DISCUSSION PAPER SERIES

DP16060

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DEVELOPMENT ECONOMICS

PUBLIC ECONOMICS

CEPR

ISSN 0265-8003

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Discussion Paper DP16060
Published 21 April 2021
Submitted 15 April 2021

Centre for Economic Policy Research
33 Great Sutton Street, London EC1V 0DX, UK
Tel: +44 (0)20 7183 8801
www.cepr.org

This Discussion Paper is issued under the auspices of the Centre's research programmes:

- Development Economics
- Public Economics

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JEL Classification: D22, O12

Keywords: Corruption, Firm Growth, enterprise surveys

Raymond Fisman - rfisman@bu.edu
Boston University

Sergei Guriev - sergei.guriev@sciencespo.fr
Sciences Po and CEPR

Carolin Ioramashvili - c.a.ioramashvili@lse.ac.uk
London School of Economics

Alex Plekhanov - plekhana@ebrd.com
European Bank for Reconstruction and Development

Acknowledgements
The authors are grateful to Ralph de Haas and Helena Schweiger for excellent comments and suggestions and to Tea Gamtkitsulashvili for the excellent research assistance. Views presented are those of the authors and not necessarily of the EBRD or any other organization.

Corruption and Firm Growth: Evidence from around the World*

Raymond Fisman† Sergei Guriev‡ Carolin Ioramashvili§ Alexander Plekhanov ¶

April 2021

Abstract

We empirically investigate the relationship between corruption and growth using a firm-level data set that is unique in scale, covering almost 88,000 firms across 141 economies in 2006-2020, with wide-ranging corruption experiences. The scale and detail of our data allow us to explore the corruption-growth relationship at a very local level, within industries in a relatively narrow geography. We report three empirical regularities. First, firms that make zero informal payments tend to grow slower than bribers. Second, this result is driven by non-bribers in high-corruption countries. Third, among bribers growth is decreasing in the amount of informal payments — in both high- and low-corruption countries. We suggest that this set of results may be reconciled with a simple model in which endogenously determined higher bribe rates lead to lower growth, while non-bribers are often excluded entirely from growth opportunities in high-corruption settings.

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†Boston University, 270 Bay State Road, Boston, MA 02215, USA, rfisman@bu.edu

‡Sciences Po, 28 rue des Saints-Pères, 75007 Paris, France, sergei.guriev@sciencespo.fr

§London School of Economics, Houghton St., London, WC2A 2AE, UK, C.A.Ioramashvili@lse.ac.uk

¶European Bank for Reconstructions and Development, One Exchange Square, London, EC2A 2JN, UK, plekhana@ebrd.com

1 Introduction

A large literature has documented the adverse impact of poor governance on economic growth (e.g., Mauro, 1995; Robinson et al., 2005). A business environment characterized by corruption or weak rule of law makes investment riskier while depriving governments of revenue (e.g., Wei, 2000). It leads to an increased reliance on political and personal connections, which in turn distorts market signals and results in suboptimal allocation of capital and labor (Faccio, 2006; Murphy et al., 1991; Khwaja and Mian, 2005).

At the level of an individual firm, however, the relationship between corruption and growth is both more ambiguous conceptually and less studied empirically. Faced with onerous regulations and inefficient bureaucracies, a firm may find that its best option is to make informal payments in order to "grease the wheels." The opportunity to jump the queue may be particularly valuable for firms with greater opportunity cost of wasted resources (Lui, 1985). In this scenario, firms that report making informal payments will conceivably grow relatively quickly. The relationship also depends, however, on a firm's ability to negotiate with corrupt officials in a market that often lacks clear pricing benchmarks. Indeed, Svensson (2003), Bai et al. (2017) and others document a broad range of corruption experiences among firms in narrowly defined industries or geographies.

While arguments about the costs and benefits of corruption are well established, empirical evidence on the value (positive or negative) of corruption to a typical firm, holding the business environment constant, is relatively scarce. We aim to begin filling this gap by establishing several stylized facts about corruption and firm growth in a large cross-country firm-level data set covering more than 88,000 firms across 141 economies during 2006-2020. Our data are derived from the Enterprise Surveys, a repeated cross-sectional survey conducted by the World Bank Group, which follow a common methodology. As part of face-to-face interviews, the respondents—senior managers or owners of firms—answer a wide range of questions about their firms' activities and experiences, including those related to recent sales growth and employment, as well as corruption. The countries included in the surveys span a broad range of corruption environments, from Zimbabwe to Estonia (the latter has a corruption perceptions rating from Transparency International that is better than that of the U.S.).

The range and scale of the data enable us to examine the correlation between firms' corruption experiences and their growth, comparing businesses within a given industry and a subnational region at a point in time.

We report several stylized facts. For the sample overall, firms that report making zero informal payments have relatively weak growth in sales and productivity when compared to other firms in their industry-region-year cell, as do firms with relatively high informal payments. (Thus, if one looks simply at a linear specification relating informal payments to growth—within an industry-region-year grouping—there is no significant association). We argue that

the zero bribe "penalty" does not reflect misreporting, as it is driven by survey respondents who also report (despite making zero informal payments) that corruption is a "moderate," "major," or "very severe" obstacle for doing business. We also examine how this relationship differs in high versus low corruption settings, splitting our sample countries at the median of the Worldwide Governance Indicator for Control of Corruption. We find that, whereas firms that make high rates of informal payments grow slowly in both subsamples, the zero bribe penalty is driven entirely by the high corruption subgroup. Finally, the preceding relationships manifest themselves mostly in changes in sales per worker (labor productivity) rather than changes in employment.

The magnitudes of the effects we describe above are substantial, implying a 3 percentage point lower annual sales growth rate for firms that do not make informal payments in countries where such practices are the norm. The negative relationship between informal payments and growth is such that non-bribers grow more slowly than firms making informal payments of up to 10% of sales.

The relationships we document do not necessarily imply a causal link from corruption to firm growth and productivity – even with the inclusion of industry-region-year fixed effects, many of the caveats and critiques of cross-region or cross-country corruption analyses apply here as well. However, our data are able to reveal some nuance to the corruption-growth association: firms that pay high bribes grow more slowly, but so do firms that abstain from bribery altogether. While not impossible to reconcile with reverse causation, we suggest that the simplest versions of such models would predict a subset of these results, but not the collective set of findings. We show that these patterns can be rationalized in a simple framework in which profit-maximizing firms have to deal with officials who administer a certain scarce resource that firms require to operate (such as construction permits or operating licenses). Firms which face (endogenously determined) steep bribe rates grow slowly, but so do firms which choose not to pay bribes and instead report bribe-demanding officials, and are unsuccessful in their petitions. We argue that in high-corruption settings officials may act with relative impunity, and these are thus the environments where we would observe non-bribing firms shut out of growth opportunities. We provide an illustrative model following our empirics to highlight the assumptions and implications of this framework.

Our paper contributes to the literature on governance and economic development. Modern empirical research on this topic was launched by Mauro (1995), which documented the cross-country relationship between corruption, and investment and growth, during 1960-1985. In the intervening years, a sizable body of work has enriched our understanding of what leads to weak institutions, and the consequences for development (e.g., Hall and Jones, 1999, and Robinson et al., 2005; see also Besley and Mueller, 2018, and Acemoglu et al., 2019 on the importance of political accountability). Researchers have also turned their focus to microeconomic data to better understand whether and how corruption and other institutional failures constrain firm growth overall and lead to allocative distortions across firms. We provide a review of this

literature in the next section. We see our contribution as providing the largest-scale analysis of credible observational data on firm bribe payments and growth, which reveals several heretofore undocumented empirical regularities that may provide input into the development of better theoretical foundations for understanding corruption, and also inform future empirical research on the topic.

2 Corruption and firm performance

The link from institutional quality (as reflected in robust property rights enforcement and constraints on rent-seeking by those in power) to economic development plausibly runs in part through the impact on individual firms. Predation by officials and weak legal enforcement inhibits investment because of lower and more uncertain returns. Prior work suggests that bribery is thus several times more detrimental to firm growth than formal taxation, based on cross-country analysis of foreign investment (Wei, 2000) and firm-level evidence from Uganda (Fisman and Svensson, 2007). Furthermore, weakness in the rule of law tends to increase the reliance of individuals and firms on personal connections, thus blunting market signals and leading to labor and capital misallocation across firms (Bussolo et al., 2018). Governance can influence long-term economic outcomes in part by altering the structure of economic activity. Economies with stronger institutions tend to specialize in sectors that are more reliant on innovation and complex contracts, and utilize more production inputs to produce final goods (Nunn, 2007; Levchenko, 2007; Silve and Plekhanov, 2018).

While extant evidence indicates that corruption lowers growth for firms overall, the relationship between the choices of individual firms—holding institutional context fixed—and performance is ambiguous. There are several well-known arguments for why bribe-paying firms may perform relatively well. Faced with onerous regulations and inefficient bureaucracies, firms may choose to make informal payments to "grease the wheels."[1] Firms that are better connected, less principled, or otherwise face lesser frictions in making informal payments may also be afforded opportunities that are unavailable to other businesses, which may also allow bribe-payers to grow faster.

Firm-level evidence on the corruption-performance relationship is limited. Fisman and Svensson (2007) find a strong negative association between informal payments and sales growth in Uganda in the 1990s; De Rosa et al. (2015) document a positive relationship in most economies in Central and Eastern Europe, apart from three high-corruption economies where the relationship is negative; Aterido et al. (2011) find inconclusive results on the link between the incidence of facilitation payments in a certain region/sector and employment growth. Fore-

[1] At the level of the economy overall, this argument may be turned on its head due to "endogenous red tape;" see, e.g., Guriev (2004). However, our analysis is within industry-region-year cells; this presumably allows us to control to some extent for the local regulatory environment.

shadowing the inevitable endogeneity concerns that will arise in our analysis, Bai et al. (2017) show that growth *causes* a reduction in bribe extraction, based on an instrumental variables strategy applied to Vietnamese firm-level data.

As we noted at the outset, our contribution is not to solve the endogeneity problems inherent in studying the corruption-growth relationship, but rather to document in a vast and credible dataset a number of patterns that may inform our understanding of the theories and frameworks that we briefly delineate above.

3 Data

Our empirical analysis draws on a cross-country firm-level dataset of unique scale. The Enterprise Surveys follow a common methodology and contain detailed data on sales, employment and the business environment for almost 88,000 firms across 141 economies during 2006-2020. Most participating countries are low- and middle-income economies, although the sample also includes a number of advanced economies (such as Italy, Israel and Portugal) offering a wide range of corruption experiences, from, say, Zimbabwe to Estonia. The former is consistently ranked as among the most corrupt in global corruption perception surveys, while Estonia is ranked on par with Iceland (and eight ranks above the U.S.) in Transparency International's 2020 Corruption Perceptions Index.

These face-to-face representative surveys cover firms with at least five employees. Stratified random sampling is performed by broad sector (manufacturing, retail and other services, with further sub-sectors in selected economies), firm size (5-19 employees; 20-99 employees; and 100+ employees) and by subnational region. Surveys exclude enterprises fully owned by the state, and for other firms surveyors record the levels of state and foreign ownership. All participating firms operate in the formal sector. The dataset is a repeated cross-section, although a handful of firms enter the survey in more than one wave.

A typical (median) firm covered by the survey is a domestically-owned private-sector firm with 20 employees serving the domestic market, with US$ 570,000 in annual revenue. The median firm has been operating for 16 years and has two-year annual sales growth (in US dollars) of 5.2%. We omit firms that report positive or negative change in sales in excess of 50 times over the two-year period as these likely reflect errors in the data, a total of 1.2% of sample firms.

As part of the survey, respondents (who are all senior managers or owners of firms) are asked the following question: *"It is said that establishments are sometimes required to make gifts or informal payments to public officials to 'get things done' with regard to customs, taxes, licenses, regulations, services etc. On average, what percentage of total annual sales, or estimated total annual value, do establishments like this one pay in informal payments or gifts*

to public officials for this purpose?" The wording seeks to elicit a truthful response given the topic's sensitive nature. Additionally, the survey records various firm characteristics as well as data on sales and employment in the last fiscal year and the three years prior.

On average, firms in the sample report spending 0.8% of revenues on informal payments. This figure ranges from more than 7% in Sierra Leone to 5% in Uganda to 3% in Albania, to less than 0.01% in most advanced economies. The informal payment rate—or the bribe rate—tends to be higher in economies where corruption is more pervasive based on the Worldwide Governance Indicator of the Control of Corruption. (See Appendix Figure A1 for a scatterplot depicting the relationship between Control of Corruption and the mean fraction of firms that report non-zero bribes (Panel A), as well as a scatterplot of the relationship between Control of Corruption and the average bribe rate for the subset of bribe-paying firms.) As in Fisman and Svensson (2007), we exclude a small number of firms with unrealistic reports of informal payments, in excess of 50% of sales.

While the majority of firms report making no informal payments, this does not necessarily imply corruption-free business environments for these firms. In fact, we see evidence that this is not the case in our own data. Surveyed firms were asked to evaluate corruption as a constraint to doing business on a five-point scale ranging from corruption being "no obstacle" (coded 0) to corruption being a "very severe obstacle" (coded 4). Of the firms that report no informal payments, 14% nonetheless described corruption as a severe obstacle to doing business, suggesting that they may make a conscious choice to forego opportunities to make facilitation payments; only 37% of zero-bribe firms refer to corruption as "no obstacle" at all. Interestingly, the correlation between the country-level Control of Corruption variable and firms' responses on this five-point scale is just as strong for firms that report zero informal payments as it is for firms that report positive bribes (Appendix Figure A1, Panels C and D).

The nearly 88,000 firms that constitute our main estimation sample are drawn from a larger dataset of 167,286 firms. In addition to the small fraction of firms that are screened out as described above due to unrealistic data on informal payments or sales, a substantial number of firms do not provide responses to some of the key variables in our analysis. Specifically, 14% declined to answer the question about informal payments. This may reflect respondents' genuine lack of knowledge of the issue or reluctance to answer the question if the firm is making informal payments. Missing information about firms' bribe shares is not systematically related to performance (the coefficient on the missing bribe share in a regression explaining sales growth is small and highly insignificant).[2]

[2] Full details on observations lost from the original dataset are as follows: Of the full 167,286 observations, we exclude 43,137 observations with missing sales growth and a further 19,057 observations with missing data on informal payments. 1,382 further observations were discarded because of improbably high sales growth above 200%, and a further 193 because of informal payments above 50% of sales. We then exclude an additional 14,158 observations with missing information on age, ownership, kvetch index, lagged employment, sector or region. Finally, we drop 1,530 observations that were single observations in the region × sector × year cells that make up the fixed effects in our main model.

The main dependent variable of interest is sales growth, calculated as the log difference between sales in the last fiscal year and the three years prior, divided by two. We convert sales figures in national currencies to US dollars. We consider growth of sales per worker, as a proxy for labour productivity, and employment growth as alternative dependent variables.

Appendix Table A1 contains summary statistics for the main variables used in our analysis. In Appendix Table A2 we show the patterns in bribe payments over time. Of the 141 countries in our sample, most only appeared in one or two waves; however, 37 countries were surveyed in each of the three waves, allowing us to look at how firms' informal payments have changed in recent years. This kind of over-time comparison is generally difficult in perceptions-based cross-country measures (see, e.g., Fisman and Golden, 2017). The most striking pattern is the dramatic decline in the fraction of firms that report paying bribes; the share of such firms fell by half across the three waves. Among the firms that do pay bribes, the average bribe rate has not changed substantially over time, remaining at 5-6% of sales. It should be emphasised that the dataset is a repeated cross-section, not a panel, so that changes in composition may to some extend drive these results.

4 Results

4.1 Baseline results

We regress the annualized change in the logarithm of the sales of firm i between time $t-3$ and time $t-1$ ($\Delta log(Sales_i)$) on various parameterizations that capture the extent to which firms make informal payments to officials ($Bribes$):

$$\Delta log(Sales_i) = \alpha + \beta Bribes_i + \lambda Z_i + \upsilon_{rst(i)} + \epsilon_i, \tag{1}$$

where Z is a vector of firm-level controls including the logarithm of lagged sales in US dollars, the logarithm of lagged employment, indicator variables for ownership type (state ownership, foreign ownership or private domestic ownership), the logarithm of firm age, and exporter status; $\upsilon_{rst(i)}$ is a set of 5,340 fixed effects for subnational region $\times$ sector $\times$ year, and ϵ_i is the error term, with standard errors clustered at the region-sector-survey-wave level. The fixed effects absorb the many factors that may be correlated with both rent extraction and growth across industries or areas, and focuses our analysis on the relationship between bribery and growth within relatively narrow groupings of firms. Finally, Z also includes a control for a firm's propensity to complain about various constraints on its operations, to account for the fact that underperforming firms may have many complaints, real or imaginary, including extortion by corrupt officials – Kaufmann and Wei (1999) call such propensity to complain the "kvetch effect." It is measured as the difference between a firm's perception of transport, electricity and

access to land as obstacles to its operations and the country average complaints about these aspects of the business environment. In each case, firms were asked to evaluate a potential constraint on the same five-point scale as for corruption.

Results based on specifications of this form appear in Table 1. Column (1) provides a minimalist specification which includes region-sector-year fixed effects, since we are focused on the within- rather than cross-economy relationship between informal payments and growth, and uses $BribeShare$, defined as informal payments as a fraction of sales, as our measure of bribery. Interestingly, while the coefficient on $BribeShare$ is negative, it is not statistically significant, and is of modest magnitude.[3] A one percentage point increase in the share of informal payments is associated with a reduction of 0.053 percentage points in the annual growth of sales; given the standard error of 0.052 percentage points, we can reject effect sizes larger than 0.15 percentage points at the 5% level, based on a two-tailed test.

In column (2) we rerun this specification using instead an indicator variable for non-zero informal payments, $I(BribeShare > 0)$, as our measure of firm-level bribery. Interestingly, the coefficient changes sign, with a positive relationship between making a non-trivial informal payment and firm growth. The coefficient is significant at the 5% level and large in magnitude: bribe-paying firms grow 1 percentage point per year *faster* than those with zero bribes.

In column (3), we include the measure of bribe share as well as the indicator variable for non-zero bribes. Given the opposing forces observed in the prior columns, it is unsurprising that the coefficients on both terms increase in magnitude. The point estimate on $BribeShare$ is -0.14, and 0.018 on $I(BribeShare > 0)$ ($p < 0.01$ in both cases). In our preferred specification in column (4) we add the full set of firm-level controls described above; for brevity, we do not report the point estimates on these controls (these are presented in Appendix Table A3). In this preferred specification, both coefficients increase marginally in magnitude, and are estimated with comparable precision as in the previous column. The point estimates imply that firms paying even fairly high bribes grow more rapidly than bribe-abstainers, with the 'crossing point' coming only at $BribeShare = 0.09$ (0.021/0.232), which is the 78^{th} percentile of the distribution of $BribeShare$ conditional on taking a positive value.

Finally, in column (5) we allow for greater flexibility in the relationship between the share of informal payments and firm growth via a set of indicator variables which capture various ranges of $BribeShare$. The coefficients reflect the link from informal payments to growth relative to the omitted category of $BribeShare = 0$. Broadly consistent with the prior results, we observe a positive relationship between relatively modest bribe payments and growth, with the relationship only changing sign at extremely high rates of informal payments ($BribeShare > 0.10$).

[3] In Appendix Table A8, we show the results if we include *only* survey year fixed effects, and also separate year, region, and sector fixed effects (i.e., not their product). The coefficient on $Bribes$ is much more negative and statistically significant ($p < 0.001$), which is as expected given findings from the cross-country corruption literature.

We believe these results to be the first documentation of such a non-monotonic relationship between firm bribe payments and firm performance, one which is enabled by the granularity, detail, and scale of our data. Below, we will argue that it is unlikely to be driven by misreporting of zeros, and furthermore can be reconciled with an intuitive framework of how firms respond to the demands of corrupt officials.

Our intuition for this non-monotonicity is that firms which pay zero bribes are one of two types: (i) those which may operate without having to make informal payments; and (ii) those which choose not to pay bribes, and are potentially shut out of growth opportunities as a result. Intuitively, the latter effect should be more dominant in settings where corruption is pervasive. This intuition motivates our heterogeneity analysis in the next subsection, where we split the sample according to country-level corruption rankings.

Before turning to these sample splits, we note that the effects we describe above come primarily through labor productivity (sales per worker) rather than changes in employment. The results for labor productivity (Appendix Table A4) look very similar to those of Table 1, while the relationship between firm corruption experiences and employment growth is relatively weak (Appendix Table A6).

4.2 High-corruption versus low-corruption countries

We split the sample based on the Worldwide Governance Indicator of Control of Corruption. This measure—available at the country-year level—aggregates data from a large number of available surveys of corruption. Each year, the resulting country-level measures are normalized to have a global mean of zero and a standard deviation of 1 (see Kaufmann et al., 2009 for details). Higher values correspond to lower corruption. The Control of Corruption measure is highly correlated with other cross-country measures of corruption such as Transparency International's Corruption Perception Index.

We classify countries as low-corruption and high-corruption using the median observation of Control of Corruption in our sample. As the Enterprise Surveys focus on lower-income, less well-governed economies, the cutoff of -0.43 is well below the global mean. Thus, countries like Bolivia, India or Vietnam belong (just barely) to the low-corruption subsample. As expected, informal payments are far higher in high-corruption countries relative to low-corruption one. For example, in the former group 20% of firms report non-zero informal payments versus 9.6% in the latter.

We rerun our preferred specification that includes both $BribeShare$ and $I(BribeShare > 0)$, as well as firm-specific controls, for the two subsamples in columns (1) and (3) of Table 2. The coefficient on $BribeShare$ is negative ($p < 0.05$) in both instances. However, the indicator variable denoting whether a firm makes informal payments at all is significant ($p < 0.01$) and large in magnitude only in the high-corruption subsample. That is, among bribe-abstainers,

there is no growth penalty in lower-corruption settings, only in high-corruption environments.[4]

4.3 Firms which report bribes as an obstacle

As we observed earlier, a firm that makes no informal payments may nonetheless be vulnerable to corruption. Indeed, we have suggested above that, when bribery is common, such firms may be *particularly* impacted by corruption because they are unable to exploit business opportunities. In this final set of results, we limit the sample to firms which self-report that corruption is at least a "moderate" obstacle to growth. We argue that this sample is also one for which underreporting of informal payments is likely less of a concern, since it is the set of respondents that were willing to describe government corruption as a problem.

We report these results in Table 3, separately for high- and low-corruption countries. The results are qualitatively similar to those reported earlier, though the point estimates are, in general, larger in magnitude relative to the full-sample estimates.

4.4 Discussion

To recap, we documented several stylized facts thus far. First, we observe a *positive* correlation, in a given region-sector-year cell, between making positive (i.e., non-zero) informal payments and growth. However, once bribery is positive, the relationship changes sign – firms that pay a larger fraction of sales in informal payments grow more slowly. Furthermore, the "zero-bribe penalty" is borne entirely by firms in higher-corruption environments.

As we have emphasized from the outset, these patterns do not necessarily reflect causal links from corruption to growth – many of the same concerns that arise in the cross-country literature relating institutional quality to economic performance apply to our within-economy analysis. Causation may run the other way, with informal payments made by firms depending on firms' performance. If operating a business involves a "fixed cost" of informal payments, firms that grow their sales will pay a smaller fraction of revenue in bribes (Bai et al., 2017 show that experience of firms in Vietnam is consistent with this). This "fixed cost" argument is consistent with the negative correlation between bribe share and sales growth that we document for firms which pay positive bribes in either clean or corrupt countries, but does not explain our results on the "zero bribe penalty" and the fact that the latter is only observed in corrupt countries.

On the other hand, unambitious firms may grow slowly and also be unwilling (by virtue of their lack of ambition) to pay bribes to bureaucrats. Also, if rules are established by rent-seeking bureaucrats, regulations may take into account firms' ability to pay bribes. Firms that grow

[4] Again, the differences between high and low corruption countries is driven by labor productivity rather than employment growth; see Appendix Tables A5 and A7.

faster may be targeted for extra checks and inspections by rent-seeking officials in expectation of receiving facilitation payments. These explanations suggest that high growth causes higher bribe payments, or some third factor lies behind the positive bribe-growth correlation – in line with our result that non-bribers grow slower, but not consistent with the negative correlation between bribes and growth among bribers that we also document.

We cannot rule out the possibility that some particular combination of these explanations collectively account for the non-monotonic relationship between bribery and growth that we observe. Our goal is thus not to make causal claims but rather to document a set of empirical regularities that have not yet been described and, in the next section, present a simple model with fairly standard assumptions that generates the non-monotonic relationship between firm-level bribe share and output growth that we observe in the data.

5 The model

We present a simple game-theoretical model of corruption that shows how the empirical findings above can emerge in equilibrium.

5.1 Setup

Consider three sets of risk-neutral agents: principal P, bureaucrat B, and a continuum of firms F normalized to 1. Firms are indexed by $i \in [0,1]$; they differ in their cost structures; the cumulative distribution function is $G(\cdot)$.

The principal is not a strategic player. If a firm reports corrupt behavior by a bureaucrat, the principal fires the reported bureaucrat with probability $1-k$.[5] The parameter $k \in [0,1]$ is a country-level measure of corruption.

Each firm i has a growth opportunity which generates additional output y at a firm-specific cost $c_i(y)$. $c_i(y)$ is an increasing convex function: $c_i'(y) > 0, c_i''(y) > 0$. The growth opportunity may involve a fixed cost, so $c(0)$ may be positive. In what follows, it will be convenient to use the profit function:

$$\pi_i(p) \equiv \max_y \{py - c_i(y)\}.$$

We denote the profit-maximizing level of output $y_i^*(p) \equiv \arg\max_y \{py - c_i(y)\} = \pi_i'(p)$. This is an increasing function of p, while $\pi_i''(p) > 0$.

The bureaucrat extorts bribes by threatening to block the growth opportunity. He maximizes the expected amount of bribes minus the cost of being fired if caught.

[5] It is easy to provide microfoundations of this behavior with a strategic principal and multiple bureaucrats.

5.2 Timing

The game is as follows:

1. B makes a take-it-or-leave-it offer to F, that it pay a share $b \geq 0$ of output as a bribe, or B will block its growth opportunity. B does *not* observe the cost structure, so the offer is the same for all firms.

2. Each firm i chooses whether to accept or reject the offer.

   (a) If F accepts, it then chooses y_i. F receives $(1-b)y_i - c_i(y_i)$. B receives by_i.

   (b) If F rejects, it complains to the principal P. The outcome depends on the country's level of corruption k:

      i. With probability k, the complaint is neglected, B denies the growth opportunity to F. Both get zero.[6]

      ii. With probability $1-k$, B is fired, there is no bribe $b=0$. F chooses y_i and receives $y_i - c_i(y_i)$. B incurs a non-pecuniary cost z.

5.3 Assumptions

We make several assumptions that simplify the analysis below. Without loss of generality, we sort the firms by $\xi_i \equiv \frac{\pi_i(1)}{\pi_i'(1)}$.[7] We denote the density function $g(\xi) \equiv G'(\xi)$. We assume that the density is finite and that the distribution $G(\cdot)$ of ξ_i has a finite support $\left[0, \bar{\xi}\right]$:

Assumption 1. *There exists a finite* $\bar{\xi} > 0$ *such that* $G(\bar{\xi}) = 1$.

The second assumption ensures that the equilibrium bribe share is small $b << 1$ (as observed in the data):

Assumption 2. *For all firms* $g(0)\frac{\pi_i'(1)}{\pi_i''(1)} << 1$.

As becomes clear later, this assumption allows for a Taylor expansion at $b << 1$ which simplifies the analysis.

Finally, we make the following "comparability" assumption:

Assumption 3. *In the absence of bribes firms have the same output growth* $y_i^*(1) = y^*$.

This assumption implies that the heterogeneity between firms relates to their sensitivity to bribes, while without bribes their output is the same.

[6] The firm does not pay the fixed cost $c_i(0)$ as the latter is associated with the growth opportunity rather than the firm's current business.

[7] This is a proxy for the ratio of fixed and variable costs. The higher the fixed costs, the lower $\frac{\pi_i(1)}{\pi_i'(1)}$.

5.4 Analysis

We first need to determine which firms accept to pay the bribe and which ones refuse. When firm i agrees to pay, it receives $\max_y \{(1-b)y - c_i(y)\} = \pi_i(1-b)$. If it refuses, the expected payoff is $(1-k)\pi_i(1)$. Therefore, firm i agrees if and only if

$$k \geq \frac{\pi_i(1) - \pi_i(1-b)}{\pi_i(1)}.$$

Assuming that the equilibrium bribe share is small ($b << 1$), we obtain

$$\frac{b}{k} \leq \frac{\pi_i(1)}{\pi_i'(1)} = \xi_i. \tag{2}$$

Since firms are sorted in the order of increasing ξ_i, for a given b there exists a cutoff $\hat{i}(b/k)$ that for all $i > \hat{i}(b/k)$ firms agree to pay the bribe and for all $i < \hat{i}(b/k)$ firms refuse. Obviously, $\hat{i}(b/k)$ is increasing in bribe b, holding country-level corruption k constant.

We can now solve for the bureaucrat's optimal strategy. His payoff is

$$b \int_{b/k}^{\bar{\xi}} y_i^*(1-b) dG(\xi_i) - (1-k) z G(b/k). \tag{3}$$

where $y_i^*(1-b)$ is the optimal output of firm i, given the bribe, and $y_i^*(1-b) = \pi_i'(1-b) = y^* - b\pi_i''(1) + o(b)$ is a decreasing function of b.

When maximizing (3), the bureaucrat faces a standard trade-off: higher b increases the bribe collected from each firm that agrees to pay the bribe, while higher b results in a greater share of firms refusing to pay the bribe. This trade-off leads to the optimal choice of b as a function of the distribution of firms' types $G(\cdot)$, the bureaucrat's cost of being fired z, and country-level corruption k.

5.5 Comparative statics

We now discuss the comparative statics with regard to exogenous parameters k and z, and show that the results are consistent with the empirical findings from Section 4.

1. Extensive margin.

Let us compare the output growth y of firms with $b = 0$ and $b > 0$. For a given b set by B, firms that refuse to pay a positive bribe have average output of

$$y^0 \equiv (1-k) E\left[y^* | i < \hat{i}(b/k)\right] = (1-k) y^*.$$

Firms that agree to pay a positive bribe have average output of

$$y^+ \equiv E\left[y_i^*(1-b)|i > \hat{i}(b/k)\right] < y^*. \tag{4}$$

We now compare y^0 and y^+ for countries with high and low corruption k. If a country is very clean $k \to 0$ then $b \to 0$;[8] therefore both y^0 and y^+ converge to y^*. So for perfectly non-corrupt countries $y^0 = y^+$.

Now consider $k = 1$. In this case $y^0 = 0$. To find y^+, we solve the bureaucrat's maximization problem. Taking the first derivative of (3) with respect to b, we obtain the first order condition:

$$\int_b^{\bar{\xi}} \left[y^* - 2b\pi_i''(1)\right] dG(\xi_i) = bg(b)\left[y^* - b\pi_{I(b)}''(1)\right].$$

Using $b << 1$, we find $b = 1/g(0)$.

As the bribe share is small, each firm that pays a positive bribe has a positive $y_i^*(1-b) = y^* - b\pi_i''(1)$. Therefore, the average output growth for these firms (4) is also positive so $y^+ > y^0$.

This analysis implies that if country-level corruption changes from high $k = 1$ to low $k = 0$, the output of firms refusing to pay bribes $y^0 = (1-k)y^*$ increases from zero to y^*. At the same time, the output of firms agreeing to pay bribes y^+ increases from a positive but inefficiently low level ($y^+ < y^*$) to the efficient level y^* (the latter being the case in the perfectly clean country with $k = 0$ and $b = 0$).

The intuition is straightforward. Firms that refuse to pay bribes $b = 0$ are either (i) the ones denied access to growth opportunities (with probability k) and have $y = 0$, or (ii) those that avoid paying bribes (with probability $1-k$) and produce y^*. As k increases, the average output growth of this group falls from y^* to zero. At the same time, firms with $b > 0$ produce a suboptimal but non-trivial amount $y_i^*(1-b)$, so for sufficiently high k we have $y^0 < y^+$. If there is no corruption at all ($k = 0$ and $b = 0$), then there is no discontinuity at $b = 0$: both y^0 and y^+ converge to the efficient level y^*. If corruption is very high, there is a discontinuity: $y^0 = (1-k)y^* = 0$, while firms that pay a small bribe produce $y^* - b\pi_i''(1)$ which is strictly positive.

2. Intensive margin.

We shall now check that once a firm pays a positive bribe, an increase in b reduces the firm's y. As b is an equilibrium outcome in a game between firm and bureaucrat, for exploring this issue, we need to change an exogenous parameter — such as the bureaucrat's propensity to extort larger bribes. Let us consider the comparative statics with regard to the bureaucrat's cost of being fired, z. Suppose that there is a bureaucrat who is less concerned about being fired, i.e., his z is lower. Then for the same country-level and firm-level characteristics (k and

[8] For a given k, B always chooses $b \leq \bar{\xi}k$, otherwise no firm agrees to pay a bribe.

$G(\cdot)$), the equilibrium bribe share b is higher. Indeed, the monotone comparative statics imply that the b that maximizes (3) decreases with z.

Facing a higher b, some firms that previously paid the bribe will now refuse to pay. However, for those that continue to pay, output will decline. Indeed, $y_i^*(1-b)$ is a decreasing function of b.

6 Conclusion

This paper investigates the relationship between corruption and growth of individual firms using a comprehensive set of enterprise surveys conducted in 141 economies in 2006-20 and aggregating experiences of almost 88,000 firms.

We document several empirical regularities. Firms that make zero informal payments have relatively weak growth in sales and productivity when compared to other firms in their industry-region-year cell, as do firms with relatively high rates of informal payments. Furthermore, whereas firms that make high informal payments grow slowly in both high- and low-corruption countries, the zero bribe penalty is driven entirely by firms in high-corruption economies.

As we have emphasized throughout, these patterns need not reflect a causal relationship between corruption and growth; however, we also show that they can be rationalized in a simple framework in which profit-maximizing firms confront officials who administer a certain scarce resource that firms require to operate; some agree to pay a bribe and others refuse, with the latter group suffering particularly negative consequences in high-corruption settings in which corrupt officials shut bribe-abstainers out of growth opportunities with high probability. We hope that, by introducing these new facts to the literature as well as a framework for organizing them, we may inspire future work to better develop and test microeconomic models of corruption.

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Table 1: Informal payments and growth of sales

Dep. var.: Growth of sales	1	2	3	4	5
Informal payments	-0.053		-0.139**	-0.232***	
	(0.052)		(0.060)	(0.058)	
Non-zero informal payments		0.010**	0.018***	0.021***	
		(0.004)	(0.005)	(0.005)	
Informal payment categories					
$0 < b \leq 0.5\%$					0.047***
					(0.008)
$0.5 < b \leq 1\%$					0.015**
					(0.007)
$1 < b \leq 5\%$					-0.001
					(0.007)
$5 < b \leq 10\%$					0.005
					(0.009)
$10 < b \leq 20\%$					-0.015*
					(0.009)
$> 20\%$					-0.025
					(0.017)
R-squared	0.237	0.237	0.237	0.293	0.294
Observations	87829	87829	87829	87829	87829
Region-Sector-Year FE	Yes	Yes	Yes	Yes	Yes
Firm-level controls				All	All

Source: Authors' calculations.

Note: Standard errors in parentheses at clustered at the level of industry*region*survey wave. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively. Estimated using ordinary least squares. The dependent variable is annual growth of sales (half of the difference between the logarithm of sales in the last fiscal year and the logarithm of sales three fiscal years ago, both expressed in US dollars at market exchange rates). All regressions control for region-sector-year fixed effects. Specifications in columns 4-5 also control for ownership (state/foreign/domestic), the logarithm of firm age, exporter status, propensity to complain (the kvetch factor), the logarithm of employment three years ago, the logarithm of sales in US dollars three years ago. In column (5), the omitted category is the one with zero informal payments.

Table 2: High-corruption vs low-corruption economies

Dep. var.: Growth of sales	High-corruption economies		Low-corruption economies	
	1	2	3	4
Informal payments	-0.194**		-0.301***	
	(0.076)		(0.084)	
Non-zero informal payments	0.030***		0.007	
	(0.007)		(0.007)	
Informal payment categories				
$0 < b \leq 0.5\%$		0.064***		0.018*
		(0.011)		(0.010)
$0.5 < b \leq 1\%$		0.021**		0.006
		(0.009)		(0.011)
$1 < b \leq 5\%$		0.006		-0.014
		(0.009)		(0.011)
$5 < b \leq 10\%$		0.015		-0.013
		(0.012)		(0.013)
$10 < b \leq 20\%$		-0.008		-0.025*
		(0.011)		(0.014)
$> 20\%$		-0.002		-0.070***
		(0.022)		(0.024)
R-squared	0.306	0.306	0.275	0.274
Observations	42341	42341	45488	45488
Region-Sector-Year FE	Yes	Yes	Yes	Yes
Firm-level controls	All	All	All	All

Source: Enterprise Surveys and authors' calculations.

Note: Standard errors in parentheses at clustered at the level of industry*region*survey wave. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively. Estimated using ordinary least squares. The dependent variable is annual growth of sales (half of the difference between the logarithm of sales in the last fiscal year and the logarithm of sales three fiscal years ago, both expressed in US dollars at market exchange rates). All regressions control for ownership (state/foreign/domestic), the logarithm of firm age, exporter status, propensity to complain (the kvetch factor), the logarithm of employment three years ago, the logarithm of sales in US dollars three years ago, region-sector-year fixed effects. Low-corruption economies are those with the Worldwide Governance Indicator of control of corruption of -0.43 or above (sample median); the rest are high-corruption economies.

Table 3: Informal payments and growth: Firms that complain about corruption

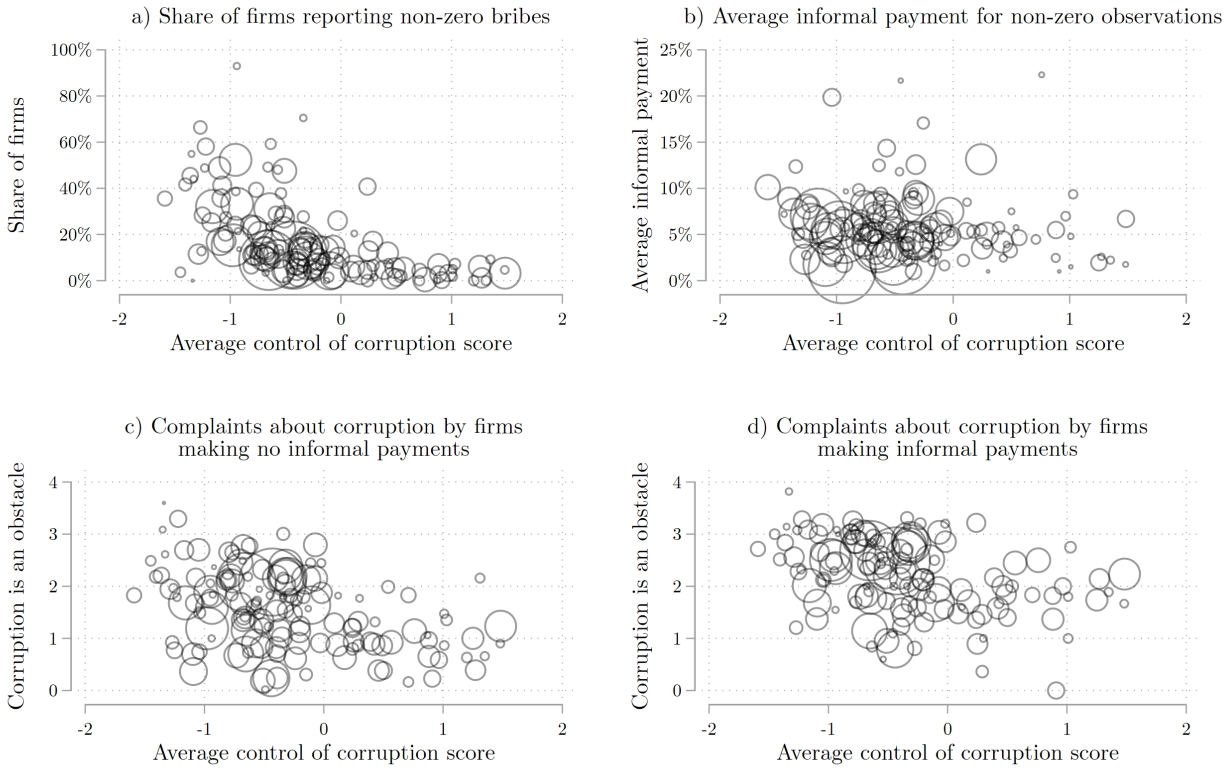
Dep. var.: Growth of sales	High-corruption economies		Low-corruption economies	
	1	2	3	4
Informal payments	-0.257***		-0.347***	
	(0.088)		(0.102)	
Non-zero informal payments	0.035***		0.010	
	(0.009)		(0.008)	
Informal payment categories				
$0 < b \leq 0.5\%$		0.074***		0.029**
		(0.014)		(0.012)
$0.5 < b \leq 1\%$		0.031**		0.007
		(0.013)		(0.014)
$1 < b \leq 5\%$		0.008		-0.017
		(0.012)		(0.014)
$5 < b \leq 10\%$		0.006		-0.025
		(0.015)		(0.015)
$10 < b \leq 20\%$		-0.005		-0.020
		(0.014)		(0.017)
$> 20\%$		-0.018		-0.079***
		(0.025)		(0.029)
R-squared	0.350	0.350	0.317	0.317
Observations	21182	21182	20655	20655
Region-Sector-Year FE	Yes	Yes	Yes	Yes
Firm-level controls	All	All	All	All

Source: Enterprise Surveys and authors' calculations.

Note: Standard errors in parentheses at clustered at the level of industry*region*survey wave. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively. Estimated using ordinary least squares. The dependent variable is annual growth of sales (half of the difference between the logarithm of sales in the last fiscal year and the logarithm of sales three fiscal years ago, both expressed in US dollars at market exchange rates). All regressions control for ownership (state/foreign/domestic), the logarithm of firm age, exporter status, propensity to complain (the kvetch factor), the logarithm of employment three years ago, the logarithm of sales in US dollars three years ago, region-sector-year fixed effects. Low-corruption economies are those with the Worldwide Governance Indicator of control of corruption of -0.43 or above (sample median); the rest are high-corruption economies. Sample is restricted to firms that view corruption as a moderate, major or very severe obstacle to their operation. Firms that view corruption as no obstacle or a minor obstacle are excluded.

Appendix Figures and Tables

Figure A1: Correlations between informal payments and corruption as an obstacle



Note: Includes observations in the estimation sample only. For countries with multiple surveys, we use the average Control of Corruption score across the survey years. Marker size indicates the number of underlying observations. The "Corruption is an obstacle" question is answered on a 5-point scale from "no" to "very severe" obstacle.

Tables

Table A1: Descriptive statistics

Variables	Mean	St. dev.	Median	Min	Max
Informal payments	0.008	0.034	0.000	0.000	0.500
Non-zero informal payments	0.148	0.355	0.000	0.000	1.000
Sales growth, per annum	0.066	0.340	0.050	-1.969	1.998
Labor productivity growth, per annum	0.019	0.347	0.008	-3.708	5.300
Sales growth, real terms, per annum	0.035	0.331	0.019	-2.142	2.124
Productivity growth, real terms, p.a.	-0.012	0.341	-0.023	-3.795	5.230
Employment growth, per annum	0.047	0.193	0.000	-4.736	3.719
Sales 3 years ago, USD, log	13.258	2.444	13.215	0.411	28.478
Employment 3 years ago, USD, log	3.248	1.413	2.996	0.000	13.122
Age, years, log	2.760	0.707	2.773	0.000	5.421
Foreign ownership	0.073	0.242	0.000	0.000	1.000
State ownership	0.015	0.121	0.000	0.000	1.000
Exporter	0.199	0.399	0.000	0.000	1.000
Propensity to complain (kvetch score)	0.001	0.684	-0.091	-2.588	2.737

Source: Authors' calculations.

Note: Based on 87,829 firms across 141 economies surveyed as part of Enterprise Surveys in 2006-20.

Table A2: Informal payments over time

Variable	Time period		
	2006-2010	2011-2015	2016-2020
Average bribe share	0.00992	0.00697	0.00610
Average bribe share for firms reporting non-zero bribes	0.0471	0.0493	0.0605
Share of firms reporting non-zero bribe share	0.211	0.141	0.101
Number of observations	25481	33746	28602

Source: Enterprise Surveys and authors' calculations.

Note: Averages across all firms surveyed during the time periods shown.

Table A3: Baseline regressions: coefficients on control variables

Dep. var.: Growth of sales	1	2
Informal payments	-0.232***	
	(0.058)	
Non-zero informal payments	0.021***	
	(0.005)	
Informal payment categories		
$0 < b \leq 0.5\%$		0.047***
		(0.008)
$0.5 < b \leq 1\%$		0.015**
		(0.007)
$1 < b \leq 5\%$		-0.001
		(0.007)
$5 < b \leq 10\%$		0.005
		(0.009)
$10 < b \leq 20\%$		-0.015*
		(0.009)
$> 20\%$		-0.025
		(0.017)
Sales 3 years ago, USD, log	-0.061***	-0.061***
	(0.002)	(0.002)
Employment 3 years ago, USD, log	0.056***	0.056***
	(0.002)	(0.002)
Propensity to complain (kvetch score)	0.004**	0.004**
	(0.002)	(0.002)
Foreign ownership	0.049***	0.048***
	(0.005)	(0.005)
Exporter	0.045***	0.044***
	(0.003)	(0.003)
State ownership	0.014	0.013
	(0.012)	(0.012)
Age, years, log	-0.034***	-0.034***
	(0.002)	(0.002)
Constant	0.776***	0.778***
	(0.019)	(0.019)
R-squared	0.293	0.294
Observations	87829	87829
Region-Sector-Year FE	Yes	Yes
Firm-level controls	All	All

Source: Authors' calculations.

Note: Standard errors in parentheses at clustered at the level of industry*region*survey wave. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively. Estimated using ordinary least squares. The specifications are the same as those in Table 1's columns (4) and (5). The dependent variable is annual growth of sales (half of the difference between the logarithm of sales in the last fiscal year and the logarithm of sales three fiscal years ago, both expressed in US dollars at market exchange rates). All regressions control for region-sector-year fixed effects, ownership (state/foreign/domestic), the logarithm of firm age, exporter status, propensity to complain (the kvetch factor), the logarithm of employment three years ago, the logarithm of sales in US dollars three years ago.

Table A4: Informal payments and productivity growth

Dep. var.: Labor productivity growth	1	2	3	4	5
Informal payments	-0.046		-0.112*	-0.211***	
	(0.053)		(0.061)	(0.060)	
Non-zero informal payments		0.008*	0.014***	0.017***	
		(0.004)	(0.005)	(0.005)	
Informal payment categories					
$0 < b \leq 0.5\%$					0.037***
					(0.008)
$0.5 < b \leq 1\%$					0.007
					(0.007)
$1 < b \leq 5\%$					0.000
					(0.007)
$5 < b \leq 10\%$					0.003
					(0.009)
$10 < b \leq 20\%$					-0.010
					(0.009)
$> 20\%$					-0.032*
					(0.018)
Log labour productivity t-2 (USD)				-0.088***	-0.088***
				(0.002)	(0.002)
Employment 3 years ago, USD, log				0.025***	0.025***
				(0.001)	(0.001)
Propensity to complain (kvetch score)				0.002	0.002
				(0.002)	(0.002)
Foreign ownership				0.037***	0.037***
				(0.005)	(0.005)
Exporter				0.015***	0.015***
				(0.003)	(0.003)
State ownership				-0.001	-0.001
				(0.012)	(0.012)
Age, years, log				-0.006***	-0.006***
				(0.002)	(0.002)
Constant	0.020***	0.018***	0.018***	0.831***	0.832***
	(0.000)	(0.001)	(0.001)	(0.021)	(0.021)
R-squared	0.201	0.201	0.201	0.305	0.305
Observations	87780	87780	87780	87780	87780
Region-Sector-Year FE	Yes	Yes	Yes	Yes	Yes
Firm-level controls				All	All

Source: Authors' calculations.

Note: Standard errors in parentheses at clustered at the level of industry*region*survey wave. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively. Estimated using ordinary least squares. The dependent variable is annual growth of sales per worker (half of the difference between the logarithm of sales per worker in the last fiscal year and the logarithm of sales three fiscal years ago, both expressed in US dollars at market exchange rates). All regressions control for region-sector-year fixed effects. Specifications in columns 4-5 also control for ownership (state/foreign/domestic), the logarithm of firm age, exporter status, propensity to complain (the kvetch factor), the logarithm of employment three years ago, the logarithm of sales in US dollars three years ago.

Table A5: Productivity growth in high-corruption vs low-corruption economies

Dep. var.: Labor productivity growth	High-corruption economies		Low-corruption economies	
	1	2	3	4
Informal payments	-0.194**		-0.234**	
	(0.077)		(0.094)	
Non-zero informal payments	0.023***		0.005	
	(0.007)		(0.007)	
Informal payment categories				
$0 < b \leq 0.5\%$		0.051***		0.010
		(0.011)		(0.010)
$0.5 < b \leq 1\%$		0.011		-0.001
		(0.010)		(0.010)
$1 < b \leq 5\%$		0.002		-0.001
		(0.010)		(0.011)
$5 < b \leq 10\%$		0.008		-0.005
		(0.012)		(0.013)
$10 < b \leq 20\%$		0.002		-0.029**
		(0.011)		(0.014)
$> 20\%$		-0.020		-0.055**
		(0.023)		(0.026)
R-squared	0.326	0.326	0.272	0.272
Observations	42313	42313	45467	45467
Region-Sector-Year FE	Yes	Yes	Yes	Yes
Firm-level controls	All	All	All	All

Source: Enterprise Surveys and authors' calculations.

Note: Standard errors in parentheses at clustered at the level of industry*region*survey wave. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively. Estimated using ordinary least squares. The dependent variable is annual growth of sales per worker (half of the difference between the logarithm of sales per worker in the last fiscal year and the logarithm of sales per worker three fiscal years ago, both expressed in US dollars at market exchange rates). All regressions control for ownership (state/foreign/domestic), the logarithm of firm age, exporter status, propensity to complain (the kvetch factor), the logarithm of employment three years ago, the logarithm of sales in US dollars three years ago, region-sector-year fixed effects. Low-corruption economies are those with the Worldwide Governance Indicator of control of corruption of -0.43 or above (sample median); the rest are high-corruption economies.

Table A6: Informal payments and employment growth

Dep. var.: Employment growth	1	2	3	4	5
Informal payments	-0.010		-0.031	-0.061**	
	(0.028)		(0.032)	(0.031)	
Non-zero informal payments		0.003	0.004	0.006**	
		(0.003)	(0.003)	(0.003)	
Informal payment categories					
$0 < b \leq 0.5\%$					0.017***
					(0.004)
$0.5 < b \leq 1\%$					0.009*
					(0.004)
$1 < b \leq 5\%$					-0.005
					(0.005)
$5 < b \leq 10\%$					0.001
					(0.005)
$10 < b \leq 20\%$					-0.008
					(0.006)
$> 20\%$					-0.001
					(0.009)
Employment 3 years ago, USD, log				-0.029***	-0.029***
				(0.001)	(0.001)
Propensity to complain (kvetch score)				0.003***	0.003***
				(0.001)	(0.001)
Foreign ownership				0.027***	0.027***
				(0.003)	(0.003)
Exporter				0.039***	0.039***
				(0.002)	(0.002)
State ownership				0.012**	0.012**
				(0.006)	(0.006)
Age, years, log				-0.026***	-0.026***
				(0.001)	(0.001)
Constant	0.047***	0.046***	0.046***	0.203***	0.203***
	(0.000)	(0.000)	(0.000)	(0.005)	(0.005)
R-squared	0.135	0.135	0.135	0.180	0.180
Observations	87780	87780	87780	87780	87780
Region-Sector-Year FE	Yes	Yes	Yes	Yes	Yes
Firm-level controls				All	All

Source: Authors' calculations.

Note: Standard errors in parentheses at clustered at the level of industry*region*survey wave. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively. Estimated using ordinary least squares. The dependent variable is annual growth of employment (half of the difference between the logarithm of employment in the last fiscal year and the logarithm of employment three fiscal years ago. All regressions control for region-sector-year fixed effects. Specifications in columns 4-5 also control for ownership (state/foreign/domestic), the logarithm of firm age, exporter status, propensity to complain (the kvetch factor), the logarithm of employment three years ago.

Table A7: Employment growth in high-corruption vs low-corruption economies

Dep. var.: Employment growth	High-corruption economies		Low-corruption economies	
	1	2	3	4
Informal payments	-0.046		-0.092**	
	(0.041)		(0.042)	
Non-zero informal payments	0.009**		0.002	
	(0.004)		(0.004)	
Informal payment categories				
$0 < b \leq 0.5\%$		0.021***		0.010
		(0.006)		(0.006)
$0.5 < b \leq 1\%$		0.011*		0.005
		(0.006)		(0.007)
$1 < b \leq 5\%$		0.001		-0.016**
		(0.006)		(0.007)
$5 < b \leq 10\%$		0.007		-0.010
		(0.007)		(0.009)
$10 < b \leq 20\%$		-0.011		-0.000
		(0.007)		(0.011)
$> 20\%$		0.009		-0.022
		(0.011)		(0.014)
R-squared	0.189	0.190	0.171	0.171
Observations	42313	42313	45467	45467
Region-Sector-Year FE	Yes	Yes	Yes	Yes
Firm-level controls	All	All	All	All

Source: Enterprise Surveys and authors' calculations.

Note: Standard errors in parentheses at clustered at the level of industry*region*survey wave. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively. Estimated using ordinary least squares. The dependent variable is annual growth of employment (half of the difference between the logarithm of employment in the last fiscal year and the logarithm of employment three fiscal years ago). All regressions control for ownership (state/foreign/domestic), the logarithm of firm age, exporter status, propensity to complain (the kvetch factor), the logarithm of employment three years ago, region-industry-year fixed effects. Low-corruption economies are those with the Worldwide Governance Indicator of control of corruption of -0.43 or above (sample median); the rest are high-corruption economies.

Table A8: Robustness: alternative choice of fixed effects

Dep. var.: Growth of sales	1	2	3	4	5	6
Informal payments	-0.251***	-0.192***			-0.235***	-0.279***
	(0.060)	(0.051)			(0.073)	(0.059)
Non-zero informal payments			-0.015**	0.003	-0.003	0.018***
			(0.006)	(0.004)	(0.007)	(0.005)
R-squared	0.112	0.213	0.111	0.213	0.112	0.213
Observations	87829	87829	87829	87829	87829	87829
Fixed effects	Year	Sector, region, survey wave	Year	Sector, region, survey wave	Year	Sector, region, survey wave
Firm-level controls	All	All	All	All	All	All

Source: Enterprise Surveys and authors' calculations.

Note: Standard errors in parentheses are clustered at the level of industry*region*survey wave. ***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively. Estimated using ordinary least squares. The dependent variable is annual growth of sales (half of the difference between the logarithm of sales in the last fiscal year and the logarithm of sales three fiscal years ago, both expressed in US dollars at market exchange rates). All regressions control for fixed effects as indicated. Other control variables included in all specifications but not shown are ownership (state/foreign/domestic), the logarithm of firm age, exporter status, propensity to complain (the kvetch factor), the logarithm of employment three years ago, the logarithm of sales in US dollars three years ago.