to advanced technology. Furthermore, they likely have stronger bargaining power with respect to the government because they can leave and locate in a more favorable jurisdiction. We thus expect that compared to domestic firms, foreign firms are less sensitive to aspects of the BE for which they have better access, such as finance and information on markets. They should also be less sensitive to government expropriation (due to their ability to relocate and stronger bargaining power). Furthermore, because countries tend to offer land deals to lure foreign direct investment (FDI), we also expect foreign firms to be less concerned with BE indicators related to land access. In contrast, due to cultural differences and a lack

of immersion in the local context, they have worse access to information about local markets and the preferences and demand of local consumers (Hayek 1945). Finally, because foreign firms have more wealth and more physical assets that are vulnerable to stealing and looting, and they have less indigenous connections to the local community, they should be more sensitive to issues related to crime or physical safety.

Thus, our hypothesis of a *differential BE effect by ownership* is as follows: Relative to domestic firms, foreign firms' performance is less sensitive to aspects of the BE that are related to government expropriation, finance, access to market information, and land access, but is more sensitive to local physical safety.

Relatedly, the BE effects likely differ significantly among firms of different sizes. In developing countries, micro and small firms are by far the most prevalent (Beck et al., 2005; Beck and Demirgüç-Kunt 2006; Knack and Xu 2017). Compared to relatively larger firms, micro and small firms tend to have worse connection to politicians and local government officials, and lack critical resources to "get things done" (Cai, Fang, and Xu 2011). Small firms also have significantly worse access to finance (Beck and Demiguc-Kunt 2006). The basic BE elements such as access to infrastructure and access to finance would thus likely be especially important for micro and small firms. In addition, modern technology affords smaller firms a chance to leapfrog in technology adoption. In particular, internet access dramatically reduces the costs of information access, communication, and advertising, making it a "general-purpose technology" (Clarke et al., 2015). Internet access is thus likely to have stronger effects on smaller firms.

Thus, our hypothesis of a *differential BE effect by size* is as follows: Smaller firms benefit more from basic elements of the BE such as basic and modern infrastructure, government expropriation, and access to finance.

### 3. Data and measurements

#### 3.1. The world bank enterprise survey data

The main data sources are the World Bank enterprise surveys (ES) in 709 cities of 128 countries. The ES data are collected by the World Bank to benchmark the business climate in (mostly) developing countries and to understand the determinants of firm performance. The annual GDP per capita of sample countries ranges from around US\$200 (low-income countries) to US\$46,000 (upper-middle-income countries). In each country the survey is based on the universe of eligible firms obtained from the country's statistical office with stratified random sampling with replacement, and the result is a representative sample of the nonagricultural private economy in the country.<sup>2</sup> Stratification is based on two criteria: the sector of activity and firm size. Typically, the stratified sampling yields between 100 and 1000 firms per country, with 108 firms for the median city. Industries range from manufacturing and construction to services and retail and wholesale trade.<sup>3</sup> Each survey is largely a cross-sectional data set. However, firms are asked about their sales and employment for both the survey year and three years prior to it, which allows us to construct annualized growth rates.

We include data collected after 2006 till 2020, although some Enterprise Surveys were conducted earlier. Before 2006, there was considerable heterogeneity across countries in terms of the questionnaire format, sectors covered, and sampling methodology, and the samples were not generally representative. A complete list of variables and data sources is shown in table 1 and table 2; the summary statistics for our key variables are presented in table 3. Our final sample consists of approximately 80,000 firms covering 709 cities in 128 countries.<sup>4</sup>

<sup>2</sup> Thus wholly state-owned firms are not included in the sample.

<sup>3</sup> For a more detailed description of the WBES, see <http://www.enterprisesurveys.org>.

<sup>4</sup> For each dependent variable, the number of observations differs. The figure of 80,000 is for the dependent variable of employment growth, which has fewer

#### 3.2. The doing business and the global competitive index

We first discuss the logic of the *doing business*(DB) and the global competitiveness (GC) data collection and the pros and cons of these data sets. The World Bank *Doing Business* project provides objective measures of business regulations for local firms in 190 economies annually. Each indicator in *Doing Business* is calculated from several objective questions based on case scenarios with specific assumptions. Instead of surveying firms, the *Doing Business* project collects the data from legal professionals, such as lawyers, judges, public officials, and other professionals (that is, accountants, architects, and engineers). In addition, about two-thirds of the data are based on a reading of the law because the primary goal of the project is to measure what is regulated by the law of a certain country.

The advantage of such a methodology is that the procedure is highly standardized and comparable across economies and entails lower measurement errors for what it intends to measure, and the indicators provide good reflections of the de jure regulatory environment. However, a limitation, as documented in the *Doing Business* report (2019), is that these indicators assume that entrepreneurs have knowledge of and comply with applicable regulations. As a result, *Doing Business* indicators cannot capture what is actually happening on the ground in real business settings. Hallward-Driemeier and Pritchett (2015) document significant differences between closely related indicators in *Doing Business* (which focus on the de jure regulatory environment) and in the Enterprise Survey (which reflects the de facto regulatory environment). Another limitation is that the survey cases in *Doing Business* are located in the largest business city of each country,<sup>5</sup> which cannot capture the heterogeneity across a country.

The Global Competitiveness Index, provided annually, is produced by the World Economic Forum (WEF). It aims to present comprehensive insights into a country's drivers of economic growth. A portion of the Global Competitiveness indicators is based on the Executive Opinion Survey conducted by WEF in cooperation with its partner institutes in each country. In the 2018 survey, for example, more than 12,000 business executives from companies of various sizes and from the various sectors in 140 countries were surveyed. The other indicators are drawn from external data sources, such as the International Energy Agency and the International Telecommunications Union. The Global Competitiveness project uses detailed data to construct 12 pillars of competitiveness, and its indicators capture broader aspects of the business environment. However, because of the limited sample size in each country (for example, in 2018, the median number of respondents in a country was 83), the representativeness of the indicators drawn from the Executive Opinion Survey can be an issue.

#### 3.3. Construction of key measures

We now turn to the construction of our variables. The business environment has many aspects. In this paper, we rely on the guidance of Reyes, Roberts, and Xu (2017) and focus on five main categories: (1) Government Protection, (2) Infrastructure, (3) Human Capital, (4) Access to Finance, and (5) Barriers to Entry. Government Protection refers to the control of corruption and provision of physical safety. Infrastructure includes traditional infrastructure (captured here by the quality of the provision of electricity) and modern infrastructure (captured here by the extent of access to the internet). Human Capital focuses on the skill level of labor, which is mainly affected by education quality. Access to finance refers to access to basic financial services such as bank facilities and general financial development. Barriers to Entry is mea-

missing observations. The 709 cities in 128 countries refers to the sample where the issue of missing data does not arise.

<sup>5</sup> For the countries with a population exceeding 100 million, DB also covers the second biggest city.

**Table 1**  
Selection of business environment indicators and construction of variables.

	RE Category	Series	Variable Name	Direction	Variable Meaning
Basic Protection	Corruption	ES	<i>ES Corruption Obstacles</i>	negative	City-industry average of the firm's answer on whether corruption constitutes an obstacle. ranking from 0 (no obstacle) to 4 (very severe obstacle). 2 (moderate obstacle) and above are treated as firm considering it an obstacle. (The logic is the same for skilled labor availability, access to land, and informal competition.)
		DB			
		GC	<i>GC Corporate Ethics</i>	positive	Ethics/corruption score, from Executive Opinion Survey: "How do you rate the corporate ethics of companies (ethical behavior in interactions with public officials, politicians, and other firms)?"
	Security	ES	<i>ES Security Costs</i>	negative	Share of a firm's sales paid for security protection
		DB			
		GC	<i>GC Police System</i>	positive	Reliability of police service, from Executive Opinion Survey: "To what extent can police services be relied upon to enforce law and order?"
Infrastructure	Electricity	ES	<i>ES Power Outage</i>	negative	% of firms experience electricity power outage in the past year
		DB	<i>DB Get Electricity</i>	positive	Getting Electricity score
		GC	<i>GC Electricity Quality</i>	positive	Electric power transmission and distribution losses as a percentage of domestic supply, from the International Energy Agency
	Internet	ES	<i>ES Web</i>	positive	% of firms using a website to conduct business
		DB			
		GC	<i>GC Broadband</i>	positive	Broadband coverage, number of fixed-broadband internet subscriptions per 100 population, from the International Telecommunications Union
Human Capital	ES	<i>ES Skill Obstacles</i>	negative	% of firms reporting skilled labor shortage as an obstacle	
	DB	<i>WB HLO</i>	positive	Harmonized Learning Outcome (Angrist et al., 2019)	
	GC	<i>GC Education System</i>	positive	Quality of education system, from WEF Executive Opinion Survey: how well does the education system meet the needs of a competitive economy?	
Access to finance	ES	<i>ES Overdraft</i>	positive	% of overdraft ability	
	DB	<i>DB Get Credit</i>	positive	Getting credit score	
	GC	<i>GC Financial Development</i>	positive	Financial development score, pillar 8	
Barriers to entry/exit	ES	<i>ES Land Access Obstacles</i>	negative	% of firm reporting access to land as an obstacle	
	DB	<i>DB Construction Permit</i>	positive	Dealing with Construction Permits score	
	GC				

Note: BE = business environment; DB = *Doing Business*; ES = Enterprise Survey; GC = Global Competitiveness index; HLO = Harmonized Learning Outcome; LP = labor productivity; SD = standard deviation; TFP = total factor productivity; WB = World Bank; WEF = World Economic Forum.

sured with the barrier of access to land; we also control for competition from informal firms. For each category of the business environment, we find the relevant variables in the Enterprise Survey, *Doing Business*, and Global Competitiveness data set, respectively. Table 1 reports the name and definition of each variable.

For Enterprise Survey (ES) indicators, the logic of constructing the variables is the same as in Reyes, Roberts, and Xu (2017). We measure an aspect of the business environment for a firm with the mean of the response of other firms in the same city and in the same industry category. Specifically, (1) Government Protection is measured with "Corruption Obstacle" (the extent to which corruption is viewed as an obstacle by firms in the city-industry cell) and "Security Costs" (the city-industry average of a firm's expenditure on security as a share of its sales). (2) Infrastructure is measured with "Power Outage" (the city-industry share of firms that experienced a power outage in the survey year) and "Web" (the city-industry share of firms that use websites to conduct business). (3) Human Capital is captured by "Skill Labor Obstacle" (the extent to which a shortage of skilled labor is viewed as an obstacle by firms in a city-industry cell). (4) Access to Finance is reflected by "Overdraft" (the city-industry share of firms with an overdraft facility from a financial institution). (5) Barriers to Entry is measured by "Land Access Obstacle" (the extent to which access to land is viewed as an obstacle by firms in a city-industry cell). For all the variables based on subjective perceptions of the degree of obstacles (Corruption Obstacle, Skill Labor Obstacle,

Land Access Obstacle),<sup>6</sup> we transform the ranking to a dummy variable indicating moderate or more serious obstacles. In total, we have seven Enterprise Survey indicators to measure the business environment. It is worth noting that even though some of the indicators are binary variables at the firm level, when aggregated to the city-industry level, all these ES indicators are continuous.

When constructing *Doing Business* indicators and Global Competitiveness indicators, we find the most relevant variables for each BE category. Two points are worth noting. First, when more than one indicator measures the same aspect of the BE, we choose only one variable among the candidates according to the number of non-missing observations and the correlation with the corresponding Enterprise Survey indicator. Second, although *Doing Business* indicators and Global Competitiveness indicators overlap to some extent with Enterprise Survey indicators, not all BE categories in Enterprise Survey indicators can be matched to a counterpart in the *Doing Business* or Global Competitiveness data.<sup>7</sup>

<sup>6</sup> The original ranking ranges from zero (no obstacle) to 4 (very severe obstacle).

<sup>7</sup> The *Doing Business* project does not capture some BE aspects by design, including the quality of the labor force, incidence of bribery and corruption, and lack of security. See Table 2.2 of the most recent *Doing Business* report (World Bank 2019).

**Table 2**  
Definitions of and data sources for variables.

Variable Name	Data Source	Definition
<i>Firm level</i>		
Lgrow	ES	One-year employment growth rate as calculated as follows: dividing the change in employment between the survey year and three years earlier by the simple average of employment in the beginning and ending years.
TFP	ES	Industry-specific total factor productivity (in logarithm), winsorized highest and lowest 1%. TFP is the firm specific residual of ln(value added) from a regression of ln(value added) on ln(capital), ln(labor) and industry fixed effects. For variable construction details, see Reyes et al. (2018).
lnLP	ES	ln(sales / number of employees in constant U.S. dollars), winsorized highest and lowest 1%. For variable construction details.
Biggest owner share	ES	The ownership share of the largest owner.
Firm micro	ES	The firm had 1–20 employees three years ago.
Firm small	ES	The firm had 21–50 employees three years ago.
Firm middle	ES	The firm had 51–100 employees three years ago.
Firm large	ES	The firm had more than 100 employees three years ago.
Age 6–10	ES	The firm is between 6 and 10 years old.
Age 11+	ES	The firm is more than 10 years old.
Exporter	ES	The firm is an exporter.
Foreign Share	ES	The share of foreign ownership of the firm.
Foreign Firm	ES	Whether the share of foreign ownership of the firm is not zero.
<i>City-industry level</i>		
ES Corruption Obstacles	ES	City-industry average of the firm's answer on whether corruption constitutes an obstacle. The original ranking is from 0 (no obstacle) to 4 (very severe obstacle). 2 (moderate obstacle) and above are treated as "having obstacle"(the logic is the same for skilled labor availability, access to land and informal competition).
ES Security Cost	ES	City-industry average of the share of a firm's sales paid for security.
ES Web	ES	City-industry share of firms that answer that they use websites to conduct business.
ES Power Outage	ES	City-industry share of firms that had ever experienced a power outage in the survey year.
ES Skill Obstacles	ES	City-industry average of the firm's answer on whether skilled labor availability constitutes an obstacle.
ES Overdraft	ES	City-industry share of firms with an overdraft facility.
ES Land Access Obstacles	ES	City-industry average of the firm's answer on whether access to land constitutes an obstacle.
ES Informal Competition Obstacles	ES	City-industry average of the firm's answer on whether competition with informal sectors constitutes an obstacle.
<i>Country level</i>		
DB Contract Enforcement	DB	Country-level Contract Enforcement score.
DB Get Electricity	DB	Country-level Getting Electricity score.
DB Get Credit	DB	Country-level Getting Credit score.
DB Construction Permit	DB	Country-level Dealing with Construction Permits score.
WB HLO	ES	Country-level Harmonized Learning Outcome score. It is one of the factors used to construct the World Bank Human Capital Index.

**Table 2. Variable definition and Data source (Continue)**

Variable Name	Data Source	Definition
GC Corporate Ethics	GC, WEF Executive Opinion Survey	Ethics/corruption score: "How do you rate the corporate ethics of companies (ethical behavior in interactions with public officials, politicians, and other firms)?"
GC Police System	GC, WEF Executive Opinion Survey	Reliability of police service: "To what extent can police services be relied upon to enforce law and order?"
GC Electricity Quality	GC, International Energy Agency	Electric power transmission and distribution losses as a percentage of domestic supply
GC Broadband	GC, International Telecommunications Union	Broadband coverage, number of fixed-broadband internet subscriptions per 100 population
GC Education System	GC, WEF Executive Opinion Survey	Quality of education system: "How well does the education system meet the needs of a competitive economy?"
GC Financial Development	GC	Financial development score (GC indicator pillar 8)
Population	WDI	Country total population
GDP PC	WDI	Country GDP per capita
Pop Density	WDI	Country population density

Note: DB = *Doing Business*; ES = Enterprise Survey; GC = Global Competitiveness index; HLO = Harmonized Learning Outcome; LP = labor productivity; TFP = total factor productivity; WDI = World Bank World Development Indicators; WEF = World Economic Forum.

**Table 3**  
Summary statistics of variables.

Variable	Source	N	Mean	SD	Minimum	Maximum
<b>Firm-level variables</b>						
Labor Growth (percentage point)	ES	93,699	3.9	14.4	-183.7	169.1
TFP	ES	31,283	-0.11	1.35	-3.10	3.31
ln(LP)	ES	81,348	9.56	1.56	5.84	12.58
Biggest owner share	ES	98,268	0.79	0.26	0.01	1.00
Micro firm (1–20)	ES	102,919	0.48	0.50	0.00	1.00
Small firm (21–50)	ES	102,919	0.22	0.41	0.00	1.00
Medium firm (51–200)	ES	102,919	0.20	0.40	0.00	1.00
Large firm (201+)	ES	102,919	0.10	0.29	0.00	1.00
Firm age: 1–5	ES	101,513	0.14	0.34	0.00	1.00
Firm age: 6–10	ES	101,513	0.22	0.41	0.00	1.00
Firm age: 11+	ES	101,513	0.65	0.48	0.00	1.00
Exporter	ES	101,533	0.22	0.42	0.00	1.00
Foreign owner share	ES	101,429	0.07	0.24	0.00	1.00
Foreign firm (foreign share > 0)	ES	101,429	0.10	0.30	0.00	1.00
City Population: capital	ES	84,771	0.19	0.39	0.00	1.00
City Population: more than 1m	ES	84,771	0.29	0.45	0.00	1.00
City Population: 250k–1m	ES	84,771	0.23	0.42	0.00	1.00
City Population: 50k–250k	ES	84,771	0.16	0.37	0.00	1.00
City Population: less than 50k	ES	84,771	0.14	0.34	0.00	1.00
No competitor	ES	64,972	0.03	0.17	0.00	1.00
1 competitor	ES	64,972	0.03	0.16	0.00	1.00
2+ competitors	ES	64,972	0.94	0.23	0.00	1.00
<b>City-industry-level variables</b>						
ES Corruption Obstacles	ES	6077	0.48	0.35	0.00	1.00
ES Security Costs	ES	5702	0.02	0.03	0.00	0.50
ES Web	ES	6255	0.48	0.34	0.00	1.00
ES Power Outage	ES	6186	0.57	0.35	0.00	1.00
ES Skills Obstacles	ES	6195	0.42	0.32	0.00	1.00
ES Overdraft	ES	5862	0.39	0.34	0.00	1.00
ES Land Access Obstacles	ES	5953	0.32	0.30	0.00	1.00
<b>Country level</b>						
DB Contract Enforcement	DB	119	53.7	12.7	20.8	81.1
DB Getting Electricity	DB	119	62.4	21.6	0.0	94.9
DB Getting Credit	DB	119	46.8	22.0	6.3	93.8
DB Construction Permit	DB	119	56.0	18.9	0.0	89.1
WB HLO	Angrist et al. (2019)	96	409.8	60.3	304.9	542.0
GC Corporate Ethics	GC	87	2.99	0.86	1.63	5.52
GC Police System	GC	92	3.77	0.95	2.06	6.32
GC Electricity Quality	GC	88	4.00	1.39	1.27	6.52
GC Broadband	GC	85	4.66	7.05	0.00	32.6
GC Education System	GC	92	3.37	0.71	1.72	5.16
GC Fin Development	GC	87	3.88	0.61	2.37	5.25
ln(Population)	WDI	117	15.8	2.02	10.85	21.02
ln(GDP pc)	WDI	115	7.63	1.26	5.02	10.72
ln(Pop Density)	WDI	117	4.08	1.28	0.53	7.08

Note: DB = *Doing Business*; ES = Enterprise Survey; GC = Global Competitiveness index; HLO = Harmonized Learning Outcome; Lgrow = one-year employment growth rate (growth); ln(LP)=ln(sales/number of employees) (labor productivity); SD = standard deviation; TFP = total factor productivity; WB = World Bank; WDI = World Bank World Development Indicators.

We can match four categories of the business environment indicators from Global Competitiveness data and Enterprise Survey data as follows (see table 1 for how each theme of the BE is represented in the three data sets). For Government Protection in the Enterprise Survey data—which includes Corruption Obstacle and Security Cost—we use “Corporate Ethics/Corruption” (based on the survey question, “How do you rate the corporate ethics of companies?”) and “Police System” (based on the survey question, “To what extent can police services be relied upon to enforce law and order?”). For Infrastructure in Global Competitiveness data, we choose “Electricity Quality” (from the International Energy Agency) and “Broadband” (from the International Telecommunications Union). For Human Capital, we choose “Quality of Education System” (based on the survey question, “How well does the education system meet the needs of a competitive economy?”). For Access to Finance, we choose “Financial Development” (the eighth pillar of the Global Competitiveness indicator). For Barriers to Entry, we could not find an appropriate indicator from Global Competitiveness data. All

Global Competitiveness indicators range between 0 and 100 points. A higher value of a Global Competitiveness indicator for a country indicates a better business environment.

For *Doing Business* indicators, we can match three categories of the regulatory environment: for basic Infrastructure (in the Enterprise Survey), we choose the “Getting Electricity” score (from *Doing Business*). For Access to Finance, we choose the “Getting Credit” score. For access to land (in the Enterprise Survey) in Barriers to Entry, we choose the “Dealing with Construction Permits” score.

In addition, a relevant indicator outside the scope of *Doing Business* that comes from the World Bank is the newly minted measure of Human Capital (3), the Harmonized Learning Outcome (HLO), a country-level index for education quality (for more details, see Angrist et al., 2019). A higher value of a *Doing Business* (and HLO) indicator implies a better BE.

Table 3 reports the summary statistics of all the BE indicators from various sources. Because the scale of these three sets of BE indicators

differs greatly, to facilitate comparison, we standardize them into variables with means of zero and variances of one (that is, the z-score) in our regression analysis. For other control variables and the dependent variables, we retain the original scales in the regression part.

These three groups of indicators are different and complementary. First, all the *Doing Business* indicators and the Global Competitiveness indicators are at the country level and country-invariant,<sup>8</sup> while the Enterprise Survey indicators are city-industry-level indicators that capture more local BE variations. Second, in contrast to the objective nature of the *Doing Business* indicators, some Enterprise Survey indicators are subjective and are based on whether the entrepreneurs consider certain aspects of the business environment to be a relatively severe obstacle. Third, the Enterprise Survey indicators capture the real actions that firms take and the real conditions firms face. For example, while the Global Competitiveness indicators measure the level of internet infrastructure by proxying a country's broadband quality, the Enterprise Survey indicators measure the same aspect by proxying the share of firms using websites to conduct business; compared with measuring the ease of getting credit in *Doing Business*, the Enterprise Survey indicators directly measure the share of firms having an overdraft facility.

### 3.4. How the enterprise survey indicators are related to those from the global competitiveness and the doing business

Table 4 reports how the Enterprise Survey indicators are related to the Global Competitiveness and *Doing Business* indicators. In particular, we run a simple regression in which the dependent variable is an Enterprise Survey indicator and the key explanatory variable is either a Global Competitiveness or a *Doing Business* indicator. The regression is at the city-industry level, the level that an Enterprise Survey indicator is measured uniquely.<sup>9</sup> In the regressions, we control for basic country-level characteristics (that is, log GDP per capita, log population, and log population density), along with the industry fixed effects. We cluster the standard errors at the country level because some of the key variables are at this level.

The Enterprise Survey indicators and those country-level indicators are significantly correlated, with some exceptions. The following pairs are reasonably correlated: (1) the Enterprise Survey indicator on Corruption and the Global Competitiveness indicator on Ethics; (2) the Enterprise Survey indicator on Security Costs and the Global Competitiveness indicator score on Police System; (3) the Enterprise Survey indicator on Web intensity and the Global Competitiveness indicator on Broadband; (4) the Enterprise Survey indicator on Power Outage and the Global Competitiveness indicator on Electricity Quality (or the *Doing Business* indicator on Getting Electricity); (5) the Enterprise Survey indicator on access to bank finance (Overdraft) and Global Competitiveness indicator on Financial Development.

In contrast, there is no significant correlation at the conventional level (i.e., 5 percent) between (1) the Enterprise Survey indicator on skill constraints (Skill Labor Obstacle) and the Global Competitiveness indicator on Quality of Education System (and the World Bank's Harmonized Learning Outcome); (2) the Enterprise Survey indicator on access to bank finance (Overdraft) and the Global Competitiveness indicator on Financial Development (or the *Doing Business* on Getting Credit); or (3) the Enterprise Survey indicator on Land Access Obstacle and the *Doing Business* score on Dealing with a Construction Permit.

The mild or nonexistent correlation of related indicators from various sources suggests that they likely differ in their explanatory power for firm performance. The lack of correlation between different sources

<sup>8</sup> The variables are time-varying, but when being merged into the WBES data, which are largely cross-sectional, the *Doing Business* and the *Global Competitiveness* indicators are in effect time-invariant.

<sup>9</sup> In table 4, all BE indicators are standardized with their sample mean and standard deviation so that they have means of zero and a standard deviation of one.

could also indicate that these measures capture different aspects (such as formal schooling and on-the-job training) of a theme (such as skills).

## 4. Associations between firm performance and de jure and de facto measures of the business environment

We estimate the association between the business environment and firm performance, as captured by firm employment growth and the labor productivity level. These two measures capture both dynamic and static performances of firms. We focus on firm employment growth for two reasons. First, firm growth is a key source of overall national economic growth, and a country in which firms are failing to grow is unlikely to develop. Firm growth is especially important for the path to prosperity for developing countries because the vast majority of firms are small, yet relatively larger firms in developing countries are significantly more productive (Hsieh and Olken 2014). Furthermore, there is evidence that cities featuring a sufficiently large share of relatively larger firms (those with more than 50 employees) tend to facilitate firm employment growth (Clarke et al., 2016) and firm productivity growth in relatively low-income countries (Reyes et al., 2017). Because growth rates are heavily influenced by outlier issues,<sup>10</sup> we follow Davis et al. (1996) by calculating mid-point growth rates by dividing the change in employment (or labor productivity) between the survey year and three years earlier by the simple average of employment (or labor productivity) in the beginning and ending years. This bounds the resulting growth rate between  $-2$  and  $+2$ , thereby significantly reducing the influence of outliers.<sup>11</sup> Labor productivity is measured as sales divided by the number of employees, expressed in constant US dollars. We also experimented with using total factor productivity (TFP) as a measure of productivity, which is often viewed as a cleaner measure of efficiency. However, the Enterprise Survey does not have data on capital stock for a large share of firms (including all those in service sectors). To preserve sample size, and with the knowledge that the results based on TFP and labor productivity tend to be similar, we rely on labor productivity to measure firm productivity. The specification we use is as follows:

$$Y_{icjkt} = ES_{cjk} \alpha_1 + DB_{kt} \alpha_2 + GC_{kt} \alpha_3 + X_{it} \beta_1 + W_{kt} \beta_2 + \theta_j + \eta_t + \epsilon_{jcikt} \quad (1)$$

Here,  $Y_{icjkt}$  is firm performance. When the outcome is employment growth, the unit is in percentage points (that is, one means one percentage point). Subscript  $i$  stands for firm;  $c$  for city;  $j$  for industry;  $k$  for country; and  $t$  for survey year.  $ES_{cjk}$  is a vector for city-industry-year level Enterprise Survey indicators.  $DB_{kt}$  and  $GC_{kt}$  are vectors for country-year-level *Doing Business* and Global Competitiveness indicators. All sets of BE indicators in the regressions are standardized, so the coefficient should be interpreted as the effect of a one-standard-deviation increase of the BE indicators on firm performance.  $W_{kt}$  is the country-level control variable vector, including GDP per capita, population, and population density (all in logarithms).  $\theta_j$  and  $\eta_t$  are industry and survey year fixed effects, respectively.  $X_{it}$  is a vector for firm-level control variables, including the ownership share of the largest owner; two dummy variables indicating firm size (being middle-sized, with the

<sup>10</sup> Consider a firm whose employment grows from 10 to 100 workers compared to one whose employment grows from 100 to 200 workers. Both firms increase employment by 100 workers. However, whereas the growth rate of the former is 900 percent, the growth rate of the latter is only 100 percent.

<sup>11</sup> Because the dependent variables are bound between  $-2$  and  $+2$ , a nonlinear Tobit estimation of equation (1) may be used. However, it is not necessary when one is mainly interested in the marginal effect. The Tobit model requires "commitment to functional form and distributional assumptions, about which we do not usually feel strongly" (Angrist and Pischke 2009, 197–98), while the ordinary least squares (OLS) method has the virtue of "simplicity, automation, and comparability across studies" (Angrist and Pischke 2009, 197). We experimented with estimation using the Tobit model, and found qualitatively similar results to those based on OLS.

**Table 4**  
Correlation between local Enterprise Survey indicators and country-level Global Competitiveness and *Doing Business* indicators.

Dependent Variable	ES Corruption Obstacles	ES Security Costs	ES web	ES Power Outage	ES Skills Obstacles	ES Overdraft	ES Power Outage	ES Overdraft	ES Land Access Obstacles	ES Skills Obstacles
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
GC Corporate Ethics	-0.138***									
	(0.025)									
GC Police System		-0.003**								
		(0.001)								
GC Broadband			0.065***							
			(0.016)							
GC Electricity Quality				-0.109***						
				(0.018)						
GC Education System					-0.033					
					(0.020)					
GC Fin Development						0.057*				
						(0.030)				
DB Get Electricity							0.027*			
							(0.016)			
DB Get Credit								0.017		
								(0.025)		
DB Construction Permit									-0.008	
									(0.018)	
WB HLO										-0.098
										(0.100)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country ctrl	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	5163	5001	5228	5236	5387	4981	5783	5489	5602	5469
adj. R <sup>2</sup>	0.172	0.038	0.277	0.272	0.079	0.120	0.194	0.100	0.069	0.071

This table report the results of regression of ES indicators on relative GC or DB indicators. SEs are clustered at country level. Country control variables include ln(GDP per capita), ln(population), and ln(population density).

DB = *Doing Business*; ES = Enterprise Survey; FE = fixed effects; GC = Global Competitiveness index; HLO = Harmonized Learning Outcome; SD = standard deviation; WB = World Bank.

\*p < 0.1, \*\*p < 0.05, \*\*\* p < 0.01.

number of employees three years ago between 20 and 100; being large-sized, with the number of employees three years ago exceeding 100); two firm age indicators (firm age of 6–10 years; firm age of 11+ years); being an exporter; being a foreign firm; and the share of foreign ownership. We also include indicators of competition faced by a firm.<sup>12</sup> In the ES data set, firms are asked the number of competitors they face. Based on their responses, we construct two indicators of competition: the firm facing one competitor in its market, and the firm facing more than one competitor in its market, with the firm facing no competitors as the base group.<sup>13</sup>

<sup>12</sup> The inclusion of this variable does not affect our main results.

<sup>13</sup> The survey contains richer information about competition than we utilize here. The number of competitors can be classified as no competitors, one competitor, two to four competitors, and five or more competitors. Moreover, the number of competitors is specific for the types of market in which the firm is involved (mainly with the local market, with the national market, and with the international market). We have experimented with more nuanced classification of the number of competitors, and found that the effect of competition tends not to differ much when the number exceeds one. Moreover, controlling for the dummies for the extent of the market (being in national market or being in in-

In table 5, we first present the regressions including each set of BE indicators (ES, DB, and GC) separately,<sup>14</sup> and then pull all three sets of BE indicators together to compare the explanatory power of each set of BE indicators. Here, we control only for several basic country-level controls; we do not control for country fixed effects because the *Doing Business* and the Global Competitiveness indicators are collinear with the country fixed effects. The results that contain the coefficients of the firm- and country-level controls are presented in appendix Table A1. The patterns of the BE effects tend to be quite similar when using TFP instead of log labor productivity (log LP), although the sample size is smaller (less than half). Our discussion thus centers on log LP.

All three groups of BE indicators have independent explanatory power, but the Enterprise Survey indicators have a slight edge. In terms

ternational market, relative to the base category of the local market) does not matter for the effect of competition. In our base specification and all main specifications, we do not control for the dummies related to the extent of the market because it is too endogenous—better-performing firms are in larger markets.

<sup>14</sup> The World Bank HLO indicator is not part of the *Doing Business* project. We include it for ease in exposition, and because DB indicators and the HLO indicator are all country-level indicators produced by the World Bank.

**Table 5**  
The impact of the business environment on firm performance (Enterprise Survey, *Doing Business*, and Global Competitiveness indicators) .

Dependent Variable	Lgrow			ln(LP)				TFP	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ES Corruption Obstacles	-0.749** (0.309)			-0.948*** (0.280)	-0.048* (0.027)			-0.001 (0.023)	-0.034 (0.026)
ES Security Costs	-0.035 (0.179)			-0.154 (0.138)	-0.094*** (0.028)			-0.081*** (0.024)	-0.039** (0.018)
ES Web	0.064 (0.214)			0.234 (0.173)	0.167*** (0.029)			0.141*** (0.024)	0.096*** (0.026)
ES Power Outage	-0.138 (0.207)			-0.383** (0.178)	0.005 (0.023)			0.002 (0.028)	0.008 (0.021)
ES Skills Obstacles	0.354* (0.194)			0.422*** (0.147)	-0.022 (0.024)			-0.032 (0.025)	-0.063** (0.025)
ES Overdraft	0.458* (0.254)			0.260 (0.196)	0.150*** (0.034)			0.137*** (0.034)	0.080*** (0.028)
ES Land Access Obstacles	0.497* (0.278)			0.391 (0.242)	-0.037* (0.018)			-0.032* (0.017)	-0.036** (0.015)
DB Get Electricity		-0.033 (0.389)		-0.157 (0.320)		0.172*** (0.038)		0.088** (0.042)	0.050 (0.039)
DB Get Credit		-0.033 (0.372)		-0.234 (0.418)		-0.068 (0.055)		-0.054 (0.066)	-0.141** (0.059)
DB Construction Permit		0.163 (0.334)		0.242 (0.307)		0.015 (0.056)		0.028 (0.049)	0.013 (0.042)
WB HLO		-0.780 (0.506)		-1.103*** (0.352)		0.229** (0.100)		0.161* (0.093)	0.175** (0.086)
GC Corporate Ethics			-1.151** (0.491)	-1.181*** (0.430)			-0.110 (0.084)	-0.047 (0.072)	-0.081 (0.060)
GC Police System			0.425 (0.481)	0.227 (0.417)			0.148* (0.074)	0.059 (0.060)	-0.051 (0.045)
GC Electricity Quality			-0.369 (0.497)	-0.504 (0.434)			0.079 (0.097)	-0.026 (0.092)	-0.045 (0.088)
GC Broadband			0.047 (0.407)	0.334 (0.332)			0.184** (0.073)	0.112* (0.057)	0.101* (0.058)
GC Education System			0.342 (0.455)	0.388 (0.333)			0.052 (0.067)	0.040 (0.050)	0.084** (0.033)
GC Fin Development			1.162*** (0.431)	0.974* (0.509)			-0.006 (0.070)	-0.019 (0.066)	0.127** (0.061)
1 competitor	-0.940* (0.509)	-0.963* (0.515)	-1.075** (0.509)	-0.985* (0.500)	0.245*** (0.058)	0.266*** (0.060)	0.271*** (0.060)	0.252*** (0.059)	0.136** (0.063)
2+ competitors	-0.794* (0.435)	-0.699 (0.429)	-0.814* (0.441)	-0.718* (0.421)	0.206*** (0.058)	0.201*** (0.060)	0.226*** (0.060)	0.183*** (0.059)	0.012 (0.050)
Year, Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country ctrl	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	45,716	45,716	45,716	45,716	42,880	42,880	42,880	42,880	26,592
Adjusted R2	0.061	0.058	0.061	0.066	0.328	0.317	0.314	0.337	0.221

SEs are clustered at country level. All BE indicators are standardized with their sample mean and standard deviation. Firm level control variables include biggest owner share, small/medium/large scale firm, age 6–10, age 11+, exporter, foreign firm, foreign share, city population category dummies. Country level control variables include ln(GDP pc), ln(population) and ln(population density). The coefficient of control variables shown in Appendix table 1.

DB = Doing Business; ES = Enterprise Survey; FE = fixed effects; GC = Global Competitiveness index; HLO = Harmonized Learning Outcome; Lgrow = one-year employment growth rate in percentage points (growth); ln(LP)=ln(sales/number of employees) (labor productivity); SD = standard deviation; TFP = total factor productivity; WB = World Bank.

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

of adjusted R-squared, the specification with the Enterprise Survey indicators has the highest explanatory power among the three groups, closely followed by the Global Competitiveness indicators: see columns (1) to (3) and (5) to (7). In unreported specifications that are otherwise identical except excluding all BE indicators, the adjusted R-squareds are 0.050 for the employment growth specification and 0.302 for the log LP specifications. In terms of incremental changes in adjusted R-squared, the Enterprise Survey specification again has an edge, surpassing specifications relying on the *Doing Business* or the Global Competitiveness indicators by more than 100 percent.<sup>15</sup> Moreover, the qualitative results for each group of indicators tend to be similar when they are entered alone and when they are entered jointly with other groups of indica-

tors, indicating a reasonable amount of independent variations for each group of BE indicators.

Competition is associated with lower employment growth and higher productivity. Compared to firms that report no competitors, those facing one or more competitors have lower employment growth. In contrast, relative to firms that report no competitors, those facing one competitor (two or more competitors) have a labor productivity level that is 25 (18) log points higher. When using TFP as the productivity measure, firms facing one competitor also have the highest productivity edge, though those facing two or more competitors no longer have an edge.

**Government Protection.** Corruption is negatively associated with firm growth. The Enterprise Survey's Corruption Obstacle indicator is associated with lower firm growth, but not with productivity. In contrast, the Global Competitiveness indicator of Corporate Ethics<sup>16</sup> is signifi-

<sup>15</sup> An exception is for firm employment growth. The Enterprise Survey specification surpasses the Global Competitiveness specification only slightly.

<sup>16</sup> A higher value of the measure indicates a lower level of corruption.

cantly and negatively associated with firm growth—and thus in this case firm corruption is associated with higher firm growth. The contradictory findings on corruption between local indicators and national indicators suggest that corruption does not have a robust association with firm growth. Given that the Enterprise Survey indicator of corruption captures local variations better, and previous studies have found negative association/effects of corruption on firm growth (Fisman and Svensson 2007; Xu 2011), we place slightly more weight on the findings based on the Enterprise Survey data—that is, at least at the local level, corruption is negatively related to firm growth.

Basic physical safety as captured by the Enterprise Survey indicator of a lower share of a firm's sales spent on security expenses (Security Costs) is positively associated with a higher productivity level. Lowering it by one standard deviation is associated with increasing labor productivity by 8 log points and TFP by 4 log points. In contrast, the cross-country counterpart of the Global Competitiveness Index, Police System, does not show a significant association with firm performance. Again, with its ability to ascertain local variations, the Enterprise Survey indicator is better at capturing the effects of basic physical safety than the corresponding Global Competitiveness indicator.

**Infrastructure.** Electricity provision is associated with a higher productivity level and firm growth. A higher Power Outage measure (from the Enterprise Survey) is associated with lower firm growth; a higher Getting Electricity measure (from *Doing Business*) is associated with a higher productivity level. Reducing Enterprise Survey Power Outage indicators by one standard deviation is associated with a 0.4 percentage point increase in employment growth, while increasing nationwide electricity quality (captured by the *Doing Business* Getting Electricity indicator) by one standard deviation is associated with a 9-percentage point increase in labor productivity. The Global Competitiveness indicator of Electricity Quality, which is perhaps a narrower measure of the quality of the power supply system, is not significantly related to firm performance. Overall, the complementary findings from the Enterprise Survey and *Doing Business* bolster the case for the importance of the power supply system for firm performance, for both productivity and growth.

Modern infrastructure, as proxied by the adoption of internet technology, is robustly associated with both productivity and firm growth. The Enterprise Survey's Web indicator, capturing the local prevalence of internet usage for firm businesses, is positively associated with both productivity and firm growth, and in the former case, significantly. A one-standard deviation increase of the Enterprise Survey's Web indicator is associated with a 0.2 percentage point increase in employment growth and a 14 (9) log point increase in labor productivity (TFP). Moreover, the Global Competitiveness Broadband indicator is also positively and significantly associated with the productivity level. Increasing it by one standard deviation is associated with around a 10-log point increase of labor productivity and TFP. The general consistency between Enterprise Survey and Global Competitiveness on the importance of broadband renders further support to the findings of the previous literature on internet as a general-purpose technology (Clarke et al., 2015).

**Human Capital.** The Enterprise Survey and the World Bank HLO indicators yield robust patterns in terms of the associations between firm performance and human capital. A one-standard deviation decrease in the Enterprise Survey's Skill Shortage Obstacle indicator is associated with an increase of TFP of 6 percentage points and a decrease in firm growth of 0.4 percentage points. The same conclusion is observed based on the World Bank's HLO measure: a one-standard deviation increase in the HLO measure is associated with an increase in productivity of 16 log points, and a decrease in firm growth by 1.1 percentage points. In addition, the Global Competitiveness indicator of Quality of Education System is significantly associated with TFP. A one-standard deviation increase of the Education System indicator is associated with a 8-percentage point increase in TFP. The consistent findings of the productivity-boosting effect of human capital by all three sources underscores the critical importance of human capital. The negative association

between our human capital measures and firm growth is suggestive of the trade-off between the quantity and quality of jobs.

**Access to Finance.** Access to finance tends to be positively associated with both productivity and firm growth. The Enterprise Survey's Overdraft indicator is positively associated with both the productivity level and firm growth (it is significant when regressed alone and insignificant when all three groups of BE indicators are included). A one-standard deviation increase of the Overdraft measure is associated with an increase in labor productivity and TFP by 14 and 8 percentage points, respectively. The Global Competitiveness Financial Development indicator is positively associated with firm growth, and positively and significantly associated with TFP (but not log labor productivity, LP). Increasing it by one standard deviation is associated with a nearly 1-percentage point increase of employment growth and 13-percentage point increase of TFP. In contrast, *Doing Business*' Getting Credit indicator is not significantly associated with firm growth, and is negatively associated with TFP. Given *Doing Business*'s tendency to capture a firm's de jure access for a typical small and medium enterprise (SME), we would place a greater weight on the findings on the Enterprise Survey and Global Competitiveness indicators of access to finance.

**Barriers to Entry.** There is some evidence that entry barriers are associated with lower productivity. The Enterprise Survey's Land Acquisition Obstacle indicator is negatively and significantly associated with productivity. Reducing it by one standard deviation is associated with a 3-percentage point increase in labor productivity. The *Doing Business* Construction Permit measure, however, is not significantly associated with productivity.

To summarize, the three groups of indicators offer independent sources of variations in explaining firm performance. The Enterprise Survey indicators seem to work best in explaining firm performance; they explain the largest share of variations in firm performance. Their qualitative results best confirm our priors. For instance, corruption is negatively associated with firm growth when using the Enterprise Survey indicator, but positively associated when using the Global Competitiveness indicator. Physical safety is positively associated with firm performance according to the Enterprise Survey indicator but is insignificant according to the Global Competitiveness indicator. Access to finance is positively associated with firm performance in the case of the Enterprise Survey indicator, but insignificant in the case of the *Doing Business* indicator. Physical safety and ease in land access have significant and positive effects only in the case of the Enterprise Survey indicators.

By comparing the three sets of estimates, we are able to modify our priors on the effects of the BE. In particular, we increase our confidence concerning four aspects of the BE (given that findings from at least two sets of data are robust and the third set does not contradict the other two): access to finance (DB and ES); electricity/basic infrastructure (ES and DB); internet/modern infrastructure (ES and GC); and human capital (DB or World Bank HLO, ES, and GC). We are less sure about the negative effect of corruption (given that findings from the Enterprise Survey and the Global Competitiveness data are contradictory).

### Importance of contract enforcement

The systematic differences between the effects of the de jure and de facto BE indicators suggest that enforcement might play an important role in determining BE effects. We thus turn to how the *Doing Business* BE indicators depend on contract enforcement, as measured by the Contract Enforcement indicator from *Doing Business*. The results of interacting *Doing Business* BE indicators and the Contract Enforcement indicator are presented in table 6.

The *Doing Business* indicators tend to be more effective for improving firm performance in countries with better contract enforcement: The *Doing Business* Getting Electricity indicator has a more positive association with firm growth, and the *Doing Business* Construction Permit indicator has a more positive association with productivity. Provision of electric-

**Table 6**  
Interacting *Doing Business* indicators with the Contract Enforcement indicator .

	Lgrow	ln(LP)
	(1)	(2)
DB Get Electricity	-0.156 (0.405)	0.104** (0.044)
DB Get Electricity * Contract Enforcement	0.990** (0.387)	0.012 (0.052)
DB Get Credit	0.097 (0.327)	-0.031 (0.055)
DB Get Credit * Contract Enforcement	-0.486 (0.373)	-0.073 (0.070)
DB Construction Permit	-0.172 (0.419)	-0.057 (0.078)
DB Construction Permit * Contract Enforcement	-0.025 (0.508)	0.205* (0.117)
Contract Enforcement	0.773 (0.499)	-0.137 (0.119)
Year, Industry FE	Yes	Yes
Firm, Country Ctrl	Yes	Yes
Observations	57,124	51,710
Adjusted R <sup>2</sup>	0.054	0.339

SEs are clustered at country level. All BE indicators are standardized with their sample mean and standard deviation. Firm level control variables include biggest owner share, small/medium/ large scale firm, age 6–10, age 11+, exporter, foreign firm, foreign share, city population category dummies, and number of competitor dummies. Country level variables include ln(GDP pc), ln(population) and ln(population density). Contract Enforcement in this table is standardized with their sample mean (i.e., their value is their original value subtracting their mean value so that the standing alone BE indicator captures the mean effect of the BE variable at the mean Contract Enforcement).

BE = business environment; DB = Doing Business; FE = fixed effects; Lgrow = one-year employment growth rate in percentage points (growth); ln(LP)=ln(sales/number of employees) (labor productivity).

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

ity and granting of construction permits both require strong contract enforcement. Thus, it is not surprising that these two *Doing Business* aspects tend to hinge more critically on Contract Enforcement. The *Doing Business* Getting Credit indicator does not significantly interact with the Contract Enforcement indicator. Overall, there is support for the notion that the de jure indicators of *Doing Business* are more effective in improving firm performance in countries with better contract enforcement.

##### 5. Effect of the business environment on firm performance, foreign vs. domestic firms

Do domestic firms and foreign-owned firms respond differently to the business environment? If so, how? There are reasons why they might respond differently. Foreign firms, for instance, have better access to finance (from foreign owners) and to more advanced technology. They may also have stronger bargaining power with respect to the government: their ability to relocate affects the enforcement of government policies. On the other hand, they may have worse access to information about local markets and demands and preferences of local consumers. We thus assume that domestic and foreign firms respond differently to the domestic BE. In our empirical implementation, we interact the foreign ownership dummy with the BE indicators, while allowing the foreign dummy to have an independent effect on firm performance. Given that interacting all three sets of BE indicators would result in too many coefficients in a single specification (causing multicollinearity), we interact indicators separately from each set of BE indicators. The results are presented in [table 7](#).

Foreign-owned and domestic firms differ not only in their dynamic responses (firm growth) to the BE but in their static response (firm productivity). We conducted an F test that all the interaction terms of the BE indicators with the foreign dummy are jointly zero. The interaction terms are jointly significant only in the regressions of productivity on Enterprise Survey indicators and Global Competitiveness indicators (the F statistic in the *Doing Business* regression is close to being statistically significant).

**Government Protection.** Foreign-owned firms benefit more from physical safety. This is shown in the more pronounced negative effect on productivity of the Security Costs indicator from the Enterprise Survey, and the more pronounced and positive effect on productivity of the Police System indicator from the Global Competitiveness project. This is not surprising: Foreign-owned firms have fewer connections with local residents, yet they have greater assets/streams of wealth. They are thus more likely to be targets and victims of crime.

Perhaps surprisingly, foreign firms have relatively higher productivity in more corrupt countries (as captured by the GC Corporate Ethics). This could reflect that foreign firms are less vulnerable than domestic firms from government expropriation, and are thus able to attain a higher level of productivity.

**Human capital.** Relative to domestic firms, foreign firms are more hampered in firm growth by higher *Enterprise Survey* Skill Obstacles.

**Infrastructure and Access to Finance.** Foreign-owned firms gain competitive advantages when domestic infrastructure or access to finance is worse. The coefficient of the interaction term between the foreign dummy and the Power Outage indicator from the Enterprise Survey for log labor productivity is positive and significant, which suggests that foreign firms have higher productivity advantages over domestic firms where local power outages are more frequent. The negative coefficient of the interaction term between the foreign dummy and the Getting Credit indicator from *Doing Business* suggests that foreign firms have relatively higher productivity than domestic firms when the host country has worse access to finance. These findings are intuitive: Foreign-owned firms have more capital and can afford equipment to generate their own power. They are thus less vulnerable to problems with the local power supply or lack of finance, and their better access to critical inputs would naturally lead to competitive advantage over local firms in such poor business environments.

**Barriers to Entry.** Foreign-owned firms are less burdened by difficulty in gaining access to land. The interaction between the foreign dummy and the Enterprise Survey's Land Access Obstacle measure is positive and significant for firm employment growth. This likely reflects the fact that perhaps partly due to foreign firms' stronger bargaining power, host countries often offer good deals on land when luring foreign direct investment (FDI) ([Bai et al., 2019](#)), and land allocation policies thus bias the playing field in favor of firms receiving FDI.

Foreign-owned firms benefit more from obtaining construction permits. The interaction term of the foreign firm dummy and the *Doing Business*' Construction Permit measure is positive and (marginally) significant for log labor productivity. It seems that foreign firms can benefit more from efforts to reduce administrative burdens once those firms have entered the market. This is not surprising. After entry, foreign firms must inevitably deal with government officials for further permits and approvals. Their lack of local connections could more adversely affect them compared to domestic firms, which likely have better ongoing relationships with the local governments in charge of various permits.

##### Further analysis of how foreign-owned firms and domestic firms respond to the be

We further gauge how foreign-owned firms ("Foreign") and domestic firms respond to the BE differently by linking a firm's *individual* answers in the Enterprise Survey to the *country-level* indicators of the business environment based on either the Global Competitiveness or *Doing Business* surveys. This exercise, when combined with our earlier findings on the

**Table 7**  
Enterprise Survey, Doing Business, and Global Competitiveness indicators on firm performance, by domestic/foreign firms.

Dependent Variable	Lgrow	ln(LP)		Lgrow	ln(LP)		Lgrow	ln(LP)
	(1)	(2)		(3)	(4)		(5)	(6)
ES Corruption Obstacles	-0.436*** (0.131)	0.002 (0.019)				GC Corporate Ethics	-1.208** (0.521)	-0.068 (0.102)
ES Corruption Obstacles * Foreign	-0.052 (0.261)	0.025 (0.028)				GC Corporate Ethics * Foreign	0.693 (0.466)	-0.128** (0.057)
ES Security Costs	-0.158* (0.083)	-0.025** (0.011)				GC Police System	0.509 (0.492)	0.122 (0.081)
ES Security Costs * Foreign	0.117 (0.202)	-0.067 (0.043)				GC Police System * Foreign	-0.091 (0.490)	0.072 (0.044)
ES Web	0.122 (0.116)	0.114*** (0.014)				GC Broadband	-0.417 (0.365)	0.192** (0.075)
ES Web * Foreign	0.265 (0.304)	-0.007 (0.031)				GC Broadband * Foreign	0.187 (0.330)	-0.053 (0.049)
ES Power Outage	-0.163 (0.121)	0.033** (0.017)	DB Get Electricity	-0.055 (0.383)	0.217*** (0.058)	GC Electricity Quality	-0.397 (0.493)	0.158 (0.109)
ES Power Outage * Foreign	0.089 (0.277)	0.071** (0.031)	DB Get Electricity * Foreign	-0.030 (0.365)	-0.060 (0.041)	GC Electricity Quality * Foreign	-0.279 (0.403)	0.039 (0.072)
ES Skills Obstacles	0.125 (0.110)	-0.018 (0.014)	WB HLO	-0.920* (0.552)	0.233** (0.106)	GC Education System	0.327 (0.458)	0.119 (0.089)
ES Skills Obstacles * Foreign	-0.626** (0.303)	0.021 (0.031)	WB HLO * Foreign	-0.027 (0.314)	0.062 (0.071)	GC Education System * Foreign	-0.241 (0.349)	-0.044 (0.059)
ES Overdraft	0.006 (0.128)	0.072*** (0.018)	DB Get Credit	-0.091 (0.340)	-0.008 (0.066)	GC Fin Development	1.189** (0.451)	-0.052 (0.078)
ES Overdraft * Foreign	0.112 (0.270)	0.045 (0.031)	DB Get Credit * Foreign	0.566 (0.356)	-0.118* (0.069)	GC Fin Development * Foreign	-0.378 (0.341)	-0.025 (0.045)
ES Land Access Obstacles	-0.050 (0.108)	-0.037*** (0.013)	DB Construction Permit	0.062 (0.333)	-0.034 (0.064)			
ES Land Access Obstacles * Foreign	0.584* (0.330)	0.018 (0.034)	DB Construction Permit * Foreign	-0.388 (0.326)	0.129** (0.064)			
ES Land Access Obstacles * Foreign	0.468 (1.764)	-0.034 (0.156)	Foreign	1.113 (1.821)	0.102 (0.194)	Foreign	0.717 (1.854)	0.197 (0.197)
Country FE	Yes	Yes	Country FE			Country FE		
Country Ctrl			Country Ctrl	Yes	Yes	Country Ctrl	Yes	Yes
Firm Ctrl	Yes	Yes	Firm Ctrl	Yes	Yes	Firm Ctrl	Yes	Yes
Year, Industry FE	Yes	Yes	Year, Industry FE	Yes	Yes	Year, Industry FE	Yes	Yes
F stat (all interactions= 0)	0.806	1.656		0.790	1.477		0.526	2.803
p-value of F test	0.611	0.094		0.581	0.198		0.833	0.009
N	49,398	44,358		55,515	50,720		55,242	50,670
Adj. R2	0.080	0.379		0.053	0.344		0.056	0.345

SEs are clustered at the city-industry level in columns 1–2, and clustered at country level in columns 3–6. All business environment indicators are standardized with their sample mean and standard deviation. Firm level variables include two competition dummies (i.e., with one competitor, with two and more competitors) and their interaction with Foreign, together with the biggest owner share, middle scale firm, large firm, age 6–10, age 11+, exporter, foreign firm and foreign share, city population category dummies. In columns 1–2 country FE is controlled. In columns 3–6 country level variables, including ln(GDP pc), ln(population) and ln(population density), are controlled.

DB = Doing Business; ES = Enterprise Surveys; GC = Global Competitiveness Index; HLO = Harmonized Learning Outcome; Lgrow = one-year employment growth rate in percentage points (growth); ln(LP)=ln(sales/number of employees) (labor productivity); WB = World Bank.

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

links between the business environment and firm performance, allows us to understand whether foreign-owned and domestic firms respond differently to the BE due to differences in their endowment and/or returns. To this end, we allow this link to differ by whether the firm is foreign owned (“Foreign”). That is,

$$Response_{jckit} = \alpha_1 \cdot BE_{kt} + \alpha_2 \cdot BE_{kt} \times Foreign_i + X_{jt}\beta_1 + W_{kt}\beta_2 + \theta_i + \eta_t + \epsilon_{jckit} \quad (2)$$

We do this one aspect at a time to avoid multicollinearity. For instance, we regress a firm’s response to the Enterprise Survey indicator of Corruption Obstacle to the Global Competitiveness indicator on Corporate Ethics, conditioning on country and firm controls, industry and year fixed effects. The results are presented in table 8.

**Government Protection–corruption.** Foreign-owned and domestic firms are similarly hampered by a low level of the Corporate Ethics measure, as shown by the similar magnitudes of the coefficient of the Global Competitiveness Corporate Ethics indicator in explaining the Enterprise Survey’s Corruption Obstacle indicator (0.122 versus 0.151). This is consistent with our earlier finding that foreign firms do not differ signif-

icantly from domestic firms in the effect of corruption on their firm performance.

**Government Protection–safety.** Foreign-owned firms appear to be much more sensitive to physical safety. When the Global Competitiveness Police System score is lower—that is, when the host country’s physical safety is worse—foreign-owned firms increase their security costs significantly more: 33 percent more (that is, -0.004 versus -0.003). This is consistent with the notion that because the return to physical safety is higher for foreign-owned firms (as demonstrated by a higher return from reducing Security Costs for foreign firms for log labor productivity, LP), they increase their investment in safety more when the local environment is worse.

**Human Capital.** Similarly, foreign-owned and domestic firms do not differ significantly in their perception of skill obstacles (the Enterprise Survey’s Skill Obstacle measure) when facing similar country-level human capital (as captured by the Global Competitiveness Education System measure or the World Bank’s HLO).

**Access to Finance.** Compared to domestic firms, foreign-owned firms are less sensitive to local financial development (as captured by the Global Competitiveness indicator, Financial Development). This is con-

**Table 8**  
Firm response to BE indicators from GC and DB, by ownership.

ES Dependent Variables	Corruption Obstacles	Security Costs	Web	Power Outage	Skill Obstacles	Overdraft	Power Outage	Overdraft	Land Acc Obstacles	Skill Obstacles
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Foreign firm	-0.030 (0.021)	0.009 (0.006)	0.034 (0.027)	-0.032 (0.025)	-0.028 (0.021)	-0.000 (0.027)	-0.029 (0.024)	0.004 (0.030)	-0.007 (0.022)	-0.025 (0.022)
GC Corporate Ethics *	-0.151*** (0.022)									
Domestic GC Corporate Ethics *										
Foreign GC Corporate Ethics *										
GC Police System *		-0.003*** (0.001)								
Domestic GC Police System *										
Foreign GC Police System *										
GC Broadband *			0.033* (0.017)							
Domestic GC Broadband *										
Foreign GC Broadband *										
GC Electricity Quality *				-0.125*** (0.020)						
Domestic GC Electricity Quality *										
Foreign GC Electricity Quality *										
GC Education System *					-0.020 (0.020)					
Domestic GC Education System *										
Foreign GC Education System *										
GC Fin Development *						0.077*** (0.029)				
Domestic GC Fin Development *										
Foreign GC Fin Development *										
DB Get Electricity *							0.019 (0.016)			
Domestic DB Get Electricity *										
Foreign DB Get Electricity *										
DB Get Credit *								0.024 (0.022)		
Domestic DB Get Credit *										
Foreign DB Get Credit *									-0.014 (0.031)	
DB Construction Permit *										-0.030* (0.017)
Domestic DB Construction Permit *										
Foreign DB Construction Permit *										
WB HLO *										0.018 (0.033)
Domestic WB HLO *										
Foreign WB HLO *										
Year, Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm, Country ctrl	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	58,942	56,711	59,764	59,514	59,943	56,850	61,556	58,900	60,288	59,631
adj. R <sup>2</sup>	0.147	0.013	0.270	0.145	0.086	0.195	0.120	0.185	0.043	0.083

SEs are clustered at country level. All business environment indicators are standardized with their sample mean and standard deviation. Firm level control variables include biggest owner share, small/medium/large firm, age 6–10, age 11+, exporter, foreign share, city population category dummies, and number of competitor dummies. Country level control variables include ln(GDPpc), ln(population) and ln(population density).

BE = business environment; DB = Doing Business; ES = Enterprise Surveys; FE = fixed effects; GC = Global Competitiveness Index; HLO = Harmonized Learning Outcome.

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

sistent with our earlier assumption that foreign-owned firms have better access to finance from their headquarters so that they depend less on the host country's financial system.

**Infrastructure.** Relatedly, foreign-owned firms are less hampered by the host country's electricity quality (as captured by the Global Competitiveness Electricity Quality measure), and less helped by the availability of broadband and internet (as captured by the Global Competitiveness Broadband measure).

**Barriers to entry/exit.** Higher barriers to entry, as captured by a lower value of *Doing Business* Construction Permit, are associated with relatively higher *Enterprise Survey's* Land Access Obstacles for foreign firms.

Overall, we find foreign-owned firms to be less sensitive to access to finance, electricity quality, and internet quality, but more vulnerable to the lack of physical safety and the difficulty of obtaining construction permits. Interestingly, domestic and foreign-owned firms do not differ much in their responses to corruption and human capital.

## 6. Conclusions

This paper expands earlier literature on the relationship between firm performance and the business environment using multiple popular data sources and measures, including both the de jure *Doing Business* indicators at the country level, and the de facto *Enterprise Survey* indicators measured at the regional level, as well as the *Global Competitiveness* indicators at the country level. We find that the three sets of indicators offer independent sources of variations in explaining firm performance. Among them, the *Enterprise Survey* indicators explain the largest share of variations in firm performance. Our investigation also suggests that the de jure *Doing Business* indicators are more effective in improving firm performance in countries with better contract enforcement.

By comparing the three sets of estimates, we are able to modify our priors on the effects of the business environment. In particular, we increase our confidence on the four aspects of the business environment with which the multiple sources of data yield more consistent findings: access to finance, electricity, internet, and human capital. For these indicators, results from at least two data sets are robust and the third set does not contradict the other two. We are less sure about the negative effect of corruption. We also find substantial heterogeneity of the effects of the business environment by firm ownership. In terms of productivity, foreign-owned firms benefit more from the maintenance of physical safety and from ease in obtaining construction permits, and gain competitive advantages with respect to domestic firms when domestic infrastructure or access to finance is worse. Foreign-owned firms are less burdened in terms of firm growth by difficulty in land access.

Our research has several policy implications. First, because using multiple sources of data allows us to alter our priors about the importance of various elements of the business environment, we believe it is important to collect new data, and to exploit under-utilized data to enrich our understanding of the effects of the business environment. Second, we believe it is crucial to consider the interaction of government enforcement and de jure institutions. Government enforcement ability and incentives differ greatly across countries due to differences in the income level, history, and complementary institutions. The same de jure laws and regulations would have vastly different effects in countries with distinct enforcement. Third, due to differences in resources, technology, and bargaining power, firms of different ownership respond quite differently from the same business environment. Targetted policies and regulations should be considered. Our findings here thus echo the O-ring theory of development that emphasizes distinct binding constraints in different contexts (Kremer 1993).

Our study is subject to an obvious and important caveat. All our findings are associations, and we do not have a credible identification strategy for making any causal statements. While the authors have been able to change their priors on various aspects of the business environment, as mentioned above, the readers are encouraged to make up their own minds for alternative interpretations of our findings here.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Appendix

Table A1.

Table 9  
Control variables for table 5, columns, (4), (8), and (9).

Dependent Var.	Lgrow	ln(LP)	TFP
	(1)	(2)	(3)
Biggest owner share	1.840*** (0.321)	-0.397*** (0.076)	-0.115** (0.054)
Small firm (21-50)	2.222*** (0.322)	0.151*** (0.037)	-0.055* (0.029)
Medium firm (51-200)	3.059*** (0.471)	0.330*** (0.043)	-0.093** (0.039)
Large firm (201+)	3.981*** (0.674)	0.316*** (0.056)	-0.308*** (0.053)
Firm age: 6-10	-4.516*** (0.908)	0.063* (0.033)	0.006 (0.028)
Firm age: 11+	-7.693*** (1.347)	0.071* (0.037)	-0.010 (0.032)
Exporter	0.159 (0.232)	0.253*** (0.044)	0.219*** (0.036)
Foreign owner share	-1.714 (1.038)	0.462*** (0.102)	0.310*** (0.088)
Foreign firm (foreign share > 0)	-0.047 (0.784)	0.000 (0.082)	0.069 (0.083)
<i>City population category (Base group: population &lt; 50k)</i>			
City Population: capital	0.481 (0.519)	0.161** (0.067)	0.226*** (0.059)
City Population: more than 1m	0.511 (0.427)	0.034 (0.057)	0.148* (0.085)
City Population: 250k~1m	-0.216 (0.392)	0.063 (0.057)	0.111* (0.063)
City Population: 50k-250k	-0.493 (0.413)	0.069 (0.043)	0.063 (0.058)
ln(Population)	0.038 (0.188)	0.084* (0.049)	0.047 (0.040)
ln(GDP pc)	0.403 (0.451)	0.366*** (0.076)	0.377*** (0.058)
ln(Population density)	-0.647*** (0.235)	-0.048 (0.066)	-0.144** (0.065)
<b>All BE indicators</b>	Yes	Yes	Yes
Year, Industry FE	Yes	Yes	Yes
Observations	45,716	42,880	26,592
Adjusted R <sup>2</sup>	0.066	0.337	0.221

Note: Standard errors clustered at the country level. The missing values of the firm-level control variables are imputed with city-industry-size mean. Firm size is in terms of number of employees. BE = business environment; FE = fixed effects.

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

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