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Political regimes and firms' decisions to pay bribes: theory and evidence from firm-level surveys*

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Abstract

This paper makes the most of the observed actions of bribe takers and givers from the World Bank Enterprise Surveys and studies how a taker's action influences a giver's decision to pay bribes. To motivate our empirical study, we consider Kaufmann and Wei's (1999) Stackelberg game between a tax authority and a firm that undergoes tax inspection. The model predicts that, when the authority can use its action as a credible threat for the firm's profitability, the authority disturbs the firm by inspecting more, and the firm is more likely to pay bribes. Consistent with the theoretical prediction, we find correlational evidence that the propensity to pay bribes increases with the number of inspection visits, particularly for non-democratic countries.

Introduction

In the past several decades, autocratic countries have enmeshed themselves into the global economy.[1] However, their integration into the global economy has failed to alter the corrupt nature of their governments and businesses. The literature identifies several channels through which autocratic regimes induce corruption. Autocratic leaders exercise their power to avoid regime change at the expense of transparency and fair competition (Treisman, 2000). Politicians in autocratic countries have no incentives to fight against corruption because their voting processes lack transparency (Adserà *et al.*, 2003) and their legal system is not dependable (Rose-Ackerman, 1999).

To better understand why and how corruption occurs in autocratic countries, we use firm-level World Bank surveys from 138 countries and examine how governmental authorities' actions shape the distribution of red tape and bribe givers in each country.[2] To guide our empirical investigation, we use Kaufmann and Wei's (1999) Stackelberg game between a tax authority and a firm that undergoes tax inspection. The model predicts that when the authority is able to disturb the firm by threatening to impose a severe penalty, the authority has an incentive to impose more red tape, and the firm is more likely to pay in order to

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[1]For example, China joined the World Trade Organization (WTO) on December 11, 2001, and the Russian Federation joined the WTO on August 22, 2012.

[2]Aidt *et al.* (2020) emphasise that it is not regions or countries but individuals who are corrupt. They examine the characteristics of Chinese government officials who received bribes and find that high-ranked officials were more likely to receive bribes.

reduce the red tape. The World Bank surveys provide us with the two key variables from the theory: an authority's action to impose red tape (e.g., 'how many times was this establishment either inspected by tax officials or required to meet with them?'); and a firm's response to the authority (e.g., 'in any of these inspections or meetings was a gift or informal payment expected or requested?').

Figure 1 illustrates the normalised levels of red tape by bribe payment status for seven public services. Consistent with the findings of Kaufmann and Wei (1999) and Freund *et al.* (2016), the figure shows that bribe givers are those subjected to more red tape by their authority. The findings, however, mask the fact that the relationship between the incidence of bribe payments and red tape differs systematically across countries with different political regimes. Figure 2 illustrates the binned scatter plots and the fitted lines to visualise the relationships between the share of bribe givers and red tape from tax inspections for the sample of full democracies, partial democracies, and limited democracies in Panels A, B, and C, respectively.[3] The slope of the fitted line is steeper for limited democracies than for full democracies, meaning that firms in autocratic countries in which their authority has the power to disturb private firms are more likely to pay bribes when faced with more red tape.

Since corruption could arise from factors other than a country's political status, we use the linear probabilistic model and estimate the difference in the slopes by controlling for firm characteristics and country-level control variables. After controlling for these variables, we find that a one-standard-deviation difference in the log number of tax inspection visits causes the payment propensity to differ by 2.7 percentage points across non-democratic (limited and partially democratic) versus fully democratic countries. The results are robust when we (1) control for unobserved country-specific factors using country fixed effects, (2) use the sample of democratic countries from Acemoglu *et al.* (2019),[4] (3) check outlier countries by estimating for each country, (4) control for unobserved firm-specific factors by using the pooled sample of all public services available in the surveys and introducing firm fixed effects, and (5) use Oster's (2019) method to account for omitted variable bias arising from unobservable variables.

Our paper is related to the literature that examines corruption using firm-level surveys. Most of the studies (e.g., Alexeev and Song, 2013; Alm *et al.*, 2016; Diaby and Sylwester, 2015; Gauthier *et al.*, 2021; Svensson, 2003) examine how firm characteristics determine the general rates of bribery or how corruption influences firm performance. We follow Kaufmann and Wei (1999) and Freund *et al.* (2016) and examine the relationship between a government authority's action and a firm's response. Making the most of the large cross-country variation, we show that the relationship systematically differs based on political status.

Our paper is also related to the literature that examines corruption under different political and economic regimes. Using an endogenous growth model, Ehrlich and Lui (1999) examine the links between corruption, government, and growth. The equilibrium growth rate of their model depends on the relative importance of human capital versus political capital accumulation, according to alternative political regimes. Méndez and Sepúlveda (2006) find that the relationship between corruption and growth is nonlinear for a sample of free countries. Aidt *et al.* (2008) explore the possibility that differences in the quality of political institutions (i.e., their capacity to hold political leaders accountable for their actions) are the source of the nonlinear relationship between corruption and growth. Saha and Sen (2021) find evidence that the corruption–growth relationship differs based on the type of political regime, and the growth-enhancing effect of corruption is more likely to occur in autocracies than in democracies.[5] While the literature generally uses macroeconomic data, we use firm-level data and show that authorities in countries that have concentrated power are more likely to disturb private firms for their private gains at the expense of efficiency.

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[3]We use the democracy index in 1995 from the Freedom House. We define 29 countries as fully democratic countries, 77 countries as partially democratic countries, and 32 as limited democratic countries. See Appendix II for detail.

[4]We also report the results from the Polity5 and V-dem indices in the Appendix.

[5]See also Paraioannou and van Zanden (2015) who find that long years of dictatorships have negative impacts on economic growth particularly in young countries.
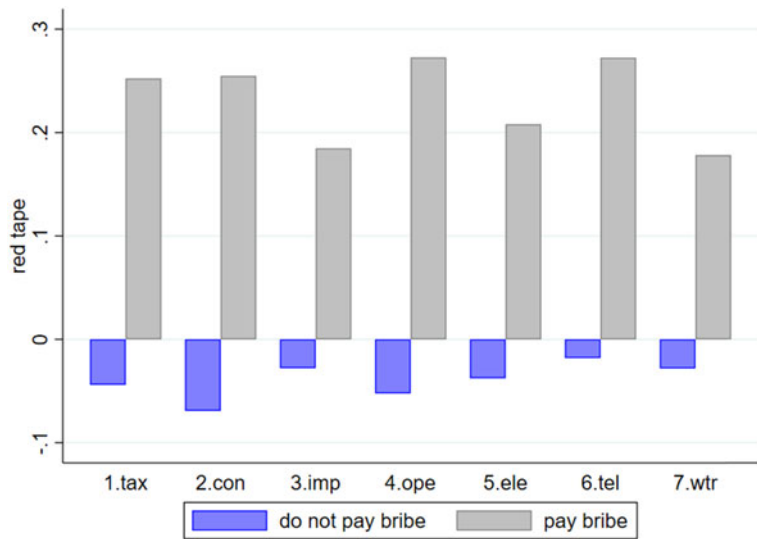
Figure 1. Red tape by bribe payment status.
Notes: (1) There are four government services: tax inspections (tax), construction permits (con), import licenses (imp), and operation licenses (ope). There are three utility services: electrical connections (ele), telephone connections (tel), and water connections (wtr). (2) Red tape is the normalised log number of wait days or authority visits for each country.
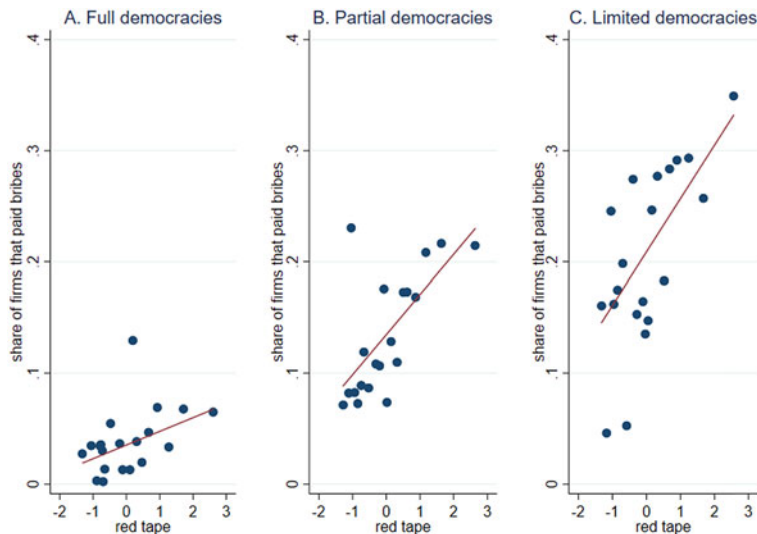
Figure 2. Red tape and the share of bribe givers by democracy index.
Notes: (1) We use the data from tax audits. (2) Red tape is the normalised log number of tax audit visits for each country. (3) We define 29 (32) countries as full democracies (limited democracies) if their Freedom House index (civil liberties, 1995) is 1–2 (6–7). We define the remaining 77 countries as partial democracies. (4) The slope of the fitted line is 0.012 (standard error clustered at the country level is 0.004) in Panel A, 0.036 (standard error clustered at the country level is 0.011) in Panel B, and that is 0.048 (standard error clustered at the country level is 0.014) in Panel C.

The rest of the paper proceeds as follows. In Section 'A model of bribe payment', we describe the model. Section 'Data' explains the development of corruption and democracy variables. In Section 'Empirical analysis', we provide empirical results, and the final section concludes the paper.

A model of bribe payment

Aidt (2003) categorises the theoretical analysis of corruption into four approaches: (1) efficient corruption; (2) corruption with a benevolent principal; (3) corruption with a non-benevolent principal; and (4) self-reinforcing corruption. Our theory is closely related to corruption with a non-benevolent principal. While Aidt (2003) introduces a license model with entry regulation, we use Kaufmann and Wei's (1999) Stackelberg game between a government authority and a firm that needs to go through tax inspection. The theory can be generalised to other government permits and public services. In the game, the authority is a leader, and the firm is a follower. The tax authority moves first to set red tape, the expected number of visits for tax inspection. The firm moves next to maximise its post-bribery profit by choosing the optimal amount of bribes.[6]

In the first meeting of the inspection, the government authority has an opportunity to inform the firm with the expected number of meetings, which is the authority's initial harassment level and is defined as endogenous red tape (r) over the minimum number of required meetings ($\underline{r}$). The authority and the firm share the bribe schedule, $s(b)$, that specifies how bribes can reduce red tape. We assume diminishing marginal returns to the amount of bribes: the first derivative is positive ($s_b > 0$); and the second derivative is negative ($s_{bb} < 0$). Bribes can reduce the number of meetings, but it gets more and more difficult to do so by paying more bribes. This assumption implies that the firm is not willing to pay an enormous amount of bribes. We also define red tape after paying bribes ($\bar{r}$):

$$\bar{r} = \underline{r} + r - s(b) \tag{1}$$

where $\bar{r}$ and $\underline{r}$ are non-negative values.

A firm's pre-bribery profit (π) is predetermined.[7] The firm's post-bribery profit is

$$\pi* = [1 - t(\bar{r})]\pi - b. \tag{2}$$

where $t(\bar{r})$ captures the penalty rate after paying bribes.

The penalty function plays a crucial role in theoretical predictions. We assume $t_r > 0$ and $t_{rr} > 0$. The first and second derivatives combined imply that, as the number of inspection meetings (r) increases, the authority can scrutinise the firm's tax files and impose an exponentially higher penalty rate.

We use the backward induction method and identify the sub-game perfect Nash equilibrium. The firm observes equations (1) and (2) and chooses the optimal amount of bribes (b). The first-order condition is

$$t_r(r, b)s_b(b)\pi = 1, \tag{3}$$

and, conditional on the firm's profit, the firm's reaction function depends on the red tape imposed by the authority:

$$b = b(r). \tag{4}$$

By differentiating the firm's reaction function (4) with respect to r, we can obtain the following condition, which indicates that the authority has the incentive to set more red tape to increase their bribe intakes:

$$\frac{\partial b}{\partial r} = \frac{t_{rr}s_b}{t_{rr}s_b^2 - t_r s_{bb}} > 0 \tag{5}$$

where $\partial b/\partial r$ is strictly increasing with t_{rr}.[8]

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[6]Gauthier *et al.* (2021) empirically examine the determinants of demand- versus supply-side corruption by categorizing non-bribe paying firms into two groups: non-complying to requests versus non-paying for requests.

[7]A firm's profit and the amount of bribes could be endogenously determined. See, for example, Bliss and Di Tella (1997) who build a model in which both the equilibrium number of firms and the level of bribes are endogenously determined and show that bribery may not decline with the competition.

[8]We can derive the following condition: $\frac{\partial(\partial b/\partial r)}{\partial t_{rr}} = \frac{-t_r s_b s_{bb}}{(t_{rr}s_b^2 - t_r s_{bb})^2} > 0$.

The authority observes the firm's reaction function and moves first to choose the red tape (r) using equation (5). Then, the firm moves next to choose its best response (b) to maximise its post-bribery profit.

From equations (1) and (5), we can predict the post-bribery number of inspection meetings:

$$\frac{\partial \bar{r}}{\partial b} = \frac{\partial r}{\partial b} - s_b > 0. \tag{6}$$

The equilibrium conditions from equations (5) and (6) suggest that when the authority has the ability to impose a severe penalty ($t_r > 0$ and $t_{rr} > 0$), conditional on the high red tape imposed by the authority, the number of meetings remains high even after paying bribes.

While the authority cares about their bribe intakes, the bribery-corruption deal involves the risk for the authority, including law enforcement and criminal justice (e.g., Fisman and Miguel, 2007). As such, we define the authority's objective function:

$$U = b(r) - cr \tag{7}$$

where $c > 0$ represents the cost of harassment.

The authority's decision to impose more red tape depends on the following condition:

$$\frac{\partial U}{\partial r} = \frac{\partial b}{\partial r} - c > 0. \tag{8}$$

The equilibrium conditions from equations (5) and (8) suggest that, when corruption is not costly, the authority is more likely to impose red tape to induce the firm's bribe payments.

To show that the authority without power does not have an incentive to harass the firm by imposing more red tape, we consider the equilibrium when $t_r > 0$ and $t_{rr} \leq 0$. This assumption means that the authority's threat to increase the penalty rate is not credible.

Because $\partial b/\partial r$ in equation (6) is strictly increasing with t_{rr}, the authority's harassment does not induce the firm's bribe payments: $\partial b/\partial r = 0$ when $t_{rr} = 0$ and $\partial b/\partial r < 0$ when $t_{rr} < 0$. Thus, while equation (6) suggests that paying bribes would reduce red tape as in the efficient grease literature (e.g., Leys, 1965; Lui, 1985), equation (8) suggests that the authority has no incentives to do so because it is costly for the authority ($\partial U/\partial r < 0$).

Data

We use the firm-level survey data from the World Bank Enterprise Surveys (WBES).[9] The original sample consists of 124,940 observations from 139 countries over the period of 2006–2016. After excluding observations from Sweden[10] and those without data on firm-level employment, we have 122,855 observations from seven sectors[11] and 138 countries.[12] Some countries have three years of survey results, but most of the countries report only one year of results. The average gross domestic product (GDP) per capita (in current international dollars converted by purchasing power parity) within our sample is \$9,230; Israel is the most advanced country in the sample with an average GDP per capita of \$34,324, and the Democratic Republic of the Congo is the least developed country with an average GDP per capita of \$642. The World Bank database is one of the most reliable data sources

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[9]The data we use was released on September 6, 2016.

[10]This is because all the firms in the Swedish sample reported that they did not pay bribes for tax inspection.

[11]We organise the manufacturing and service industries into the following seven broad industries: (1) textile, leather, and garments; (2) food; (3) chemicals and plastic materials; (4) machinery; (5) wood and other manufacturing; (6) retail; wholesale, hotel and restaurants; and (7) all other service industries.

[12]See Appendix II for the list of countries and survey years.

for corruption studies because it surveys managing directors, business owners, accountants, and other relevant staff members who have firsthand experience of the issues.

Corruption variables

Using the survey data, some studies (e.g., Alexeev and Song, 2013; Diaby and Sylwester, 2015; Kraay and Murrell, 2016) focus on the question of the general rates of bribery (e.g., the amount of bribes divided by sales). To examine the bribery-corruption deal between an authority and a firm, we use the following survey questions. The surveys, for example, ask 'over the last 12 months, was this establishment visited or inspected by tax officials?' and then ask 'how many times was this establishment either inspected by tax officials or required to meet with them?' and 'in any of these inspections or meetings was a gift or informal payment expected or requested?' Therefore, we can examine the sequence of bribery-corruption actions without facing identification problems the survey data typically face.[13] Of course, the variables we use are not perfect either. In the surveys, we cannot clearly distinguish red tape imposed by the authority from red tape after paying bribes. Respondents may also choose to refuse, misreport, or not report for many reasons. For example, around 3% of the firms refused to answer or do not respond to the bribe payment question.[14]

Following the survey structure of the WBES, we study seven types of public services: (1) tax inspection; (2) construction permit application; (3) import license application; (4) operation license application; (5) electrical connection; (6) telephone connection; and (7) water connection. Among the public services available from the surveys, we believe that tax inspection best describes the Stackelberg game above. The tax authority in countries with concentrated power could use a severe penalty as a credible threat for firms and individuals. As such, we use tax inspection as our baseline results.[15] Nevertheless, we report the results including other public services.

Using the sample of the firms that used a public service, we develop a service-specific bribe payment indicator variable (p_i), defined as one when firm i made a gift or informal payment to government officials, and zero otherwise. Table 1 reports the summary statistics of bribe payment indicator variables. In the last 12 months, 66,428 firms in the sample were visited by tax officials. Among these firms, 14.6% paid or had bribes requested. Table 1 also illustrates that there is a significant cross-firm variation in the number of tax inspection visits (r_i). The average number of visits is 3.4 with a median of 2 and a standard deviation of 4.8, suggesting that most of the firms were visited only a few times.

Democracy index

The Freedom House has assessed the condition of political rights and civil liberties around the world. Similar data are reported by the Center for Systemic Peace as well as the University of Gothenburg, V-Dem Institute. We use the Freedom House democracy index because it covers all 138 countries

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[13]The results from bribe rates may suffer identification problems. Consider the most-used questionnaire item in the World Bank surveys, which asks 'we've heard 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 percent 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?' From this item, we are unable to identify a type of public service (because it refers to various services at a time) and a certain firm (because it refers to establishments like yours).

[14]Using data from the WBES, Jensen, Li, and Rahman (2010) show that both at the national and firm levels, countries with lower levels of political freedom are more likely not to answer bribe-related questions and are more likely to provide false responses. Kraay and Murrell (2016) show that surveys tend to underestimate the prevalence of corruption because respondents are often reticent to tell the truth about sensitive subjects like corruption.

[15]For similar reasons, Alm *et al.* (2016) use tax inspection data from the surveys, and Gauthier *et al.* (2021) use tax inspection and operation license application. We include all seven services because our theory is applicable to these services. For example, public officials can use the delay in granting an import license as a threat to firms' losses arising from the lost business opportunities.

Table 1. Summary statistics of corruption variables

	WBES item	Obs	Mean	s.d.	Median	Min	Max
Government services Tax inspections							
Payment	j5	66,428	0.146	0.354	0	0	1
# of officials' inspection visits	j4	66,428	3.4	4.8	2	1	40
Construction permits							
Payment	g4	12,069	0.214	0.410	0	0	1
# of days waiting	g^3	12,069	68.6	111.9	30	1	720
Import licenses							
Payment	j 12	12,727	0.134	0.340	0	0	1
# of days waiting	j11	12,727	18.4	29.1	7	1	180
Operating licenses							
Payment	j 15	25,717	0.162	0.368	0	0	1
# of days waiting	j 14	25,717	26.4	48.9	10	1	365
Utility services Electrical connections							
Payment	c5	14,816	0.163	0.369	0	0	1
# of days waiting	c4	14,816	33.1	61.1	12	1	390
Telephone connections							
Payment	c21	14,286	0.065	0.246	0	0	1
# of days waiting	c20	14,286	19.4	42.7	7	1	365
Water connections							
Payment	c14	6,026	0.140	0.347	0	0	1
# of days waiting	c13	6,026	28.6	57.6	10	1	365

Notes: (1) The 'payment' dummy variable is one if a firm makes an informal gift and zero otherwise. (2) We replace outlier values (99.5-percentile values or higher) with the 99.5-percentile value for each of the red tape in a country.

in our data set.[16] Their numerical ratings, ranging from 1 to 7, cover more than 200 countries and territories and are assigned by analysts who assess research, consultations with local contacts, and information from news articles, nongovernmental organisations, governments, and a variety of other sources. We use the index from 1995 because transitions towards democracy allow the old-regime elites to sustain their political power (e.g., Martinez-Bravo *et al.* (2017) for evidence from Indonesia and González *et al.* (2021) for evidence from Chile). For each country, the analysts study the electoral process, political pluralism and participation, the functioning of the government, freedom of expression and of belief, associational and organisational rights, the rule of law, and personal autonomy and individual rights. For example, the subset of the not-free rating (i.e., the index is 6 or 7) in our sample includes China, Indonesia, and Nigeria in 1995, while the subset of the free rating (i.e., the index is 1 or 2) includes Poland and Uruguay.[17] Most of the countries in our data set are countries without complete democracy. 29 countries are in the range of 1–2, which we refer to as full democracy,

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[16]We need to drop 4 countries when we use the index in Acemoglu *et al.* (2019), 14 countries when we use the Polity2 index from the Center for Systemic Peace, and 11 countries when we use the V-Dem index from the University of Gothenburg.

[17]See Appendix II for the list of countries by rating.

77 countries are in the range of 3–5, which we refer to as partial democracy, and 32 countries are in the range of 6–7, which we refer to as limited democracy.

Since there are different ways to define and measure democracy, we also use the democratic country list from Acemoglu *et al.* (2019) for the robustness check. Acemoglu *et al.* (2019) follow Papaioannou and Siourounis (2008) and develop an indicator variable of democracy. They combine several sources including the Freedom House democracy index. We merge their democracy index with the 134 countries in our data set, of which 78 countries are democracies and 56 countries are non-democracies. See Table 2 for the summary statistics for these variables. Across the regions, countries in the Americas and the European Union tend to be more democratic than those in the Middle East (see Appendix Table A1 for the regional summary statistics).

Empirical analysis

In this section, we first illustrate how we derive the empirical specification from our theory. We then examine how red tape imposed by a government authority is associated with firms' propensity to pay bribes.

Empirical strategy

Our theory suggests that the second derivative of the penalty rate schedule (t_{rr}) captures the threatening power of a government authority.

The equilibrium conditions we derived do not necessarily guarantee that a firm would pay the optimal amount of bribes to reduce red tape. While Kaufmann and Wei (1999) assume that a firm has an arbitrary threshold to tolerate the authority's harassment, we consider the possibility that a firm has an opportunity to walk away from the bribery-corruption deal because such a deal is not always enforceable. To derive our empirical specification, we assume that a firm would pay bribes if its benefits exceed its costs of bribery:

$$[t(\bar{r} + s(b)) - t(\bar{r})]\pi > b \tag{9}$$

where the firm's benefits, $[t(\bar{r} + s(b)) - t(\bar{r})]\pi$, are the penalty payment saved due to the bribery payment.

To understand the firm's decision to actually pay bribes, we define the latent variable from equation (9):

$$Z = t_r \frac{\pi}{b} \tag{10}$$

where $t_r \approx t(\bar{r} + s(b)) - t(\bar{r})$.[18]

Equation (10) is the ratio of the firm's benefits to costs surrounding bribery-corruption acts. The firm would pay bribes if and only if the benefit-to-cost ratio is greater than one: $Z > 1$. We are particularly interested in the empirical correlation between the propensity to pay (Z) and the first derivative of the penalty rate (t_r). When an authority's action is not a threat for severe penalties (see Panel A in Figure 3), the propensity to pay should not strongly correlate with red tape because t_{rr} increases slowly with $\bar{r}$. When an authority's action is a threat to a firm (see Panel B in Figure 3), more red tape induces firms to pay bribes. Thus, the propensity to pay and the red tape should be positively correlated because t_{rr} increases strongly with $\bar{r}$.

Equation (10) indicates that a firm's bribe amount and pre-bribery profit are determinants for the firm's decision to pay bribes. Because the bribe amount for tax inspections is not available, and the profit is not accurately reported in the surveys, we need to control for these unobservables. The

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[18]Here, we assume that the amount of bribes is small because the firm understands that it gets more and more difficult to reduce red tape by paying more bribes ($s_{bb} < 0$).

Table 2. Summary statistics of key explanatory variables

	Obs	Mean	s.d.	Median	Min	Max
Macroeconomic variables						
Freedom House index	122,855	4.43	1.49	4	1	7
Democracy index (Acemoglu *et al.*, 2019)	121,353	0.61	0.49	1	0	1
ln (per capita GDP)	122,855	8.87	0.86	9	6	10
ln (years of compulsory education)	122,855	2.19	0.25	2.20	0.00	2.77
ln (population)	122,855	17.31	1.95	17.29	10.77	21.03
Government share in GDP	122,855	0.14	0.06	0.13	0.05	1.16
Oil share in GDP	122,855	0.03	0.07	0.01	0.00	0.50
Trade share in GDP	122,855	0.68	0.34	0.58	0.01	3.48
Legal origin (UK)	122,855	0.31	0.46	0	0	1
Legal origin (France)	122,855	0.55	0.50	1	0	1
WTO membership dummy	122,855	0.79	0.41	1.00	0.00	1.00
State capability	122,855	−0.41	0.60	−0.41	−1.91	1.17
Firm characteristics						
ln (labor)	122,855	3.24	1.39	3.00	0.00	11.07
ln (firm age)	120,882	0.00	1.00	0.08	−5.63	4.12
Foreign firm dummy	122,855	0.08	0.28	0	0	1
SOE dummy	122,855	0.01	0.10	0	0	1
Exporter dummy	122,855	0.20	0.40	0	0	1
Certificate dummy	122,855	0.22	0.41	0	0	1

Notes: See Appendix I for the definitions of the variables.
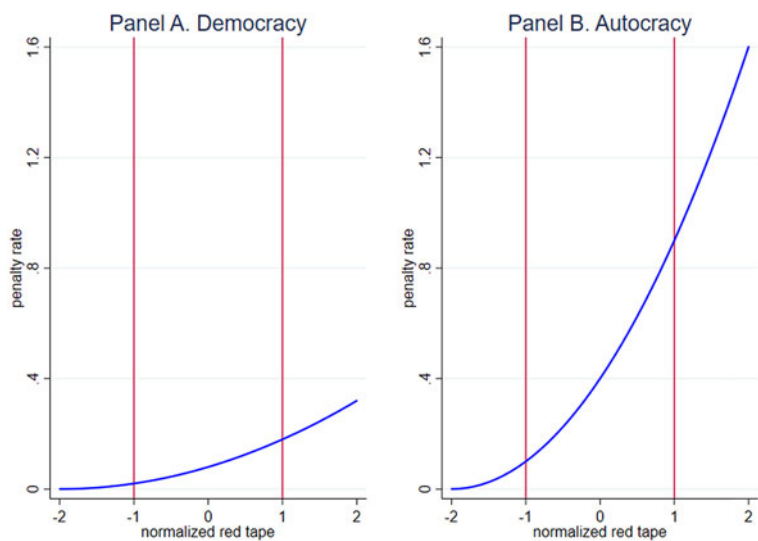

Figure 3. The theoretical relationship between red tape and penalty rate.
Notes: The solid vertical line is a situation where a firm is imposed a one-standard deviation more or less red tape by an authority.

selection of control variables is a critical aspect of our study. We adhere to the literature and use six firm-level (e.g., employment, export status, and technology certificates) and ten country-level variables (e.g., per capita GDP, oil share, the size of government, and legal origins) throughout our analysis.[19] We also include year fixed effects to control for survey years. Although we include a wide range of observable control variables, our results could be biased due to the omitted variable bias arising from unobservables. Therefore, we use Oster's (2019) strategy and show that the omitted variable bias is not significant in our study (see Section 'Omitted variable bias').

In our paper, we do not attempt to identify the causality of the explanatory variables. Rather, we want to examine if the propensity to pay bribes differs systematically with red tape across countries with different political regimes. We define the bribe payment indicator variable where $p_i = 1$ when $Z_i > 1$, otherwise $p_i = 0$. And we use the log of the latent variable to derive the following empirical model:

$$p_i = \beta_1 D_c + \beta_2 \ln(\bar{r}_i) + \beta_3 D_c \times \ln(\bar{r}_i) + X_i + X_c + \varepsilon_i \qquad (11)$$

where D_c is the country-level democracy dummy variable from the Freedom House or Acemoglu *et al.* (2019), $\ln(\bar{r}_i)$ is the normalised log number of tax inspection visits by the authority, X_i includes the firm-specific control variables, X_c captures the country-specific control variables, and ε_i is a random error term.

Figure 2 gives us some insights on the expected signs of the coefficients (β_1, β_2, and β_3) in equation (11). In the figure, the horizontal axis represents the normalised number of tax inspection visits, and the vertical axis represents the propensity to pay bribes. We find these two variables are positively associated for full democracies, partial democracies, and limited democracies. These three subsets of countries, however, are different in the slope of the fitted line, meaning that firms in less democratic countries are more likely to pay bribes when more red tape is imposed on them. This is because t_{rr} is greater for these countries. Thus, we expect that $\beta_1 < 0$, $\beta_2 > 0$, and $\beta_3 < 0$. Intuitively, a firm that faces harassment from the authority has a strong incentive to pay bribes to reduce the red tape imposed by the authority because the firm understands that payment would substantially reduce the risk of enormous tax penalty payments.

Main results

By limiting the sample to the firms that were visited by tax officials, we use the linear probabilistic model[20] and estimate equation (11).[21] Throughout the paper, we use standard errors that are clustered at the country level.

To start, Table 3 reports the results from tax inspection when we use the sub-samples of countries with different political regimes. Columns (1)–(3) report the results when we use the samples of 29 fully democratic countries, 77 partially democratic countries, and 29 limited democracies from the Freedom House. Columns (4)–(5) report the results when we use the samples of 78 democratic and 56 non-democratic countries from Acemoglu *et al.* (2019). Because we use the subsets of the sample, we set $\beta_1 = 0$ and $\beta_3 = 0$ in equation (11) and check if firms in democracies are less likely to pay bribes when they face more red tapes. The results in columns (1)–(3) suggest that a one-standard-deviation difference in red tape causes the payment likelihood to differ by 1.3, 3.7, and 4.8 percentage points in full, partial, and limited democracies, respectively.[22] Firms in less democratic countries are more likely

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[19]See Svensson (2003), Clarke and Xu (2004), and Rand and Tarp (2012) for firm-level variables and Shleifer and Vishny (1993), Svensson (2005), and Fisman and Miguel (2007) for country-level variables. Appendix I reports the complete list of the control variables.

[20]The results from the Probit and Logit models are similar to our OLS results. Thus, to save space, we do not report the results.

[21]See Appendix I for the definitions of the firm-level variables and country-specific macroeconomic variables.

[22]We use the chi-squared test and examine if we can reject the null hypothesis that the coefficients on red tape in columns (1)–(3) from the sub-samples are identical. We reject the null hypothesis at the 1% confidence level when we test 0.013 in

Table 3. Red tape and propensity to pay bribes

Dependent variable:	Bribe payment indicator variable for tax inspection				
Source of democracy variable:	Freedom House			Acemoglu *et al.* (2019)	
Countries:	Full (1)	Partial (2)	Limited (3)	Democracies (4)	Others (5)
Red tape	0.013*** (0.004)	0.037*** (0.006)	0.048*** (0.009)	0.031*** (0.007)	0.047*** (0.007)
Firm controls					
ln (labour)	−0.005** (0.002)	−0.007 (0.005)	−0.007 (0.007)	−0.008 (0.005)	−0.006 (0.006)
ln (firm age)	−0.002 (0.001)	0.001 (0.003)	−0.008* (0.004)	0.002 (0.003)	−0.008** (0.004)
Foreign firms	0.024*** (0.007)	−0.021** (0.010)	−0.016 (0.025)	−0.016 (0.011)	−0.002 (0.018)
SOEs	−0.024** (0.010)	−0.108*** (0.024)	−0.025 (0.029)	−0.052 (0.036)	−0.038* (0.022)
Exporters	0.010* (0.006)	0.005 (0.006)	0.018 (0.012)	0.008 (0.006)	0.010 (0.010)
Certificates	−0.015*** (0.004)	−0.020*** (0.006)	−0.006 (0.012)	−0.020*** (0.006)	−0.011 (0.011)
Control variables					
Macroeconomic variables	Yes	Yes	Yes	Yes	Yes
Survey-year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	6,736	39,431	19,414	37,319	27,306
R^2	0.056	0.088	0.102	0.096	0.096

Notes: (1) We regress the bribe payment indicator variable with red tape. Red tape is the normalised log number of tax inspection visits for each country. (2) In columns (1), (2), and (3), we use the sample of 29 fully democratic, 77 partially democratic, and 32 limited democratic countries, respectively, from the Freedom House index. In columns (4) and (5), we use the sample of 78 democratic and 56 non-democratic countries from Acemoglu *et al.* (2019). (3) Standard errors clustered at the country level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% confidence levels, respectively.

to pay bribes when they face more red tape. This is because red tape imposed by the authority is a credible threat to a severe penalty in countries with concentrated power. We find consistent results from the samples of democratic versus non-democratic countries from Acemoglu *et al.* (2019). The results from alternative measures of democracy are reported in Table A2 in the Appendix.[23]

Column (1) in Table 4 reports the results from equation (11) using the full sample of countries. Consistent with the results in Table 3, firms that faced substantially higher numbers of tax inspection visits are more likely to pay bribes, and firms that faced higher numbers of visits in fully democratic countries are less likely to pay bribes than those in non-democratic (partial and limited democratic) countries. In particular, the results indicate that a one-standard-deviation difference in the log number of tax inspection visits causes the payment propensity to differ by 2.7 percentage points across democratic versus non-democratic countries.[24]

Robustness checks

Fixed effects

Since unobservable country and firm characteristics could bias the results, we use various fixed effects and show the robustness of the baseline results in column (1) in Table 4. Column (2) reports the results when we use country and sector fixed effects. Columns (3) and (4) report the results when we follow Freund *et al.* (2016) and stack seven public services for each firm, which enables us to introduce firm fixed effects.[25] Column (3) reports the results when we use the same control variables from the baseline results in column (1) as well as public service fixed effects. Column (4) reports the results when we use firm fixed effects. The results reported in column (2) indicate that our results are robust to the introduction of country fixed effects, suggesting that our macroeconomic control variables created from the literature (e.g., Fisman and Miguel, 2007; Shleifer and Vishny, 1993; Svensson, 2005) adequately capture cross-country variation in the propensity to pay bribes. The results reported in column (4) indicate that, even if we control unobservable firm characteristics, we find consistent results.

Omitted variable bias

In this section, we examine the omitted variable bias arising from unobservables. The selection of control variables is a critical aspect of our study. We use six firm-level and ten country-level control variables; however, several important variables, including political linkages and profitability, are not observable. A common technique to assess the robustness of the results to determine if there is omitted variable bias is to observe the movement of the coefficient on the variable of interest before and after including the control variables. As shown in columns (1) and (2) of Table 5, the coefficient for red tape remains stable across all subsets of the data, both before and after accounting for the control variables. This suggests that omitted variable bias is not a significant issue in our study.

However, relying solely on coefficient movements using observable variables is not sufficient to determine the extent of omitted variable bias. To measure the magnitude of bias arising from unobservables, Altonji *et al.* (2005a, 2005b) develop an empirical method to test the robustness of the results. The relationship between the variable of interest and the observables contains information about the relationship between the variable and the unobservables. Their test statistic is derived under the assumption that (1) the selection of observables is proportional to the selection of unobservables and (2) the variance of the outcome variable would be fully explained by unobservables (i.e., an

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column (1) versus 0.037 in column (2) and test 0.013 in column (1) versus 0.048 in column (3). We cannot reject the null hypothesis at the 10% confidence level when we test 0.037 in column (2) versus 0.048 in column (3). We can reject the null hypothesis at the 10% confidence level when we test 0.031 in column (4) and 0.048 in column (5).

[23]We report the results from the Freedom House index using both the survey year and ten years prior to it, as well as those from the Polity5 and V-Dem indices.

[24]See Table A3 in the Appendix for other public services.

[25]Here, our outcome bribe payment indicator variable is firm- and service-specific (p_{is}).

Table 4. The results with fixed effects

Dependent variable:	Bribe payment indicator variable			
	Tax inspection		All	
Policy variable:				
Specification:	Baseline (1)	Country FE (2)	Baseline (3)	Firm FE (4)
Full democracy	0.035 (0.029)	−0.264*** (0.033)	0.047* (0.025)	
Red tape	0.040*** (0.005)	0.041*** (0.005)		
Full democracy × Red tape	−0.027*** (0.006)	−0.028*** (0.006)	−0.028*** (0.004)	−0.016*** (0.005)
Firm controls				
ln (labour)	−0.007* (0.004)	−0.007* (0.004)	−0.006** (0.003)	
ln (firm age)	−0.002 (0.002)	−0.001 (0.002)	−0.002 (0.002)	
Foreign firms	−0.017 (0.011)	−0.006 (0.008)	−0.014* (0.008)	
SOEs	−0.067*** (0.025)	−0.034** (0.016)	−0.060*** (0.016)	
Exporters	0.011** (0.005)	0.006 (0.004)	0.018*** (0.006)	
Certificates	−0.015** (0.006)	−0.014*** (0.005)	−0.013*** (0.005)	
Control variables				
Macroeconomic variables	Yes	Yes	Yes	Yes
Survey-year fixed effects	Yes	Yes	Yes	Yes
Country & sector fixed effects	No	Yes	No	No
Service fixed effects	No	No	Yes	No
Firm fixed effects	No	Yes	No	Yes
Observations	65,581	65,581	150,362	152,055
R^2	0.091	0.150	0.097	0.749

Notes: (1) We regress the bribe payment indicator variable with red tape, the democracy indicator variable (full democracy countries) from the Freedom House index, and the interaction between red tape and the democracy variable. (2) Columns (1)–(2) report the results from tax inspection, and columns (3)–(4) report the results from the pooled sample of seven public services. (3) Standard errors clustered at the country level are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% confidence levels, respectively. (4) The number of observations declines from column (3) to (4) because the firm age variable is not available for all firms.

Table 5. Oster's (2019) bias-adjusted coefficient

Specification:	β from OLS		Bias-adjusted β	
	w/o controls (1)	with controls (2)	$R_2 + (R_2 - R_1)$ (3)	$1.3R_2$ (4)
Full democracies				
Red tape (β)	0.012	0.013	0.013	0.013
R^2	0.004	0.056	–	–
Partial democracies				
Red tape (β)	0.036	0.037	0.038	0.037
R^2	0.011	0.088	–	–
Limited democracies				
Red tape (β)	0.048	0.048	0.049	0.048
R^2	0.014	0.102	–	–

R^2 value of one). The second assumption, however, is not realistic for our study because of the idiosyncratic nature of firm-level responses to corruption. Therefore, we follow Oster (2019) and estimate the bias-adjusted coefficient from the two different assumptions of maximum R^2 values that unobservables could possibly explain.[26] Columns (3) and (4) in Table 5 report the bias-adjusted coefficient of the red tape. The adjusted coefficient is nearly identical to the results in column (2), indicating that the omitted variable bias arising from both observables and unobservables is not significant.

Country-level results

Thus far, we report the results when we pool the countries in the data set. The results, however, could possibly depend on some outlier countries. Therefore, we estimate equation (11) for each country using the following equation:

$$p_i = \beta_2 \ln(\bar{r}_i) + X_i + \varepsilon_i. \tag{12}$$

We report the results from the two fully democratic countries (Poland and Uruguay) in columns (1) and (2), the two partially democratic countries (Ukraine and Russia) in columns (3) and (4), and the three limited democracies (Indonesia, Nigeria, and China) in columns (5)–(7) in Table 6.

We first compare the results from Poland and Ukraine. After the collapse of the Soviet Union, Poland, Ukraine, and other Easter European countries started their transition to democracy. Poland was among the first countries that prepared to join the European Union. As a result, it carried out economic and political reform to meet the requirements. The Freedom House index of Poland is 2 and that of Ukraine is 4 in 1995. Thus, Poland was more democratic than Ukraine in 1995. We find that the red tape variable carries a statistically significant positive coefficient only for Ukraine, suggesting that corruption problems arising from the authority's threat are much more prevalent in Ukraine. Moreover, we find consistent results from another example of democratic countries in the data: Uruguay.[27]

Column (4) reports the results from Russia, confirming that firms are more likely to pay bribes when they face high red tape. The results are consistent with anecdotal evidence for the authority's ability to disturb private firms. Yukos Oil Company was a successful oligarch until the owner criticised

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[26]See Table 5 in Oster (2019).

[27]Although the Freedom House ranked Uruguay and Chile in the same rating of democracy, we find a positive correlation from Chile. Chile's democratisation process began in 1990; however, González et al. (2021) show that the democratisation changed the distribution of *de jure* political power but has limited changes in *de facto* political power.

Table 6. Propensity to pay bribes for selected countries

| Dependent variable:	Bribe payment indicator variable for tax inspection						
Regime:	Full democracies		Partial democracies		Limited democracies		
Country:	Poland (1)	Uruguay (2)	Ukraine (3)	Russia (4)	Indonesia (5)	Nigeria (6)	China (7)
Red tape	0.019* (0.011)	0.003 (0.005)	0.078*** (0.015)	0.016*** (0.006)	0.057*** (0.017)	0.062*** (0.008)	0.029*** (0.008)
Firm controls							
ln (labour)	−0.007 (0.005)	−0.002 (0.003)	−0.015 (0.016)	0.008 (0.006)	−0.003 (0.016)	−0.028*** (0.008)	−0.004 (0.009)
ln (firm age)	−0.003 (0.005)	−0.002 (0.006)	−0.025* (0.013)	0.005 (0.005)	−0.007 (0.017)	0.004 (0.008)	−0.001 (0.007)
Foreign firms	−0.013 (0.009)	0.011 (0.016)	0.011 (0.066)	0.058 (0.044)	0.031 (0.048)	0.036 (0.066)	−0.076*** (0.023)
SOEs	−0.025 (0.016)		−0.013 (0.111)	−0.051 (0.048)	−0.152*** (0.036)	0.090 (0.116)	0.081 (0.104)
Exporters	0.015 (0.016)	−0.004 (0.006)	0.032 (0.040)	0.020 (0.021)	0.048 (0.029)	−0.042** (0.021)	−0.006 (0.018)
Certificates	−0.019* (0.011)	0.009 (0.013)	−0.057 (0.042)	−0.002 (0.017)	0.054* (0.032)	−0.057** (0.026)	−0.017 (0.017)
Control variables							
Survey-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	No
Observations	331	476	853	2,379	608	2,998	1,485
R^2	0.041	0.007	0.058	0.036	0.085	0.029	0.014

Notes: See Table 4.
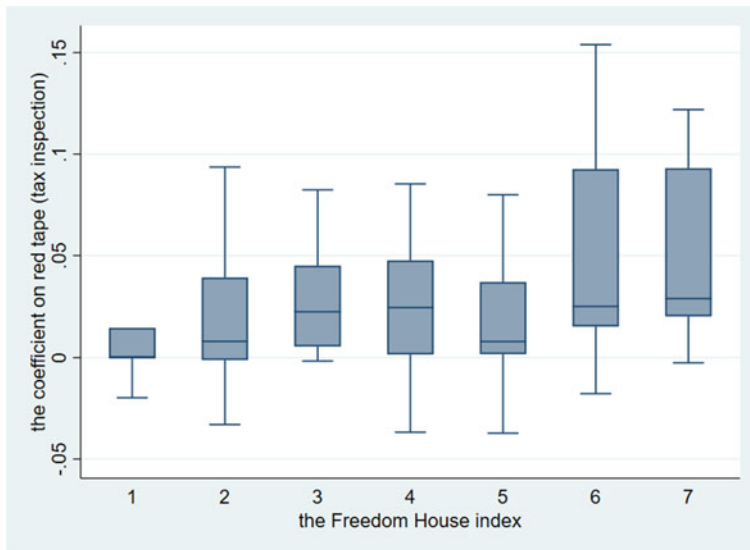
Figure 4. The Freedom House index and country-level estimates on β_2 from tax inspection.
Notes: The bottom and top values of the boxes are the 25th percentile and 75th percentile values, respectively.

President Vladimir Putin for spreading corruption in Russia in 2003. Soon after his statement, the Russian tax authority launched eight investigations and charged the company with $27 billion tax penalties. The anecdote suggests that the Russian authority displayed the ability to impose a severe penalty on firms and individuals.

The results in columns (5)–(6) from Indonesia and Nigeria indicate that red tape is a significant determinant for the propensity to pay bribes. Indonesia is considered one of the most corrupt countries in the world. Following the Asian Financial Crisis of 1997, Indonesia sought financial aid from the International Monetary Fund (IMF). In exchange, Indonesia had to implement anti-corruption reforms, including transitioning to a democracy. Pertiwi and Ainsworth (2021), however, find that democratisation did not reduce corruption. Corruption has been a persistent public issue in Nigeria for a long time. Diamond (1991) argues that Nigerian officials are induced into corruption merely in pursuit of economic security, and democratic transition is the key to reducing corruption.

The results in column (7) indicate that the coefficient on red tape in China is smaller than those from Indonesia and Nigeria. According to our theoretical discussion, this suggests that bribery-corruption deals in China are much more like greasing the wheels. Indeed, Bai *et al.* (2019) argue that China's special deals institutions emerged in the early 1990s, which enabled private firms to make special deals with political elites. They argue that China's special deals institutions contribute to China's rapid economic growth.

Figure 4 illustrates the box plots of the country-level estimates on red tape (β_2) from tax inspection by the Freedom House index. The figure confirms that firms in less democratic countries are more likely to pay bribes when they face more red tape. Table 7 further summarises the results from country-level estimates for each public service. Consistent with our theoretical prediction, the table shows that mean values on β_2 in equation (12) from the sample of non-democratic countries are greater than those from the sample of democratic countries. For example, we report the summary statistics from tax inspection in column (1). 90.6% of the limited democracies carry a positive sign, and 53.1% of the sample carry a positive and statistically significant coefficient. These numbers are very different for the sample of full democracies. 62.1% of these countries carry a positive sign, and 24.1% of the sample carries a positive and statistically significant coefficient. We find consistent results across all the public services.

Table 7. Summary statistics for country-level estimates on $\beta 2$

Types of services:	Government services				Utility services		
Policy variable:	tax (1)	con (2)	imp (3)	ope (4)	ele (5)	tel (6)	wtr (7)
All countries							
Mean	0.031	0.031	0.032	0.053	0.028	0.018	0.032
Share of positive (%)	77.5%	62.0%	64.7%	71.6%	59.4%	54.1%	59.7%
Share of positive and significant (%)	40.6%	10.2%	26.5%	26.9%	23.9%	13.5%	10.9%
Observations	138	137	136	134	138	133	119
Full democracies							
Mean	0.026	0.024	0.015	0.031	0.019	0.019	0.018
Share of positive (%)	62.1%	58.6%	44.8%	44.4%	41.4%	44.4%	37.0%
Share of positive and significant (%)	24.1%	3.4%	10.3%	18.5%	13.8%	3.7%	3.7%
Observations	29	29	29	27	29	27	27
Partial democracies							
Mean	0.024	0.027	0.036	0.052	0.021	0.001	0.023
Share of positive (%)	77.9%	59.2%	68.4%	78.7%	62.3%	50.0%	67.2%
Share of positive and significant (%)	41.6%	9.2%	27.6%	29.3%	20.8%	9.5%	9.4%
Observations	77	76	76	75	77	74	64
Limited democracies							
Mean	0.050	0.047	0.039	0.072	0.052	0.059	0.065
Share of positive (%)	90.6%	71.9%	74.2%	78.1%	68.8%	71.9%	64.3%
Share of positive and significant (%)	53.1%	18.8%	38.7%	28.1%	40.6%	31.3%	21.4%
Observations	32	32	31	32	32	32	28

Notes: (1) See Table 6 for the estimation results for selected countries for tax inspections. (2) We use the coefficient on normalised log red tape for country-level results.

Conclusion

This paper used firm-level surveys from the World Bank and studied how a government authority's threat for a severe penalty shapes the distributions of red tape and bribe givers. Our model predicts that when the authority has the ability to intimidate firms by threatening to impose a severe penalty, the authority imposes more red tape, and the firm is more likely to pay bribes. Consistent with the prediction, we found a statistically significant positive association between red tape and the propensity to pay bribes, particularly for non-democratic countries. Our results suggest that authorities in countries with concentrated power including autocratic countries are able to disturb private firms for their private gains at the expense of efficiency.

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Data Appendix

Variable list

Bribery variables

The WBES ask the bribery-related questionnaire items associated with the following public services: tax inspection, three government services (construction permit application, import license application, and operation license application), and three utilities (electrical connection, telephone connection, and water connection).

Using the sample of the firms that used a public service, we develop a payment variable (p_i), defined as one when a firm made a gift or informal payment, and zero otherwise. We also use the number of tax inspection visits or the number of wait days (r_i) that are our proxies for red tape. Table 1 reports the summary statistics of these variables.

Firm-level variables

We prepare six firm-level control variables that can possibly influence a firm's decision to pay bribes. The firm-level variables we use are log labour, log firm age, exporter, state-owned enterprise (SOE), foreign-owned, and technology certificate variables. Except for indicator variables, the variables are normalised within each country.

We develop the firm age from the firm's establishment year and survey year. We create the exporter indicator variable that is one if a firm exports (indirect and direct) at least 5% of its total sales, and zero otherwise. The SOE (foreign-owned firm) variable is one if the firm's share of government (foreign capital) is greater than or equal to 50%, and zero otherwise.[28] The technology certificate variable is one if a firm has an internationally-recognised quality certification, and zero otherwise.

Using firm-level data from the Ugandan enterprise survey, Svensson (2003) shows that the amounts of bribes can be explained by firms' ability to pay and their refusal power. Clarke and Xu (2004) and Rand and Tarp (2012) show that firms are more likely to pay bribes when they are more profitable. The proxy variables for a firm's profitability (e.g., the number of competitors, markups, and accounting profits) are not widely available. Thus, we approximate it using the exporter and technology certificate variables (e.g., Melitz, 2003). Table 2 provides the summary statistics.

Macroeconomic variables

The democratic process is not the only country-level variable that is relevant to corruption. To control for various country-level factors that can possibly influence corruption (e.g., Shleifer and Vishny, 1993; Svensson, 2005), we prepare ten contemporary variables: per capita GDP, total population, government size (the government final consumption expenditure as a share of GDP), trade share (the sum of exports and imports of goods and services measured as a share of GDP), oil share (the difference between the value of crude oil production at regional prices and total costs of production as a share of GDP), and education (the compulsory years of education) variables from the World Bank World Development Indicators (WDI). If the data from the WDI is not available, we use supplemental data from several sources, including the Penn World Table. If the data from the survey year is not available, we utilise the data from the nearest year to the survey year. To proxy legal systems and institutions (e.g., Fisman and Miguel, 2007), we derive the World Trade Organization (WTO) membership as well as legal system dummy variables from Head *et al.* (2010). Finally, we prepare the state capability index from Kar *et al.* (2022) by computing the mean of the six variables from the World

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[28]Batra *et al.* (2003) find that private firms are more likely to bribe, pay a higher revenue share as bribes, and more likely to consider bribery as an obstacle. Clarke and Xu (2004) find that SOE workers in the utility sector are more likely to accept bribes.

Governance Index (voice and accountability, rule of law, regulatory quality, political stability, government effectiveness, and corruption control).

Country list

The World Bank Enterprise Surveys

The data we use was released on September 6, 2016. We have 122,855 observations from 138 countries over the 2006–2016 period. The survey year for each country is reported in parentheses below.

African countries (43 countries): Angola (2006 and 2010), Benin (2009), Botswana (2006 and 2010), Burkina Faso (2009), Burundi (2006 and 2014), Cameroon (2009), Cape Verde (2009), Central African Republic (2011), Chad (2009), the Republic of the Congo (2009), Djibouti (2013), the Democratic Republic of the Congo (2006, 2010, and 2013), Eritrea (2009), Ethiopia (2011 and 2015), Gabon (2009), Gambia (2006), Ghana (2007 and 2013), Guinea (2006), Guinea-Bissau (2006), Ivory Coast (2009), Kenya (2007 and 2013), Lesotho (2009), Liberia (2009), Madagascar (2009 and 2013), Malawi (2009 and 2014), Mali (2007 and 2010), Mauritania (2006 and 2014), Mauritius (2009), Mozambique (2007), Namibia (2006 and 2014), Niger (2009), Nigeria (2007 and 2014), Rwanda (2006 and 2011), Senegal (2007 and 2014), Sierra Leone (2009), South Africa (2007), South Sudan (2014), Eswatini (2006), Tanzania (2006 and 2013), Togo (2009), Uganda (2006 and 2013), Zambia (2007 and 2013), and Zimbabwe (2011).

American countries (31 countries): Antigua and Barbuda (2010), Argentina (2006 and 2010), Bahamas (2010), Barbados (2010), Belize (2010), Bolivia (2006 and 2010), Brazil (2009), Chile (2006 and 2010), Colombia (2006 and 2010), Costa Rica (2010), Dominica (2010), Dominican Republic (2010), Ecuador (2006 and 2010), El Salvador (2006 and 2010), Grenada (2006), Guatemala (2010), Guyana (2006 and 2010), Honduras (2006 and 2010), Jamaica (2010), Mexico (2006 and 2010), Nicaragua (2006 and 2010), Panama (2006 and 2010), Paraguay (2006 and 2010), Peru (2006 and 2010), St. Kitts and Nevis (2010), St. Lucia (2010), St. Vincent and the Grenadines (2010), Suriname (2009), Trinidad and Tobago (2010), Uruguay (2006 and 2010), and Venezuela (2006 and 2010).

Asian and Pacific countries (25 countries): Afghanistan (2008 and 2014), Bangladesh (2007 and 2013), Bhutan (2009 and 2015), Cambodia (2013 and 2016), China (2012), Fiji (2009), India (2014), Indonesia (2009 and 2015), Laos (2009, 2012, and 2016), Malaysia (2015), Micronesia (2009), Mongolia (2009 and 2013), Myanmar (2013), Nepal (2009 and 2013), Pakistan (2007 and 2013), Papua New Guinea (2015), the Philippines (2009 and 2015), Samoa (2009), Solomon Islands (2015), Sri Lanka (2011), Thailand (2016), Timor-Leste (2009 and 2015), Tonga (2009), Vanuatu (2009), and Vietnam (2009 and 2015).

Non-EU European countries (18 countries): Albania (2007 and 2013), Armenia (2009 and 2013), Azerbaijan (2009 and 2013), Belarus (2008 and 2013), Bosnia and Herzegovina (2009 and 2013), North Macedonia (2009 and 2013), Georgia (2008 and 2013), Kazakhstan (2009 and 2013), Kosovo (2009 and 2013), Kyrgyzstan (2009 and 2013), Moldova (2009 and 2013), Montenegro (2009 and 2013), Russia (2009 and 2012), Serbia (2009 and 2013), Tajikistan (2008 and 2013), Turkey (2008 and 2013), Ukraine (2008 and 2013), and Uzbekistan (2008 and 2013).

European Union countries (11 countries): Bulgaria (2007, 2009, and 2013), Croatia (2007 and 2013), Czech Republic (2009 and 2013), Estonia (2009 and 2013), Hungary (2009 and 2013), Latvia (2009 and 2013), Lithuania (2009 and 2013), Poland (2009 and 2013), Romania (2009 and 2013), Slovakia (2009 and 2013), and Slovenia (2009 and 2013).

Middle East countries (10 countries): Egypt (2013), Iraq (2011), Israel (2013), Jordan (2013), Lebanon (2013), Morocco (2013), Sudan (2014), Tunisia (2013), Palestine (2013), and Yemen (2010 and 2013).

The Freedom House index (civil liberties) in 1995

Rating 1 (5 countries): Barbados, Belize, Dominica, Micronesia, and St. Vincent and the Grenadines.

Rating 2 (24 countries): Bahamas, Benin, Botswana, Bulgaria, Cape Verde, Chile, Costa Rica, Czech Republic, Estonia, Grenada, Guyana, Hungary, Latvia, Lithuania, Mauritius, Poland, Samoa, Slovenia, Solomon Islands, South Africa, St. Kitts and Nevis, St. Lucia, Trinidad and Tobago, and Uruguay.

Rating 3 (22 countries): Antigua and Barbuda, Argentina, Dominican Republic, Ecuador, El Salvador, Fiji, North Macedonia, Honduras, Israel, Jamaica, Malawi, Mali, Mongolia, Namibia, Panama, Paraguay, Romania, Slovakia, Suriname, Tonga, Vanuatu, and Venezuela.

Rating 4 (33 countries): Albania, Armenia, Bangladesh, Bolivia, Brazil, Burkina Faso, Central African Republic, Colombia, the Republic of the Congo, Croatia, Eritrea, Gabon, Ghana, Guinea-Bissau, India, Jordan, Kyrgyzstan, Lesotho, Madagascar, Mexico, Moldova, Mozambique, Nepal, Nicaragua, Papua New Guinea, Peru, the Philippines, Russia, Thailand, Timor-Leste, Uganda, Ukraine, and Zambia.

Rating 5 (22 countries): Belarus, Cameroon, Chad, Ethiopia, Georgia, Guatemala, Guinea, Ivory Coast, Kazakhstan, Lebanon, Malaysia, Morocco, Niger, Pakistan, Senegal, Sri Lanka, Eswatini, Tanzania, Togo, Tunisia, Turkey, and Zimbabwe.

Rating 6 (19 countries): Angola, Azerbaijan, Bosnia and Herzegovina, Cambodia, Djibouti, the Democratic Republic of the Congo, Egypt, Gambia, Indonesia, Kenya, Laos, Liberia, Mauritania, Montenegro, Rwanda, Serbia, Sierra Leone, Palestine, and Yemen.

Rating 7 (13 countries): Afghanistan, Bhutan, Burundi, China, Iraq, Kosovo, Myanmar, Nigeria, South Sudan, Sudan, Tajikistan, Uzbekistan, and Vietnam.

The democracy index in 1995 from Acemoglu *et al.* (2019)

Democracies (78 countries): Albania, Antigua and Barbuda, Argentina, Armenia, Bahamas, Bangladesh, Barbados, Belize, Benin, Bolivia, Botswana, Brazil, Bulgaria, Cape Verde, Central African Republic, Chile, Colombia, the Republic of the Congo, Costa Rica, Czech Republic, Dominica, Dominican Republic, Ecuador, El Salvador, Estonia, Ethiopia, Fiji, North Macedonia, Georgia, Grenada, Guatemala, Guinea-Bissau, Guyana, Honduras, Hungary, India, Israel, Jamaica, Latvia, Lesotho, Lithuania, Madagascar, Malawi, Mali, Mauritius, Moldova, Mongolia, Mozambique, Namibia, Nepal, Nicaragua, Niger, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, the Philippines, Poland, Romania, Russia, Slovakia, Slovenia, Solomon Islands, South Africa, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Thailand, Trinidad and Tobago, Turkey, Ukraine, Uruguay, Vanuatu, Venezuela, and Zambia.

Non-democracies (54 countries): Afghanistan, Angola, Azerbaijan, Belarus, Bhutan, Bosnia and Herzegovina, Burkina Faso, Burundi, Cambodia, Cameroon, Chad, China, Croatia, Djibouti, the Democratic Republic of the Congo, Egypt, Eritrea, Gabon, Gambia, Ghana, Guinea, Indonesia, Iraq, Ivory Coast, Jordan, Kazakhstan, Kenya, Kosovo, Kyrgyzstan, Laos, Lebanon, Liberia, Malaysia, Mauritania, Mexico, Montenegro, Morocco, Myanmar, Nigeria, Rwanda, Samoa, Senegal, Serbia, Sierra Leone, Sudan, Eswatini, Tajikistan, Tanzania, Togo, Tonga, Tunisia, Uganda, Uzbekistan, Vietnam, Yemen, and Zimbabwe.

Table A1. The sample by regions

	# of countries	Obs	Freedom House	Acemoglu *et al.*	per capita GDP
Africa	43	27,732	4.58	0.40	3,542
America	31	25,498	2.71	0.97	12,662
Asia & Pacific	25	33,381	4.52	0.52	6,337
Non-EU Europe	18	19,762	5.11	0.44	11,598
European Union	11	8,468	2.36	0.91	22,464
Middle East	10	8,014	5.40	0.11	11,466
Total	138	122,855	4.10	0.58	9,230

Notes: (1) See Appendix II for the country list. (2) We use the Freedom House index and Acemoglu *et al.* (2019) for the democracy index. (3) GDP per capita, PPP (current international $) is from the World Development Indicators.

Table A2. The results from alternative democratic indicators

Dependent variable:	Bribe payment indicator variable for tax inspection							
Source of democracy variable:	FH (10-year lag)		FH (survey year)		Polity2		V-Dem	
Countries:	Democracies (1)	Others (2)	Democracies (3)	Others (4)	Democracies (5)	Others (6)	Democracies (7)	Others (8)
Red tape	0.014*** (0.003)	0.041*** (0.005)	0.023*** (0.004)	0.042*** (0.006)	0.033*** (0.008)	0.043*** (0.006)	0.034*** (0.008)	0.042*** (0.006)
Firm controls								
ln (labor)	−0.004 (0.003)	−0.008* (0.004)	−0.004** (0.002)	−0.009* (0.005)	−0.009 (0.006)	−0.004 (0.005)	−0.010* (0.006)	−0.004 (0.005)
ln (firm age)	−0.001 (0.002)	−0.002 (0.003)	−0.002 (0.002)	−0.001 (0.003)	0.002 (0.003)	−0.004 (0.003)	0.001 (0.003)	−0.004 (0.003)
Foreign firms	0.013 (0.009)	−0.024* (0.013)	0.003 (0.008)	−0.025* (0.014)	−0.022* (0.013)	−0.016 (0.015)	−0.018 (0.013)	−0.014 (0.015)
SOEs	−0.041*** (0.015)	−0.063** (0.026)	−0.028 (0.020)	−0.062** (0.029)	−0.073** (0.035)	−0.042* (0.025)	−0.020 (0.035)	−0.027 (0.019)
Exporters	0.006 (0.006)	0.011** (0.006)	−0.002 (0.006)	0.015** (0.006)	0.013** (0.006)	0.007 (0.008)	0.007 (0.006)	0.014* (0.008)
Certificates	−0.009* (0.005)	−0.013* (0.007)	−0.013** (0.005)	−0.010 (0.007)	−0.027*** (0.006)	−0.007 (0.009)	−0.025*** (0.006)	−0.006 (0.009)
Control variables								
Macroeconomic variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Survey-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of countries	34	104	45	93	53	71	55	72
Observations	8,965	56,616	14,600	50,981	28,643	35,791	29,279	35,505
R^2	0.031	0.086	0.058	0.088	0.113	0.089	0.095	0.096

Notes: Columns (1) and (2) use the Freedom House index from 10 years before the WBES survey year. Countries with an index value of 1–2 from 10 years before the WBES survey year are democratic countries. Columns (3) and (4) use the Freedom House index from the survey year. Countries with an index value of 1–2 are democratic countries. Columns (5) and (6) use the polity2 index from the Polity IV project. The index classifies regimes from −10 to +10. Countries with a Polity2 index value from 6 to 10 are democratic countries. Columns (7) and (8) use the liberal democracy index from the Varieties of Democracy (V-Dem) database. Countries with an electoral democracy index greater than 0.5 are democratic countries.

Table A3. The results from other services

Dependent variable:	Bribe payment indicator variable						
Policy variable:	tax (1)	con (2)	imp (3)	ope (4)	ele (5)	tel (6)	wtr (7)
Full democracy	0.035 (0.029)	0.063** (0.028)	0.065* (0.033)	0.060* (0.031)	0.055** (0.026)	0.025 (0.023)	0.023 (0.027)
Red tape	0.040*** (0.005)	0.063*** (0.007)	0.027*** (0.004)	0.047*** (0.004)	0.037*** (0.005)	0.022*** (0.005)	0.030*** (0.006)
Full democracy × Red tape	−0.027*** (0.006)	−0.046*** (0.010)	−0.014** (0.006)	−0.030*** (0.007)	−0.022** (0.009)	−0.020*** (0.007)	−0.028** (0.011)
Firm controls							
ln (labour)	−0.007* (0.004)	−0.007 (0.005)	−0.003 (0.004)	−0.004 (0.005)	−0.008 (0.005)	−0.007*** (0.002)	−0.016*** (0.005)
ln (firm age)	−0.002 (0.002)	0.001 (0.004)	−0.006* (0.004)	−0.004 (0.003)	−0.001 (0.003)	0.002 (0.002)	0.009** (0.004)
Foreign firms	−0.017 (0.011)	−0.022* (0.013)	−0.010 (0.012)	−0.022** (0.011)	−0.009 (0.012)	−0.004 (0.009)	0.004 (0.018)
SOEs	−0.067*** (0.025)	−0.140*** (0.031)	−0.047 (0.032)	−0.049** (0.023)	−0.086*** (0.030)	−0.029 (0.020)	0.024 (0.047)
Exporters	0.011** (0.005)	0.008 (0.010)	0.043*** (0.013)	0.032*** (0.010)	0.008 (0.012)	0.006 (0.007)	0.025** (0.012)
Certificates	−0.015** (0.006)	−0.035*** (0.009)	−0.014** (0.007)	−0.000 (0.011)	−0.012 (0.010)	−0.002 (0.006)	−0.004 (0.009)
Control variables							
Macroeconomic variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Survey-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	65,581	11,945	12,576	25,478	14,673	14,162	5,947
R^2	0.091	0.117	0.123	0.091	0.115	0.074	0.083

Notes: See column (1) Table 4.