How Bribery Distorts Firm Growth

Differences by Firm Attributes

Murat Şeker

Judy S. Yang

The World Bank
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Abstract

How corruption affects economic performance has been studied for over a decade. Yet the lack of detailed firm-level data has limited research regarding who is carrying the real burden of corruption. This study shows that for firms in the Latin America and Caribbean region, bribery significantly distorts firm growth. Firms that pay bribes when conducting business transactions—such as applying

for permits, electricity, or water connections—have 24 percent lower annual sales growth than firms that do not face such solicitations. Moreover, these distortions are more severe for low-revenue-generating and young firms. Using the instrumental variables method, the authors show that these results are robust to different specifications and the use of different sub-samples.

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How Bribery Distorts Firm Growth: Differences by Firm Attributes¹

Murat Şeker and Judy S. Yang²
Finance and Private Sector Development
World Bank

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² **Contact:** Murat Şeker: mseker@worldbank.org, Judy S. Yang: jyang4@worldbank.org, 2121 Pennsylvania Avenue NW Washington DC, 20433 MSN F4-P 402.

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1. Introduction

In empirical studies, corruption and bribery have been found to have a negative effect on firm growth and performance. However, bribery can affect individual firms differently depending on their attributes, and the possible differential effect of bribery on firm growth has not been studied extensively. This paper identifies the differential effects of bribery by firm size based on sales as well as firm age. Understanding the significance of differential effects across firm characteristics is valuable from a policy perspective since it allows for specific recommendations on promoting private sector development.

We use firm-level data from the Latin America and Caribbean (LAC) region, covering 29 countries. There is large variation in sales growth for firms in LAC. Average annualized sales growth is modest at about 3 percent, and the standard deviation is 35 percent. Bribed firms in LAC have an average growth rate of 0.9 percent compared to 3.3 percent for firms that were not bribed.

Understanding constraints to firm growth is especially relevant in LAC since the region has experienced multiple financial crises in the early 2000s and again in 2008. While there has been great effort to promote development, efforts have been concentrated on increasing consumption rather than development of the private sector. Moreover, economic growth in LAC has been credited to changes in commodity prices rather than increases in productivity. Recognizing business climate factors constraining firms is valuable for future growth. Corruption in Latin America is regarded to be commonplace (Gaviria 2002). Many countries in the Latin America region rank as high corruption countries. Transparency International's Corruption Perception Index ranges from 0 to 10, with low scores characterizing highly corrupt countries. As an example, in 2009, Argentina scored 2.9 compared to the U.S. with a score of 7.5.

Using data from 1999, Gaviria (2002) finds negative effects from corruption on sales growth for firms in Latin America. However, perception-based corruption data are used and the possibility of simultaneity is not addressed. Asideu & Freeman (2009) also use firm-level data from 1999 and find no significant effect from corruption on investment growth in the region. Compared to previous research on corruption in LAC, we offer new insights using recent data. We find objective measures of bribery have a negative effect on sales growth. In particular,

young firms and firms with low sales are more severely affected by bribery than their counterparts. We do not find significant effects from bribery on employment growth. This may imply that bribery does not affect job creation as significantly as revenue streams.

The literature discussing the effect of bribery on firm sales growth is limited, and related studies are often restricted to individual country studies or utilize subjective measures of corruption. Many firm-level studies finding negative effects from corruption focus on only one country and none being in the LAC region: Uganda, Mauritania, China, and India (Fisman & Svensson 2007; Francisco & Pontara 2007; Hallward-Driemeier et al 2006; Honarati & Mengistae 2005).

There are several studies with wider country coverage that do not find corruption having a significant and robust effect on firm sales growth, investment, or employment growth (Beck et al 2005; Asideu & Freeman 2009; Aterido et al 2011). Still, other research with large country coverage utilizes perception-based measures of corruption (Bastos & Nasir 2004; Beck et al 2005; Carlin et al 2006; Gaviria 2002; Commander & Svejnan 2007). Objective measures are preferred over subjective or perception-based measures since they are less prone to measurement error or endogeneity problems. Perception-based data can be confounded with the aggregate health of the economy and lead to counterintuitive correlations. For example, Kaplan & Pathania (2010) find firm perceptions of the business environment are worse in periods of high growth. Asking firms to rank their perception of the severity of a business climate element such as corruption poses a host of problems. Responses may not reflect the actual severity of a business climate element, but how much the element is relevant to their business. In this paper, we use objective measures of corruption, specifically, whether or not a firm was solicited for a bribe when conducting business transactions.

Lastly, research on corruption often focuses on effects conditional on country and institutional characteristics and not firm-level characteristics (Mauro 1995; Kaufmann et al 2004; Mo 2001; Wei 2000; Lambsdorff 2003; Johnson et al 2000; Djankov et al 2002; Shleifer & Vishny 1993; Seligson 2006). In this paper, we focus on differences across firm characteristics, which is more useful to identify what types of firms are the most sensitive to corruption. From a policy perspective, understanding determinants at the firm-level is preferred since these results

aide policy makers to make precise recommendations (World Bank 2004; Pande & Udry 2005; Durlauf et al 2008; Dethier et al 2010).

In theory, bribery can have smaller distortionary effects for large or old firms. The regulatory capture branch of public choice theory suggests that regulatory power is “captured” by the very industries they were designed to regulate, and acts to the benefit of these industries. Large or established firms are more likely to be beneficiaries of regulatory capture since they have longer tenure and influence in the market. In the data, bribery interactions are recorded for business transactions conducted with public workers or officials such as connections for water and electricity, permits, and tax meetings.

Handling bribes also consumes a manager’s time. The loss of leadership from a manager dealing with bribery is more costly for younger firms requiring guidance from management while setting up their business. Firms with high sales may also be better suited to carry the financial burden of a bribe, while firms with low sales are more sensitive to bribe requests. The amount of bribe requests is not necessarily scaled according to a firm’s sales; Clarke (2011) finds that most bribes in African countries are petty. If most bribes are petty, firms with low sales are affected relatively more severely than firms with high sales.

It is unclear if bribery is random; bribe seekers may assess a firm before requesting a bribe. Profitable firms may be targets of bribery (Svensson 2003). To control for this possible endogeneity and reverse causality of high performing firms being targets of bribery, we instrument a firm’s bribery exposure by the average bribery exposure in their sector and location cluster. Fisman and Svensson (2007) use this instrumental variable method to identify the impact of corruption on firms in Uganda, and other authors have used similar methods to identify effects of the business climate on various types of firm performance (Dollar et al 2005, 2006; Şeker 2011a; Aterido et al 2011). This strategy assumes that a cluster’s average level of bribery is uncorrelated to a firm’s unobservable characteristics that affect the probability of being solicited for a bribe. For instance, certain regions may have a more corrupt official than another, and this is unrelated to unobservable firm characteristics. For each firm, the cluster average assigned to a firm excludes a firm’s own bribery data. Therefore, local bribery conditions at the location and sector explain variation in firm performance, but an individual firm’s performance will have no impact on the location and sector average. Under this construction, the cluster average

minimizes reverse causality. It is still possible that high-corruption areas experience low-growth rates and have inherently poor business environments. In our identification strategy we include a set of location dummy variables to control for local effects.

The effect of bribery on sales growth from 2007 to 2009 is examined for firms in the LAC region. We find evidence that when established (age ≥ 10 years) or large firms are bribed, their real annual sales growth is significantly less negatively affected than for younger or smaller firms.

First, we find significant differences in the impact of bribery by the size of firms based on their sales levels. Firms who are bribed grow 23.6 percent slower than firms who are not bribed. We also find that distortion from bribery decreases as annual sales increase. Compared to bribed firms with sales level in the 75th percentile, bribe-payers with sales in the 25th percentile have sales growth that is 43 percentage points lower (more than one standard deviation). These results are robust to a series of robustness tests including variations in country groupings, constructions of the bribery measure, and sample restrictions. We also obtain similar results when using a panel data set of firms surveyed in both 2006 and 2010.

Secondly, among small and medium-size enterprises (SMEs) with fewer than 100 full-time employees we find that young firms (age < 10 years) are also more adversely affected by bribery solicitations than old firms. Age has an even larger compensating effect for bribery than being a firm with higher sales. While age and sales are strongly correlated, results including both interactions are significant for the sample of SMEs. Older firms have significantly smaller bribery distortions in non-Caribbean economies.

The remainder of the paper is organized as follows. Section 2 discusses the empirical strategy. Section 3 discusses the data and how the measures of bribery are constructed. Lastly, empirical results and sensitivity analyses are discussed in Section 4. Section 5 concludes.

2. Empirical Strategy

This section discusses the empirical strategy to identify the effects of bribery on firm growth. Since the data used in the analysis is a cross-section, endogeneity of bribery may lead to

inconsistent estimates of the impact of bribery. Bribe seekers or corrupt officials could adjust their bribe request based on firm efficiency level and wealth. Such firms could be more prone to solicitations (Svensson 2003). Moreover, the owner or manager of a firm may have ties with public officials that protect the firm from abuse by bribe seekers. These relationships emerge naturally in firms with government ownership. The data used in this study exclude firms that are fully government owned. Although a firm could have a minority government ownership; in the LAC region, only 55 out of 12,449 firms reported positive amounts of government ownership, so relationships with the government or public officials do not pose an endogeneity problem³.

Selection bias may be present due to the design of the survey. A firm is asked about bribery exposure only if it conducted specific business transactions. It is possible that firms who want to expand are more likely to conduct these business transactions and are more prone to be solicited. Implementing a sample selection correction for firms conducting business transactions is difficult with the data used in this paper since it is difficult to find an exclusion restriction which predicts the likelihood of conducting a business transaction that is not related to unobservable performance measures affecting growth. However, conducting business transactions is a common practice as 74 percent of firms in the whole sample conducted at least one transaction. This large share alleviates some concerns for selection bias.

To address the endogeneity problem, we instrument each firm's bribery exposure with the average bribery exposure in their country-location-sector cluster. For identification, we assume that in addition to an idiosyncratic component, whether or not a firm is bribed is determined by the underlying characteristics of the particular country-location-sector of the firm. Several studies have drawn attention to the variation of investment climate factors across sub-national regions within countries. Almeida and Carneiro (2009) show that enforcement in labor regulations show great variation across Brazilian states. Dollar et al (2006) emphasize the importance of location for the dynamism of economic activity and economic development which could affect the likelihood of being bribed. Note that we do not cluster by firm size since a cluster's bribery exposure is assumed to be exogenous to firm bribery exposure. Unobservable firm efficiency may differ systematically by firm size.

³Only 14 firms reported government ownership over 50 percent, and these firms are spread over many countries in the region.

To motivate the use of average bribery statistics as an instrumental variable, consider the simplified linear regression model where sales growth is a function of bribery and a firm-specific component (v_{ik}) (1).

(1)

$$g_{ik} = \alpha_0 + \alpha_1 B_{ik} + \alpha_2 v_{ik} + \varepsilon_{ik}$$

The dependent variable, g_{ik} , is the sales growth of firm i who is in a location-sector cluster k . The variable B_{ik} is a firm's individual bribery statistic. Corruption distorts firm growth and the coefficient α_1 is expected to be negative. The error term, ε_{ik} , is a mean-zero idiosyncratic error term. For simplicity, assume the firm-specific component is correlated with growth and factors influencing a firm's exposure to bribery. We can also interpret the firm-specific component to capture the likelihood of a firm conducting a business transaction, such as intentions to expand their business. Omission of this variable will lead to biased coefficient estimates. When v_i is omitted, the error term is no longer orthogonal to the regressors. Assuming $\text{corr}(B_{ik}, v_i) > 0$ and $\alpha_2 > 0$, the bias in the coefficient estimate of α_1 will be positive, and lead to a positively-biased OLS coefficient⁴.

Identification relies on the assumption that bribery has an additive structure where a first component is firm-specific, and a second component is location and sector specific (2).

(2)

$$B_{ik} = \beta_{ik} + \bar{B}_k$$

The variable $\bar{B}_k$ is the average bribery levels in a country-location-sector group k , while β_{ik} is the firm-specific contribution to the bribe statistic. The necessary assumption is that across locations and sectors, bribery exposure is partly explained by local external effects that are exogenous to the characteristics of an individual firm.

Certain sector specific factors like international engagement or dependence on publicly provided infrastructure services can affect exposure to bribery. Since the sample size is small for many countries, we define two sector groups manufacturing (ISIC 15-37) and services including

⁴ We verified this hypothesis. Estimation result with OLS method, which is available upon request, yielded positive coefficient on bribery measure. Fisman and Svensson (2007) also find positive OLS estimates of bribery coefficients.

retail (ISIC 51-52) and other service sectors like transportation, hotels, and restaurants, and construction services (Table 1). Roughly 60 percent of firms are manufacturing, and the remaining are in the services sectors. From a data perspective this selection of sector clustering is also attractive since these two sector groupings are common stratifications across all countries.

Another source of exogenous variation in extraction of bribery is the geographical location of the firm. A region with corrupt officials will yield a higher number of bribery solicitations and higher bribery exposure in that location. This frequency of exposure is independent of an individual firm's characteristics. Urban and rural region differences can also play a role in the frequency of bribes being involved in business transactions. These external environmental factors are uncorrelated to idiosyncratic unobserved firm-specific characteristics that are correlated to a firm's individual experience with corruption.

The use of macro-level averages to correct for reverse causality is a common strategy to address endogeneity from perception-based or corruption related explanatory variables. Fishman and Svensson (2007) instrument firms' responses with industry-location averages of bribe and tax payments. They show these factors negatively affect firm growth in Uganda. Dollar et al. (2005, 2006) replace firm responses with country-city-sector averages of trade barriers, power outages, government services, and access to finance. They show how these factors affect productivity and export performance. This strategy is also suggested by Dethier et al (2010), Escribano and Guasch (2005), Hallward-Driemeier et al (2006), and Commander and Svejnar (2007). When computing the country-location-sector average, a firm's own response is excluded to minimize reverse causality. In addition, the sample of firms is restricted to those who are in country-location-sector clusters with at least thirty firms for which bribery information is available.⁵ These conditions assure the country-location-sector average is exogenous to a firm's individual response and prevents a single firm's response to dominate the average.

While this strategy corrects for the reverse causality of high performing firms predicting bribery exposure, it does not address the possibility that certain regions high in corruption are also poor environments for doing business. Extracting exogenous variation in the incidence of bribery across regions unconditional of the investment climate is difficult. In regression analysis,

⁵ There is no particular reason why we picked 15. Estimation results using 30 observations as cut-off were quite similar. With cut-off of 15, we drop 20% of the sample (with cut-off of 30, we drop 50%). Average bribery measures and descriptive statistics for the regression sample are similar to the full sample.

we will include a full set of country and location dummy variables to capture local effects. We also rely on a rich set of sensitivity checks with different country groups, firm groups, and variations in bribery measurement.

3. Data

Firm-level data for the LAC region are available from the World Bank’s Enterprise Surveys (ES) database. Enterprise Surveys is a primary data source for studying firm growth, obstacles, and performance.⁶ There is great variability in the income and development levels of LAC countries yielding a heterogeneous group of firms. ES data for the LAC region is also unique because it is the first region to have completed two rounds of surveys following the same sampling methodology with a focus on panel data collection. A panel data set of firms interviewed in 2006 and 2010 will also be utilized to study the effects of corruption on firm growth.

Firms are asked if they were solicited for bribes when conducting a specific set of business transactions. Data on solicitations for six business transactions are available; requesting electricity or water connections; obtaining a construction, operating, or import license; or meetings with tax officials (Table 2). Note that we are only informed about bribery activity conditional on a firm participating in a business transaction within the last complete fiscal year, and there may be other instances of bribery not captured in the surveys. This is a clear disadvantage, however, since we are capturing instances of corruption occurring when a firm is trying to “get things done”, the data will capture how often bribery affects business operations when it matters. Framing in the last complete fiscal year is also consistent with reported annual sales.

As discussed in the previous section, we restrict the data to firms located in country-location-sector cells with at least thirty responses to bribery questions. A description of the variables is listed in Table 3, and a comparison of summary statistics for firms in the full and regression samples is presented in Table 4. Means and the standard deviation across countries are presented. There are 29 countries in the study. Brazil is excluded since it was surveyed independently in

⁶ See <http://www.enterprisesurveys.org/> for the methodology and details of the data.

2009. Venezuela is excluded because the country underwent a currency regime change and there are doubts if sales figures were reported in the old or new currency. The sample is slightly reduced to 11,368 firms after restricting to cells with at least thirty bribery responses.

Seventy-four percent of the full sample (9,104 firms) conducted at least one of the six business transactions, and recall that a firm must participate in at least one transaction to have bribery data. Panama has the lowest proportion of firms who conducted at least one business transaction (40 percent). The coverage in the remaining countries is quite high, at least half, and over 90 percent of firms in Guyana conducted at least one business transaction. Historical data on past annual sales has a lower response rate than other variables used in the analysis. These two factors and excluding firms with other missing information reduce the sample to 6,554 firms, which is referred as the regression sample.

There is very little difference in the statistics on explanatory characteristics across sample restrictions. For example, in both the full and regression samples, 16-17 percent of firms are exporters. About 30 percent of firms use external financing for investments, 26 percent of firms are sole proprietors, and 15 percent of firms have at least 10 percent foreign ownership. The average age of firms in the region is 18 years. The distribution of firms across industries is also similar between the full and regression samples.

In the full sample of LAC firms, a total of 17,513 reported business transactions were reported, and 1,052 transactions (6 percent) included a bribe solicitation that affected 981 firms. Among firms conducting business transactions, average annual sales growth is higher for firms who were never bribed than for firms who were bribed (3.3% vs. 0.3%). In the regression sample, the difference in sales growth for bribed or non-bribed firms is virtually identical to the full sample. It is important that firms are not systematically excluded from the sample based on their characteristics.

Real annualized sales growth is higher in the regression sample, but insignificantly so by less than half a percentage point. Controlling for characteristics in the previous period is important when estimating growth. In 2007, the average firm had 32 full time employees and an average worker produced \$43,914 USD.

Comparing the full and regression samples, the percent of firms bribed in different business transactions is similar. For example, in both the full and regression samples, about 5 percent of firms were bribed when applying for an electricity connection. In the regression sample, there are slightly higher proportions firms bribed when applying for water connections, construction permits, and operating licenses. But this increase is expected since the sample is being restricted to cells with sufficient bribery data.

Among the six business transactions included in the study, meetings with tax officials are the most common interaction for firms. In the regression sample, 71 percent of firms report having met with a tax official. Water connections are the least common service requested; only 9 percent of firms requested this service. This could be caused by the fact that new firms are the most likely group to request a water connection and this group of firms is under-represented in the data. The other four services were requested by about 30 percent of firms each. By component, the incidence of bribery is highest when firms request construction permits or water connections, 14 percent of firms conducting these business transactions were bribed. The high level of bribery occurring with water connections is driven by Caribbean countries.

Two measures of bribery are used in the analysis: i- Bribery Indicator, (*BI*), ii- Bribery Indicator, Whole Sample (*BIW*). These measures are explained in detail below.

3.1 The Bribery Indicator

The Bribery Indicator (*BI*) equals one if a firm was solicited at least once when conducting business transactions. The construction of the Bribery Indicator is presented below.

$$BI_{ik} = \begin{cases} . & \text{if firm } i \text{ did not participate in a business transaction} \\ 0 & \text{if firm } i \text{ participated in a business transaction and was never bribed} \\ 1 & \text{if firm } i \text{ participated in a business transaction and was bribed} \\ 1 & \text{if firm } i \text{ participated in a business transaction and refuses to answer question} \end{cases}$$

Even though the indicator only reflects the instances of solicitations and not payment amounts, it is still a useful measure of how often firm operations are disrupted by bribery, which can still affect firm sales and production. Also, it can be assumed that if a firm is solicited, then the interference to business operations is already done; bribe-seekers are unlikely to retract a

bribe request or ignore an unsatisfactory payment. This measure is objective, which is preferred to perception based measures that have been used in many previous studies.

During survey collection, respondents have the option to refuse to answer or to say they don't know the answer. When a firm's response to the question if they were bribed is a refusal, the refusal is treated as an affirmative response to bribery. The rationale behind this is that if a firm refuses to answer a question about bribery, then they were likely bribed. We treat the cases where the participant doesn't know the answer as missing.

Transparency International constructs Corruption Perception Index (CPI) which ranks more than 150 countries by perceived levels of corruption determined by expert assessments and opinion surveys. A lower CPI scores implies a more corrupt country. Data from the index and ES is available for 22 LAC countries. A comparison of the Bribery indicator with the CPI scored in 2009 shows that firm responses mirror the country scores from the CPI (Figure 1). There is a strong negative correlation between the CPI and the percent of firms bribed across countries, the R-squared of the best-fit line is 0.29.

The incidence of bribery in the regression sample is marginally higher than compared to the full sample (Table 4). This is reassuring that we are not altering the incidence of bribery in a significant way by restricting the sample; the loss of observations from non-response is also not altering the average levels of bribery.

Comparison of the incidence of bribery by country for the regression sample is presented in Table 5. There is significant variation across countries. The highest proportion of firms being bribed is found in Paraguay and the Bahamas; 31 and 27 percent of firms were bribed when conducting of the selected business transactions. In Paraguay, the incidence of bribery is almost three times higher than the average in the entire LAC region (10.3 percent). Among large countries, Chile and Colombia have very low proportions of firms who are bribed (2.8 and 4.7 percent). There are also a number of other countries with fewer than 5 percent of firms being bribed: Barbados, Dominica, Grenada, Panama, St Kitts and Nevis, St Vincent and the Grenadines, and Uruguay.

There are a total of 101 clusters in the region. No country is dropped out due to an insufficient number of firms in clusters. Within countries, there is large variation in the percent

of firms being bribed, even when there are a small number of clusters. In Mexico, 22 percent of firms in the Greater Mexico City area were solicited for bribes whereas in the Monterrey region 9% were solicited. In Argentina, 16 and 11 percent of firms in Buenos Aries and Mendoza respectively were bribed. While there is only one cluster in several small island economies, there is variation across these economies: 27 percent in the Bahamas, and 2.7 percent in St. Kitts and Nevis.

Corruption is not consistently higher in a particular sector across countries. In Peru, the bribery rate is virtually the same in both manufacturing and services sectors, about 17 percent. In Argentina, there is a larger differential across sectors: 15.3 percent of firms in manufacturing were bribed compared to 9.4 percent of firms in services.

3.2 The Bribery Indicator (Whole Sample)

We construct another version of the bribery indicator that incorporates firms who did not have a business transaction (*BIW*). Here we denote firms who did not conduct a business transaction as not being bribed.

$$BIW_{ik} = \begin{cases} 0 & \text{if firm } i \text{ did not participate in a business transaction} \\ 0 & \text{if firm } i \text{ participated in a business transaction and was never bribed} \\ 1 & \text{if firm } i \text{ participated in a business transaction and was bribed} \\ 1 & \text{if firm } i \text{ participated in a business transaction and refuses to answer question} \end{cases}$$

In the full LAC sample, 74 percent of firms participated in at least one business transaction. The remaining 26 percent may be poor performing firms, and this may contribute to selection bias in unobservables affecting sales growth and the likelihood of being solicited for a bribe. Inclusion of firms who did not conduct a business transaction also increases the sample a fair amount since there will be more country-location-sector cells with at least 30 firms. In the full sample, 7.7 percent of firms were bribed when we include firms who did not participate in business transactions, this is about 3 percentage points lower than when not including these firms. Since the sample is larger, there are 174 clusters when the bribery indicator is computed for the whole sample, 13 more clusters than with the main Bribery Indicator.

4. Estimation

The specification used for the empirical estimation is shown in Eq. (3).

(3)

$$g_{ik} = \alpha_0 + \alpha_1 B_{ik} + \alpha_2 (B_{ik} \times S_{ik}) + \alpha_3 X_{ik} + \sum Ilocation + \sum Icounty + \sum Iindustry + \varepsilon_{ik}.$$

The dependent variable used in the analysis is real annualized sales growth g_{ik} , which is computed for firm i in cluster k as the difference in log sales in 2009 and 2007 divided by two. Nominal sales values are deflated by GDP deflators obtained from World Development Indicators and converted to 2009 USD with exchange rates also obtained from World Development Indicators. The variable B_{ik} represents one of the bribery measures described earlier (BI_{ik}, BIW_{ik}). The vector X of control variables include dummy variables for foreign ownership, if the firm is an exporter, sole proprietor, has external financing for investments, had at least one business transaction in the last two years, is medium (20-99 employees), or is large (over 100 employees). Continuous variables include log age and its squared term, log sales in 2007 (denoted as S_{ik}) and its squared term (see Table 3 for description).

Lastly, a full set of industry, geographic location, and country dummy variables are included in all regressions. Industries are likely to vary in intrinsic volatility of demand and supply shocks due to differences in technological or market characteristics. These differences might create variation in how bribery affects sales growth. Industry dummies control for these differences. Error terms can be heteroskedastic and correlated across firms within the same country-location-sector group. This could bias the standard errors of the estimated coefficients downward. Therefore we present robust standard errors clustered by country-location-sector to allow for the possibility of this correlation. We also control for outliers in the data as they could bias the estimation results. In each country we performed an outlier test for log of age, sales in 2007 and 2009, and employment level in 2007 and 2009. By country, values that are further than three standard deviations from the mean are removed. A total of 860 firms are removed after outlier analysis on these five variables.

Size and age are two important firm characteristics that affect sales growth. However this effect could be non-monotonic. To control for these factors, we include log of sales and age as well as their squared terms in the regressions. Firms with foreign-ownership could access more easily to better technology and knowledge base which reduces the cost of R&D and promotes growth (Şeker 2011b). For the ownership status, we set a dummy variable equal to one for firms with more than 10% of foreign ownership. Recent research in international trade literature as reviewed by Bernard et al. (2007) and Greenaway and Kneller (2007) show that exporting firms are larger, more productive, and grow faster. Legal status of firms is also relevant. Firms that are sole proprietors may have lower sales growth since they are smaller and fully liable and take fewer risks or pursue fewer opportunities.

As studies like Fisman and Svensson (2007) and Aterido et al. (2011) have shown, bribery is a distortion and is expected to have a negative effect on sales or employment growth ($\alpha_1 < 0$). Solicitations can distract managers from daily work as well as being financially costly. If a firm does not pay a requested bribe, they may not obtain a necessary license or service which can result in further barriers to production and operations. However, the magnitude of this distortion could vary across size measured in log of sales. In order to test this hypothesis, bribery measures are interacted with firm's previous sales. The total effect of bribery on annual sales growth can be measured as

(4)

$$\frac{\partial g_{ik}}{\partial B_{ik}} = \alpha_1 + (\alpha_2 * S_{ik}).$$

The sign of coefficient α_2 determines how the effects of bribery on growth change with sales. The sign could go either direction. A firm with higher sales may be able to absorb the distortions from bribery solicitations better than firms with lower sales. On the other hand, such a firm would attract more attention by corrupt officials and will face more frequent and larger bribe amounts which could be more distortive for their operations. We perform the same test with firm's age. A dummy variable is set to one for firms that are at least 10 years. Established firms which have successfully survived could be less severely affected by the frequency and amounts of bribery payments. They would also have accumulated more experience in how market transactions work. Moreover, the regulatory capture view states that incumbents are beneficiaries

of regulation if these firms have obtained control over the regulatory processes. Examining if there are differential effects in who bribery affects among young and old firms will empirically test the regulatory capture view. The business transactions surveyed in Enterprise Surveys also refers to activities involving public workers or officials.

4.1 Estimation Results

Among firms who conducted business transactions, those who were bribed have lower sales growth (0.9%) than those who were not (3.2%). Note that the variation in annual sales growth is high. Among firms who were bribed, sales growth one standard deviation from the mean ranges from -24.3 percent to 30.9 percent. In the sample, less than half of the firms have negative growth rates. Firms who participate in business transactions on average have higher sales growth than firms who do not, and this may be correlated to higher entrepreneurial abilities or plans to expand. In the surveys, bribery data is only available for firms who conducted at least one business transaction in the past two years. The analysis is restricted to these firms, 74 percent of the sample. In the main specification, firms who did not have any transactions are excluded because it is not possible to identify whether bribery was the reason why they refrained from participating in a transaction. Although this sample restriction could lead to a selection bias, the effect of the selection is not clear. Large and efficient firms with growth potential are more likely to apply for permits and have business transactions. Yet they may also be better suited to compensate for bribery distortions. In this case, any negative impact of bribery we find would be the lower bound of negative impact of bribery. On the other hand, increased visibility in the market could lead to more frequent solicitations and higher distortions. We also present results with the sample including firms without any transaction to show whether the relationship between bribery payments and sales growth is sensitive to the composition of the sample. We make the assumption that firms who did not conduct a business transaction were not faced with bribes.

The correlation table for the variables used in the estimation is presented in Table 6. Collinearity between the control variables does not seem to be a concern for the estimation. Table 7 shows IV estimates for the full sample (29 LAC countries). In this table we use the Bribery Indicator (BI). The country-location-sector average of the indicator ($\overline{BI}_k$) is used as instrument for the firm's response. The average is interpreted to represent the likelihood of

facing a bribery solicitation when any firm in that particular cell conducts a business transaction. Additional statistics are shown below the regressions. First, the Durbin Wu-Hausman F-statistic is significant, rejecting the hypothesis that bribery is an exogenous variable. First-stage F-statistics for each instrument show whether the instruments are significant. In cases with one instrument F-statistics should be greater than 10, and in our estimation the F-statistic is 18.13 (column 1). Shea's partial R-squared shows that our instrument is positively correlated to the endogenous variable.

Coefficients on the set of explanatory variables have the expected signs. Firms with higher sales in 2007 have lower sales growth, and growth rate decreases at a slower rate. This negative relationship between growth rate and size, which could be due to mean reversion, has been shown in many studies like Dunne et al. (1989), Rossi-Hansberg and Wright (2007), and Lentz and Mortensen (2008). Control for age shows that younger firms have significantly faster sales growth. This result also coincides with stylized facts that older firms have lower growth rates (Dunne et al. (1989). Firms with foreign ownership are likely to grow faster (Şeker 2011b; Almeida & Fernandes 2008). Results show that foreign owned firms have sales growth that is around 3 percent higher than those who do not. As for the exporters, although they grow faster than non-exporters, this difference is not significant. Sole proprietors have significantly lower sales growth.

Access to finance is an important factor for firm evolution. Firms with easier access to external finance for productive investment purposes are likely to grow faster. Beck et al. (2005) use a variety of proxies for financial constraints and show how adversely these factors affect growth. Estimation results show that having access to external finance increase growth by half a percentage point. We also include two dummy variables to control for the employment level of firm: medium (20-99 employees) and large (over 100 employees) firms. These dummies provide additional control for firm's size and performance. Unlike sales, they are less volatile and less noisy. Medium and large firms grow faster than small firms with large firms having the fastest growth rate.

The principle result is the negative impact of bribery on firm growth. In column (1), bribery is estimated to have a negative effect on sales growth; firm who were bribed grow 23.6 percent less, or slightly less than one standard deviation from the average. In column (2), the exercise is

repeated to show how much this distortion varies by firms' sales levels. For firms with median sales, the total effect of bribery on sales growth is -23.9 percent⁷, which is similar to the effect from column (1). However, the distortion is larger for firms that generate low sales. We compared the effects of bribery on firms that are in the 25th and 75th percentiles of the 2007 sales distribution. Among firms who were bribed, firms with sales in the 25th percentile saw growth rates that were 43 percentage points lower than the rate for firms that are in the 75th percentile⁸.

Bribery is estimated to have a larger negative effect on the growth of small firms; a higher opportunity cost of paying for bribes is one reason for this larger effect. Small firms can find it more difficult to afford bribe requests and thus their operations are slowed down and productive investment or hiring decisions are retarded. Clarke (2011) finds that most bribes are petty. Therefore small firms may feel that bribes are more costly than large firms. On the other hand, for large firm who want to expand, paying bribes may serve to speed the attainment of permits which result in greater sales that compensate the bribe payments. The results imply visibility for large firms does not create distortions severe as for small firms.

Age is another explanation for why small firms are more severely affected by bribery. Small firms are likely to be younger. Young firms have less experience dealing with public officials, making them more vulnerable to bribery. In column (3), we interact bribery with a dummy for firms greater than 10 years old. In this interaction, firms who are older have an average 21 percent higher sales growth than young firms. In column (4), bribery is interacted with sales and age. In this specification, the coefficient on the age and bribery interaction term is positive but not significant.

Selection bias due to sample composition is a concern since bribery statistics is restricted to firms that conducted at least one business transaction. However, the direction of the bias that could emerge from the selection is not clear. Including only firms doing business transactions does not necessarily negatively bias the role of bribery since these firms may be better suited to deal with bribe seekers. Table 8 shows results including firms that did not conduct any business transactions. We assume these firms did not experience bribery. The sample increases by over 2,000 firms and there are 13 additional bribery clusters. IV estimates are shown with BIW_{ik} as

⁷ Estimated using Eq (4).

⁸ This effect is calculated using Equation (4). The total effect is calculated at the 25th and 75th percentiles of sales and then a difference is taken.

the endogenous variable, and the average bribery incidence for the whole sample ($\overline{BIW_k}$) as the instrumental variable.

In these regressions, we include a dummy variable (*Applied*) to control for whether a firm conducted a business transaction. This dummy captures the direct effect of a business transaction on sales growth. Firms who apply for business transactions may do so because they have plans to expand; those who applied for a business transaction grew about nine percent more than firms who did not apply for a business transaction. Comparing these results to those obtained in Table 7, we observe a stronger negative effect for bribery on sales growth, firms who were bribed have growth rates that are 34.7 percentage points lower, or lower by two standard deviations. However, in column (1), we cannot reject the instrument is weak. In column (2), the total effect of corruption for firms with median sales is 35 percent, almost identical to estimates in column (1) without an interaction term. Comparison of the total impact of bribe payments shows that among firms who were bribed, firms with sales in the 25th percentile saw growth rates that were 57 percentage points lower than the rate for firms that are in the 75th percentile which is more severe than the result obtained from Table 7.

4.2 Robustness Tests

We perform a variety of sensitivity checks. First we repeat the estimation by different country groupings, and for only SMEs (Table 9). Second, we use an alternative definition of the Bribery Indicator by coding refusals to bribery questions as non-responses (Table 10). Thirdly, we create clusters based on finer categories using industries, and larger categories by location only (Table 12 and Table 13). Lastly, we estimate the effects of bribery using a panel of firms surveyed in both 2006 and 2010.

A. Firm & Country Groupings

First we analyze bribery distortions for only small and medium-size enterprises (SMEs). SMEs form the backbone of economic activity in most of the developing countries and they suffer more from unfavorable business environment. In order to understand how stringent bribery is for their evolution, we restrict the sample to firms with employment levels less than 100 workers. Since sales data varies substantially across countries, we use employment levels to define SME. Excluding firms with more than 100 workers drops the sample size to 4,826 firms.

Panel A in Table 9 shows that SMEs are more severely affected in their growth from bribery. Note that in this estimation, the requirement of the minimum number of firms in a cluster is reduced to 20 instead of 30. This is done because ES sample design divides the total sample evenly by firm size; small, medium, and large. An average SME is predicted to have sales growth reduced by 2.5 percentage points if they are bribed, which is much lower in magnitude than for the entire sample of firms and is also insignificant. SMEs have a lower dispersion in their sales, and the difference between the bribery impact for firms at the 25th and 75th percentile of sales is smaller than for the entire sample; bribed SMEs with sales at the 25th percentile have sales growth that is 2.6 percentage points less than SMEs with sales at the 75th percentile.

When analyzing all firm sizes, the interaction between bribery and age was insignificant in predicting growth. When analyzing only SMEs, we find that SMEs older than 10 years are less affected by bribery (columns 3 and 4). This result shows that being in the market for longer periods allows firms to acquire experience that is needed to handle market distortions. Interestingly, older SMEs actually grow 4.4 percent higher than young SMEs when bribed. For SMEs, age is more important than sales levels in terms of characteristics that can help compensate distortions.

The data includes many small countries with a low number of bribery clusters that are used as an instrument. We exclude countries that completed Indicator Surveys, a smaller variation of Enterprise Surveys. Indicator Surveys conducted in mostly Caribbean economies targeted only 150 firms due to small country size. Variation in bribery measure across location-sector cells is low in these countries. There are eighteen countries in this sample compared to 29 countries in the whole region. Excluding these countries shrinks the sample size to 5,586 observations, which is only about one thousand observations fewer than in the entire region. Bribery continues to distort sales growth and more severely for small and young firms (Panel B, Table 9). The differential effect of bribery for firms in the 25th and 75th percentiles is smaller, 18.5 percent in 18 countries compared to 24 percent for all countries.

B. Definition of Bribery

Table 10 show results when considering a different definition of bribery. Results are shown for version 2 of the Bribery Indicator where refusals to respond to bribery survey questions are

treated as missing and reduces the sample by about 100 firms. Ignoring refusals yields a stronger negative effect of bribery on firm growth. One explanation for the increase in the effect of bribery is that firms who refuse to answer to bribery questions are those that are not the most adversely affected. Perhaps firms who use bribery to their own benefit or even offer bribes to officials are the least likely to reveal their activity. By ignoring firms like these, the remaining set of firms who admit to facing a bribe are those that were solicited forcibly, and may also be the most negatively affected.

C. Clusters

As a fourth robustness test, we performed the regressions using clusters computed two different ways, one at a finer level and one at a broader level. We originally chose sector-location cells to accommodate small sample size in some countries. The two sectors used to construct the clusters were defined as manufacturing and services.

In the finer grouping, we create clusters at the location-*industry* level. There are ten industries versus two sectors (Table 1). Due to the finer grouping, the minimum number of firms in a location-industry cluster is set at 20 instead of 30. This clustering allows for an even more homogenous group of firms in comparison to those using sector groupings. There are a larger number of clusters using industry groupings instead of sectors (138 vs. 101), but about 1,500 fewer observations in the regressions. The result of this exercise presented in Table 11 also yield significant estimates of the effect from bribery. The results are quite comparable to those obtained in Table 7 (clusters at the sector level) with slightly higher coefficients. Moreover, the coefficient of interaction of age with bribery is significant with this finer cluster definition.

Table 12 shows results using clusters at the location stratification level. The number of observations increased to 7,003 and reduced the number of clusters to 64. The interaction term between sales and bribery indicator continues to be significant. Table 13 includes results over country groupings and for SMEs only and excluding small economies; this table is comparable to results in Table 9.

D. Panel Estimation

Lastly, we repeat our analysis over a set of firms that were surveyed in both 2010 and 2006 (Table 14). The panel data is available for fourteen countries as Caribbean and several Central

American countries were not surveyed in 2006. The main benefit of using the panel data is that it allows us to control firm fixed-effects such as the entrepreneurial ability of the managers. These characteristics could make a firm a target of bribery solicitations as well as affect sales growth. Thus, the panel data has the advantage over the cross-sectional data in handling the concerns on the endogeneity of the bribe measures. However, the size of the panel is quite small (1,724 observations). For this sample, we apply the first difference estimation given as

$$g_{ik,t} - g_{ik,t-1} = \alpha_0 + \alpha_1(B_{ik,t} - B_{ik,t-1}) + \alpha_2(B_{ik,t} \times S_{ik,t} - B_{ik,t-1} \times S_{ik,t-1}) + \alpha_3(X_{i,t} - X_{i,t-1}) + (\varepsilon_{ik,t} - \varepsilon_{ik,t-1}). \quad (5)$$

In the estimation with the panel data we don't exclude firms that are in a country-sector-location cell with less than 30 observations as we do not apply the IV method. Results using the bribery indicator (with whole sample) are presented in Table 14. The sample is not restricted to sub-sample of firms with business transactions because such a restriction significantly decreases the sample size. In the second column of the table, we find that bribed firms have sales growth that is 30 percentage points lower than those who were not solicited for bribes and the impact of bribery on small firms is more severe. In the panel results, the interaction term of bribery with age is no longer significant.

5. Conclusion

A limited number of studies have examined the relationship between bribery and firm evolution. In this study, we contribute to this literature by using firm-level data from 29 developing countries in the LAC region. Our analysis is novel in a few dimensions. Micro-level data on corruption are scarce. We use data from Enterprise surveys which apply the same methodology to collect data from a large set of countries. This allows us to combine data for different countries. Second, we study the differential effects of corruption on growth. We assess the impact of bribery on sales growth by focusing on how bribery affects firms differently based on their sales and age.

We find significant differential effects of bribery by firm size and firm age. Paying bribes decreases sales growth of low-sales-generating firms more severely than high-sales-generating firms. Findings of a negative effect of bribery are robust to different sub-samples and controlling for unobservable firm fixed effects with a panel data set. By applying an instrumental variable method, we correct for reverse causality.

It is important to discern which types of firms are the most sensitive to business environment distortions. From a policy perspective, our results reinforce the importance of micro-level studies to reach conclusions to help policy makers make specific recommendations.

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Figures

Figure 1. Corruption Perception Index and Bribery Indicator Correlation

Notes: Number of countries =22. Countries with lower CPI scores are highly corrupt, while countries with low Bribery Indices have higher incidences of bribery.

Source: Enterprise Surveys, Transparency International

Tables

Table 1. Industry Classifications

Industry Group	ISIC Codes	N(firms)
Other Manufacturing	16,19,20,21,22,31, 33-37	794
Manufacturing of Food and Beverages	15	962
Textiles and Garments	17,18	603
Chemicals, Rubber, and Petroleum Products	23,24,25	863
Non-metallic minerals, basic metals, and fabricated metals	26,27,28	668
Construction	45	230
Wholesale and retail trade	50,51,52	1,620
Hotels and restaurants	55	362
Transport, storage, and communications	60-67	289
Real estate, renting, and business activities	70-74	163
Total		6,554

Notes: Sample = regression sample firms. Industry classifications follow the United Nation's International Standard Industrial Classification (ISIC) of All Economic Activities, Rev.3.

Table 2. Components of the Bribery

A firm is asked if a bribe was requested when completing the following business transactions	Enterprise Surveys variable	Bribe ry Indicator	Bribery Indicator Version 2
Application for electricity connection	C.5	X	X
Application for water connection	C.14	X	X
Application for construction related permit	G.4	X	X
Inspections or meetings with tax officials	J.5	X	X
Application for an import license	J.12	X	X
Application for an operating license	J.15	X	X
Treats refusals to respond to the question as "Yes"		X	

Note: Firms only answer these questions if they participated in the business transaction. Source: Enterprise Surveys

Table 3. List of Variables

Variable	Description
Sales Growth	Real annual sales growth from 2007 to 2009
Log(Sales07)	Log of annual sales level in fiscal year 2007
Sole Proprietorship	Legal Status is Sole Proprietor
Log(Age)	Log of firm's age
Age10	Dummy =1 if firm is 10 years or older
Export	Dummy =1 if at least 10 percent of total sales is from direct exports
Foreign	Dummy=1 if at least 10 percent of the firm is owned by foreign entities
ExtFin	Dummy=1 if at least 1 percent of investment financing is from external sources
Applied	Dummy=1 if applied for at least one business transaction
Medium	Dummy=1 if firm has 20-99 full-time workers
Large	Dummy=1 if firm has more than 100 full-time workers
Industry Controls	Control for 13 industry groups (See Table 1)
Location Controls	Control for geographic location of the firm within each country

Source: Enterprise Surveys

Table 4. Summary Statistics by Sample Restrictions

	Full Sample		Clusters N>=30		Regression Sample	
N (firms)	12357		11368		6554	
Small (<20 employees)	4696		4221		1986	
Medium (20-99 employees)	4528		4185		2485	
Large (>100 employees)	3133		2962		2083	
	(mean)	(sd-country)	(mean)	(sd-country)	(mean)	(sd-country)
Real Annual Sales Growth	2.83%	5.94%	2.64%	5.52%	3.24%	7.07%
Firms that were bribed	0.27%	8.86%	1.05%	8.64%	0.95%	8.70%
Firms that were not bribed	3.26%	6.31%	3.41%	7.28%	3.42%	7.31%
Bribery Indicators						
Bribery Indicator	10.10%	6.29%	10.34%	6.68%	10.33%	7.59%
Bribery Indicator – version 2	7.66%	6.09%	7.84%	6.43%	8.19%	7.25%
Bribery Indicator (Whole Sample)	7.43%	4.71%	7.48%	4.66%	7.75%	5.24%
Business Transactions with Bribery Data						
Electricity connection	5.66	6.69	5.46	6.70	5.08	6.96
Water connection	10.19	16.65	10.51	17.02	9.71	17.70
Construction permit	11.40	9.27	11.82	9.69	12.05	11.34
Import license	4.53	5.45	4.78	6.01	3.86	5.28
Operating license	8.14	7.61	8.19	7.76	8.11	7.87
Meeting with Tax officials	6.34	4.93	6.24	4.96	6.19	5.12
Explanatory Variables						
Log(Employment 2007)	3.25	0.40	3.27	0.41	3.44	0.50
Labor Productivity 2007	10.53	0.41	10.55	0.40	10.63	0.38
Log(Annual Sales 2007)	13.81	0.57	13.85	0.57	14.07	0.63
Log(Age)	2.88	0.20	2.87	0.21	2.91	0.21
Sole Proprietorships	26.71%	16.78%	26.73%	17.31%	25.04%	17.26%
Exporters	16.60%	7.86%	16.33%	8.29%	17.27%	9.43%
Has External Investment	29.56%	9.76%	29.48%	9.91%	32.82%	10.29%
Has Foreign Ownership	14.65%	4.69%	14.64%	4.57%	14.90%	4.86%
Applied to at least 1 business transaction	74.27%	11.29%	74.31%	11.19%	100.00%	0.00%
Industry Distribution						
Other Manufacturing	12.17%	5.31%	10.68%	7.21%	10.22%	7.18%
Manufacturing of Food and Beverages	13.32%	4.66%	11.40%	7.33%	11.80%	7.49%
Textiles and Garments	6.18%	5.90%	5.99%	6.38%	5.29%	5.62%
Chemicals, Rubber, and Petroleum Products	7.02%	5.35%	6.70%	6.30%	7.69%	6.87%
Non-metallic minerals, basic & fabricated metals	7.06%	4.58%	6.38%	5.63%	6.17%	5.66%
Construction	4.96%	4.32%	5.67%	5.78%	6.52%	7.46%
Wholesale and retail trade	30.59%	12.38%	32.74%	16.10%	32.24%	16.45%
Hotels and restaurants	10.31%	8.96%	11.49%	10.75%	10.84%	9.45%
Transport, storage, and communications	6.39%	4.41%	6.90%	5.20%	7.07%	5.94%
Real estate, renting, and business activities	2.01%	1.53%	2.06%	1.55%	2.15%	1.70%

Notes: Clusters are grouped at the country-location-sector level. Source: Enterprise Surveys

Table 5. Bribery Statistics, Regression Sample

	N firms	N Clusters	Bribery Indicator		Bribery Indicator (Whole Sample)	
			(mean)	(sd)	(mean)	(sd)
Antigua and Barbuda	79	1	6.33%	24.50%	6.40%	24.57%
Argentina	649	8	15.10%	35.83%	12.69%	33.31%
Bahamas, The	51	1	27.45%	45.07%	12.50%	33.21%
Barbados	60	2	5.00%	21.98%	2.68%	16.22%
Belize	124	2	9.68%	29.68%	8.45%	27.91%
Bolivia	124	5	15.32%	36.17%	14.29%	35.13%
Chile	676	6	2.81%	16.54%	2.35%	15.17%
Colombia	553	6	4.70%	21.19%	3.32%	17.94%
Costa Rica	194	3	8.25%	27.58%	5.15%	22.14%
Dominica	80	1	5.00%	21.93%	3.54%	18.56%
Dominican Republic	163	4	17.79%	38.36%	10.39%	30.57%
Ecuador	216	5	7.87%	26.99%	5.78%	23.38%
El Salvador	219	4	5.02%	21.89%	4.30%	20.32%
Grenada	89	1	4.49%	20.84%	3.64%	18.81%
Guatemala	291	4	10.31%	30.46%	8.00%	27.17%
Guyana	109	2	13.76%	34.61%	12.40%	33.09%
Honduras	172	5	9.30%	29.13%	8.29%	27.65%
Jamaica	136	3	21.32%	41.11%	13.30%	34.04%
Mexico	727	10	15.68%	36.39%	10.55%	30.73%
Nicaragua	197	4	9.64%	29.60%	7.66%	26.65%
Panama	26	1	0.00%	0.00%	3.01%	17.14%
Paraguay	204	4	31.37%	46.51%	24.71%	43.22%
Peru	617	6	18.96%	39.23%	15.24%	35.96%
St. Kitts and Nevis	73	1	2.74%	16.44%	2.30%	15.07%
St. Lucia	107	2	11.21%	31.70%	8.63%	28.19%
St. V. and Grenadines	84	2	3.57%	18.67%	2.44%	15.49%
Suriname	112	2	5.36%	22.62%	4.08%	19.85%
Trinidad and Tobago	150	3	9.33%	29.19%	7.12%	25.76%
Uruguay	272	3	2.21%	14.71%	1.61%	12.61%
LAC Region Average	6554	101	10.33%	7.59%	7.75%	5.24%

Notes: Sample = regression sample of firms. Source: Enterprise Surveys

Table 6. Correlation Table

	Log (Sales07)	Medium	Large	Age	Ownership	ExtFin	Foreign
Log(Sales07)	1						
Medium	0.0424*	1					
Large	0.6436*	-0.4432*	1				
Age	0.2866*	0.0290*	0.2108*	1			
Ownership	0.2741*	-0.0224	0.2471*	0.0774*	1		
ExtFin	0.2889*	-0.0432*	0.2361*	-0.0184	0.1889*	1	
Foreign	0.1962*	0.0186	0.1782*	0.0417*	0.0927*	0.0084	1
Sole Proprietor	-0.3580*	-0.1276*	-0.2395*	-0.1051*	-0.1320*	-0.1386*	-0.0940*

Note: Sample =regression sample. * Significance at $p < 0.01$

Source: Enterprise Survey

Table 7. IV: Dep. Var: Real Annual Sales Growth

BI=Bribery Indicator, Cluster=Country-Location-Sector				
	(1)	(2)	(3)	(4)
BI	-0.236*** (0.0805)	-2.423*** (0.823)	-0.420*** (0.144)	-2.508*** (0.833)
Log(Sales07)* BI		0.153*** (0.0575)		0.149*** (0.0581)
Age10* BI			0.209* (0.124)	0.164 (0.134)
Log(Sales07)	-0.310*** (0.0467)	-0.323*** (0.0492)	-0.307*** (0.0467)	-0.320*** (0.0492)
Log(Sales07) ²	0.00758*** (0.00149)	0.00746*** (0.00157)	0.00748*** (0.00149)	0.00740*** (0.00157)
Medium	0.189*** (0.0190)	0.193*** (0.0192)	0.189*** (0.0192)	0.193*** (0.0193)
Large	0.343*** (0.0323)	0.344*** (0.0315)	0.342*** (0.0324)	0.343*** (0.0316)
Sole Proprietor	-0.0594*** (0.0146)	-0.0593*** (0.0156)	-0.0576*** (0.0146)	-0.0580*** (0.0155)
Log(Age)	-0.159*** (0.0377)	-0.164*** (0.0408)	-0.201*** (0.0498)	-0.197*** (0.0529)
Log(Age) ²	0.0246*** (0.00613)	0.0255*** (0.00666)	0.0304*** (0.00756)	0.0300*** (0.00812)
Exporter	0.00436 (0.0122)	0.00566 (0.0122)	0.00629 (0.0122)	0.00714 (0.0122)
ExtFin	0.0436*** (0.00945)	0.0418*** (0.0101)	0.0428*** (0.00958)	0.0412*** (0.0101)
Foreign	0.0326** (0.0131)	0.0300** (0.0135)	0.0333** (0.0133)	0.0306** (0.0136)
Constant	2.944*** (0.361)	3.126*** (0.379)	2.995*** (0.364)	3.161*** (0.380)
Durbin Hausman-Wu F-statistic	17.84 [5.30e-05]	14.07 [4.14e-06]	11.28 [3.82e-05]	11.24 [2.03e-06]
Shea's Partial R ² (BI)	0.0177	0.0183	0.0179	0.0185
F-statistic (BI)	18.13 [4.66e-05]	11.13 [4.33e-05]	9.043 [0.000245]	7.368 [0.000164]
Shea's Partial R ² (Log(Sales07)* BI)		0.0189		0.0191
F-statistic (Log(Sales07)* BI)		14.73 [2.48e-06]		9.773 [1.03e-05]
Shea's Partial R ² (Age10* BI)			0.0255	0.0260
F-statistic (Age10* BI)			198.0 [0]	139.2 [0]

Notes: In each regression, there are 6,554 observations, 29 countries, and 101 clusters. In computing country-location-sector average for bribery indicator only firms with business transactions are included. Clusters have a minimum of 30 observations. All estimation results include industry, location, and country fixed effects. P-values are in square-parentheses. Robust standard errors clustered by country-location-sector are presented in curved parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 8. IV: Dep. Var: Real Annual Sales Growth

BIW=Bribery Indicator Whole Sample, Cluster=Country-Location-Sector				
	(1)	(2)	(3)	(4)
BIW	-0.347*** (0.129)	-3.234*** (1.045)	-0.647*** (0.190)	-3.487*** (1.090)
Log(Sales07)* BIW		0.207*** (0.0732)		0.205*** (0.0747)
Age10* BIW			0.322** (0.153)	0.300* (0.159)
Log(Sales07)	-0.278*** (0.0358)	-0.269*** (0.0403)	-0.275*** (0.0356)	-0.266*** (0.0403)
Log(Sales07) ²	0.00659*** (0.00118)	0.00567*** (0.00142)	0.00649*** (0.00118)	0.00558*** (0.00142)
Medium	0.181*** (0.0169)	0.186*** (0.0171)	0.181*** (0.0170)	0.186*** (0.0173)
Large	0.333*** (0.0302)	0.332*** (0.0290)	0.331*** (0.0303)	0.330*** (0.0292)
Sole Proprietor	-0.0509*** (0.0129)	-0.0495*** (0.0138)	-0.0496*** (0.0130)	-0.0484*** (0.0139)
Log(Age)	-0.163*** (0.0339)	-0.172*** (0.0362)	-0.208*** (0.0438)	-0.213*** (0.0470)
Log(Age) ²	0.0254*** (0.00566)	0.0270*** (0.00613)	0.0314*** (0.00685)	0.0326*** (0.00748)
Exporter	0.0139 (0.0114)	0.0163 (0.0118)	0.0157 (0.0114)	0.0180 (0.0117)
ExtFin	0.0448*** (0.00856)	0.0404*** (0.00908)	0.0439*** (0.00885)	0.0397*** (0.00917)
Foreign	0.0288** (0.0122)	0.0281** (0.0130)	0.0295** (0.0125)	0.0288** (0.0132)
Applied	0.0663*** (0.0160)	0.0738*** (0.0161)	0.0702*** (0.0168)	0.0774*** (0.0166)
Constant	2.648*** (0.269)	2.669*** (0.288)	2.701*** (0.274)	2.719*** (0.291)
Durbin Hausman-Wu F-statistic	15.15 [0.000169]	10.86 [4.87e-05]	12.88 [9.18e-06]	10.77 [2.78e-06]
Shea's Partial R ² (BIW)	0.00550	0.00761	0.00569	0.00794
F-statistic (BIW)	8.490 [0.00430]	11.24 [3.53e-05]	4.782 [0.0101]	7.426 [0.000139]
Shea's Partial R ² (Log(Sales07)* BIW)		0.00899		0.00933
F-statistic (Log(Sales07)* BIW)		15.73 [9.43e-07]		10.33 [4.60e-06]
Shea's Partial R ² (Age10* BIW)			0.0127	0.0144
F-statistic (Age10* BIW)			161.2 [0]	123.7 [0]

Notes: In each regression, there are 9,025 observations, 29 countries, and 114 clusters. Clusters have a minimum of 30 observations. All estimation results include industry, location, and country fixed effects. P-values are in square-parentheses. Robust standard errors clustered by country-location-sector are presented in curved parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 9. IV: Dep. Var: Real Annual Sales Growth
Robustness Checks with Different Groupings

BI=Bribery Index, Cluster=Country-Location-Sector				
	(1)	(2)	(3)	(4)
A. SMEs only				
BI	-0.0248 (0.0168)	-2.483** (1.158)	-0.344*** (0.128)	-2.538** (1.136)
Log(Sales07)* BI		0.182** (0.0859)		0.165* (0.0843)
Age10* BI			0.388** (0.151)	0.351** (0.155)
Durbin Hausman-Wu F-statistic	3.702 [0.0589]	4.378 [0.0166]	5.717 [0.00523]	5.273 [0.00262]
Shea's Partial R ² (BI)	0.339	0.340	0.339	0.340
F-statistic (BI)	12.37 [0.000815]	11.23 [6.72e-05]	6.197 [0.00349]	7.582 [0.000208]
Shea's Partial R ² (Log(Sales07)* BI)		0.331		0.331
F-statistic (Log(Sales07)* BI)		14.60 [6.15e-06]		9.727 [2.31e-05]
Shea's Partial R ² (Age10* BI)			0.292	0.293
F-statistic (Age10* BI)			175.3 [0]	106.4 [0]
B. Excluding indicator survey countries				
BI	-0.288*** (0.0959)	-2.513*** (0.972)	-0.564*** (0.177)	-2.746*** (1.004)
Log(Sales07)* BI		0.154** (0.0674)		0.151** (0.0684)
Age10* BI			0.316** (0.150)	0.308** (0.155)
Durbin Hausman-Wu F-statistic	22.26 [9.53e-06]	14.14 [5.20e-06]	15.43 [2.01e-06]	12.74 [6.28e-07]
Shea's Partial R ² (BI)	0.0168	0.0171	0.0168	0.0172
F-statistic (BI)	13.40 [0.000442]	7.712 [0.000847]	6.776 [0.00188]	5.192 [0.00245]
Shea's Partial R ² (Log(Sales07)* BI)			0.0245	0.0246
F-statistic (Log(Sales07)* BI)			181.8 [0]	122.1 [0]
Shea's Partial R ² (Age10* BI)		0.0177		0.0178
F-statistic (Age10* BI)		10.51 [8.51e-05]		7.115 [0.000260]

Notes: In Panel A, there are 4,826 observations, 29 countries and 64 clusters. In Panel B there are 5,586 observations, 18 countries with 84 clusters. In computing country-location-sector average for bribery indicator only firms with business transactions are included. In panel A, clusters have a minimum of 20 observations. We use N=20 since ES firms are sampled one-third in each size category. In panel B, clusters have a minimum of 30 observations. All estimation results include industry, location, and country fixed effects. P-values are in square-parentheses. Robust standard errors clustered by country-location-sector are presented in curved parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 10. IV: Dep. Var: Real Annual Sales Growth
Robustness Checks, Different Definition of the Bribery Indicator

BI-2=Bribery Index version 2, Cluster = Country-Location-Sector				
	(1)	(2)	(3)	(4)
	Bribery Index Version 2 (Excluding Refusals)			
<i>BI-2</i>	-0.329*** (0.108)	-2.369*** (0.900)	-0.497*** (0.171)	-2.475*** (0.922)
Log(Sales07) * <i>BI-2</i>		0.142** (0.0630)		0.139** (0.0636)
Age10 * <i>BI-2</i>			0.193 (0.135)	0.175 (0.142)
Durbin Hausman-Wu F-statistic	15.59 [0.000147]	10.90 [5.26e-05]	9.226 [0.000212]	8.389 [5.05e-05]
Shea's Partial R ² (<i>BI-2</i>)	0.0125	0.0129	0.0125	0.0129
F-statistic (<i>BI-2</i>)	15.83 [0.000132]	8.720 [0.000325]	7.920 [0.000645]	5.820 [0.00105]
Shea's Partial R ² (Log(Sales07)* <i>BI-2</i>)		0.0135		0.0136
F-statistic (Log(Sales07)* <i>BI-2</i>)		11.55 [3.11e-05]		7.752 [0.000106]
Shea's Partial R ² (Age10* <i>BI-2</i>)			0.0211	0.0213
F-statistic (Age10* <i>BI-2</i>)			232.4 [0]	154.1 [0]

Notes: Different constructions of the Bribery Indicator are described in Table 1. There are 6,482 observations, 29 countries, and 100 clusters. In computing country-location-sector average for bribery indicator only firms with business transactions are included. Clusters have a minimum of 30 observations. All estimation results include industry, location, and country fixed effects. P-values are in square-parentheses. Robust standard errors clustered by country-location-sector are presented in curved parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 11. IV: Dep. Var: Real Annual Sales Growth

BI=Bribery Indicator, Cluster = Country-Location-Industry				
	(1)	(2)	(3)	(4)
<i>BI</i>	-0.209*	-3.011***	-0.513***	-3.019***
	(0.114)	(1.137)	(0.164)	(1.115)
$\text{Log}(\text{Sales07}) * BI$		0.194**		0.178**
		(0.0784)		(0.0785)
$\text{Age10} * BI$			0.397**	0.303*
			(0.172)	(0.175)
$\text{Log}(\text{Sales07})$	-0.295***	-0.288***	-0.291***	-0.286***
	(0.0594)	(0.0624)	(0.0593)	(0.0620)
$\text{Log}(\text{Sales07})^2$	0.00712***	0.00625***	0.00701***	0.00623***
	(0.00194)	(0.00210)	(0.00193)	(0.00208)
Medium	0.177***	0.182***	0.178***	0.183***
	(0.0184)	(0.0191)	(0.0182)	(0.0189)
Large	0.316***	0.314***	0.315***	0.313***
	(0.0308)	(0.0297)	(0.0306)	(0.0296)
Sole Proprietor	-0.0784***	-0.0806***	-0.0765***	-0.0790***
	(0.0177)	(0.0183)	(0.0178)	(0.0183)
$\text{Log}(\text{Age})$	-0.175***	-0.187***	-0.266***	-0.255***
	(0.0446)	(0.0504)	(0.0649)	(0.0679)
$\text{Log}(\text{Age})^2$	0.0277***	0.0300***	0.0403***	0.0394***
	(0.00731)	(0.00825)	(0.00981)	(0.0104)
Exporter	0.0103	0.0131	0.0134	0.0152
	(0.0115)	(0.0126)	(0.0119)	(0.0127)
ExtFin	0.0469***	0.0458***	0.0429***	0.0428***
	(0.00916)	(0.0104)	(0.00987)	(0.0109)
Foreign	0.0372***	0.0366***	0.0405***	0.0392***
	(0.0134)	(0.0134)	(0.0138)	(0.0136)
Constant	2.848***	2.914***	2.969***	3.001***
	(0.432)	(0.447)	(0.440)	(0.450)
Durbin Hausman-Wu F-statistic	3.748	6.844	5.358	6.094
	0.0549	0.00147	0.00575	0.000636
Shea's Partial R ² (<i>BI</i>)	0.0107	0.0110	0.0107	0.0111
F-statistic (<i>BI</i>)	14.89	8.429	7.436	5.683
	0.000175	0.000353	0.000859	0.00107
Shea's Partial R ² ($\text{Log}(\text{Sales07}) * BI$)		0.0113		0.0114
F-statistic ($\text{Log}(\text{Sales07}) * BI$)		10.03		6.827
		8.58e-05		0.000254
Shea's Partial R ² ($\text{Age10} * BI$)			0.0155	0.0157
F-statistic ($\text{Age10} * BI$)			95.42	63.68
			0	0

Notes: In each regression there are 4,639 observations, 29 countries, and 138 clusters. In computing country-location-industry average for bribery indicator only firms with business transactions are included. Clusters have a minimum of 30 observations. All estimation results include industry, location, and country fixed effects. P-values are in square-parentheses. Robust standard errors clustered by country-location-sector are presented in curved parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 12. IV: Dep. Var: Real Annual Sales Growth

BI=Bribery Indicator, Cluster=Country-Location				
	(1)	(2)	(3)	(4)
BI	-0.00782 (0.0112)	-0.150* (0.0760)	-0.0252 (0.0241)	-0.155** (0.0739)
Log(Sales07)* BI		0.00975* (0.00489)		0.00938* (0.00516)
Age10* BI			0.0207 (0.0259)	0.0133 (0.0276)
Log(Sales07)	-0.330*** (0.0499)	-0.331*** (0.0498)	-0.330*** (0.0500)	-0.330*** (0.0500)
Log(Sales07) ²	0.00813*** (0.00155)	0.00812*** (0.00155)	0.00812*** (0.00156)	0.00812*** (0.00155)
Medium	0.192*** (0.0196)	0.192*** (0.0196)	0.192*** (0.0196)	0.192*** (0.0196)
Large	0.356*** (0.0367)	0.356*** (0.0366)	0.356*** (0.0367)	0.356*** (0.0366)
Sole Proprietor	-0.0587*** (0.0157)	-0.0587*** (0.0157)	-0.0586*** (0.0158)	-0.0586*** (0.0158)
Log(Age)	-0.178*** (0.0379)	-0.178*** (0.0380)	-0.182*** (0.0403)	-0.181*** (0.0403)
Log(Age) ²	0.0278*** (0.00612)	0.0278*** (0.00613)	0.0284*** (0.00643)	0.0282*** (0.00644)
Exporter	0.00682 (0.0109)	0.00691 (0.0109)	0.00699 (0.0109)	0.00702 (0.0109)
ExtFin	0.0404*** (0.00971)	0.0403*** (0.00973)	0.0403*** (0.00973)	0.0402*** (0.00976)
Foreign	0.0322** (0.0143)	0.0322** (0.0143)	0.0323** (0.0143)	0.0322** (0.0143)
Constant	3.236*** (0.390)	3.248*** (0.391)	3.241*** (0.389)	3.250*** (0.390)
Durbin Hausman-Wu F-statistic	7.566 [0.00775]	8.134 [0.000721]	7.536 [0.00116]	8.471 [8.23e-05]
Shea's Partial R ²	0.291	0.291	0.291	0.292
F-statistic	13.03 [0.000609]	7.768 [0.000965]	8.899 [0.000395]	9.548 [2.76e-05]
Shea's Partial R ² (Log(Sales07)* BI)		0.278		0.278
F-statistic (Log(Sales07)* BI)		6.550 [0.00260]		5.419 [0.00222]
Shea's Partial R ² (Age10* BI)			0.254	0.254
F-statistic (Age10* BI)			125.0 [0]	90.10 [0]

Notes: In each regression there are 7,003 observations, 29 countries, and 64 clusters. In computing country-location average for bribery indicator only firms with business transactions are included. Clusters have a minimum of 30 observations. All estimation results include industry, location, and country fixed effects. P-values are in square-parentheses. Robust standard errors clustered by country-location-sector are presented in curved parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 13. IV: Dep. Var: Real Annual Sales Growth
Robustness Checks with Different Groupings

BI=Bribery Indicator, Cluster=Country-Location				
	(1)	(2)	(3)	(4)
A. SMEs only				
BI	-0.0248 (0.0168)	-2.483** (1.158)	-0.344*** (0.128)	-2.538** (1.136)
Log(Sales07)* BI		0.182** (0.0859)		0.165* (0.0843)
Age10* BI			0.388** (0.151)	0.351** (0.155)
Durbin Hausman-Wu F-statistic	3.702 [0.0589]	4.378 [0.0166]	5.717 [0.00523]	5.273 [0.00262]
Shea's Partial R ²	0.339	0.340	0.339	0.340
F-statistic	12.37 [0.000815]	11.23 [6.72e-05]	6.197 [0.00349]	7.582 [0.00020]
Shea's Partial R ² (Log(Sales07)* BI)		0.331		0.331
F-statistic (Log(Sales07)* BI)		14.60 [6.15e-06]		9.727 [2.31e-05]
Shea's Partial R ² (Age10* BI)			0.292	0.293
F-statistic (Age10* BI)			175.3 [0]	106.4 [0]
B. Excluding indicator survey countries				
BI	-0.0440** (0.0196)	-2.127*** (0.789)	-0.383*** (0.110)	-2.382*** (0.828)
Log(Sales07)* BI		0.145*** (0.0549)		0.140** (0.0566)
Age10* BI			0.393*** (0.123)	0.377*** (0.131)
Durbin Hausman-Wu F-statistic	8.268 [0.00583]	7.529 [0.00134]	9.988 [0.000213]	9.694 [3.48e-05]
Shea's Partial R ²	0.252	0.252	0.252	0.252
F-statistic	11.67 [0.00124]	6.807 [0.00237]	6.965 [0.00209]	6.923 [0.000523]
Shea's Partial R ² (Log(Sales07)* BI)		0.240		0.240
F-statistic (Log(Sales07)* BI)		5.882 [0.00498]		4.335 [0.00842]
Shea's Partial R ² (Age10* BI)			0.227	0.227
F-statistic (Age10* BI)			126.0 [0]	92.53 [0]

Notes: In Panel A, there are 4,826 observations, 29 countries and 64 clusters. In Panel B there are 5,931 observations, 18 countries with 53 clusters. In computing country-location-sector average for bribery indicator only firms with business transactions are included. Clusters in Panel A have a minimum of 20 observations, and 30 observations in Panel B. We use N=20 since ES firms are sampled one-third in each size category. All estimation results include industry, location, and country fixed effects. P-values are in square-parentheses. Robust standard errors clustered by country-location-sector are presented in curved parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 14. OLS, Dep Var.: D.Real Annual Sales Growth

	Bribery Indicator (Whole-Sample)		
	(1)	(2)	(3)
D.BI	-0.0114 (0.0211)	-0.284* (0.160)	-0.281* (0.166)
D.Log(Sales07)* BI		0.0189* (0.0108)	0.0193* (0.0107)
D.Log(Age)* BI			-0.0102 (0.0614)
D. Log(Sales07)	-0.506*** (0.0983)	-0.506*** (0.0979)	-0.507*** (0.0981)
D. Log(Sales07) ²	0.0109*** (0.00370)	0.0109*** (0.00370)	0.0109*** (0.00370)
D.Medium	0.124*** (0.0246)	0.123*** (0.0246)	0.123*** (0.0246)
D.Large	0.248*** (0.0394)	0.248*** (0.0394)	0.248*** (0.0394)
D.Log(Age)	-0.131 (0.0821)	-0.127 (0.0817)	-0.127 (0.0821)
D. Log(Age) ²	0.0214 (0.0143)	0.0207 (0.0143)	0.0206 (0.0143)
D.Exporter	0.0296 (0.0270)	0.0263 (0.0272)	0.0263 (0.0273)
D.ExtFin	-0.0253* (0.0136)	-0.0252* (0.0136)	-0.0253* (0.0136)
D.Foreign	0.0441 (0.0390)	0.0473 (0.0389)	0.0472 (0.0388)
Constant	-0.00255 (0.00938)	-0.00297 (0.00935)	-0.00296 (0.00935)
Observations	1,724	1,724	1,724
R-squared	0.431	0.432	0.432
N(country)	14	14	14

Notes: Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1