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Bribery and firm performance in India: A political economy perspective

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ABSTRACT

This study examines how corruption affects firm performance in India using data from the World Bank Enterprise Survey for 2013-14. A set of testable hypotheses is formulated with regard to the interaction between bribery and the political environment to capture the nuances of the effect of corruption on firm performance. To overcome endogeneity between bribery and firm performance, the study employs two-stage least squares instrumental variables estimation. The foremost finding is that bribery has significantly negative effects on firm profitability and labor productivity. This finding confirms the hypothesis that in India bribery "sands the wheels" of business. A further finding is that the negative effect of bribery on productivity is stronger in states run by right leaning parties, although there is no significant effect of party orientation on the relationship between bribery and profitability. This finding supports the hypothesis that tighter connections between business and government facilitate rent seeking that undermines productivity even as profitability is unencumbered. Finally, bribery is found to have more harmful effects on smaller and older firms than on larger and younger ones.

1. Introduction

Corruption has been identified as a serious problem faced by most countries today (IMF, 2016). Existence and widespread prevalence of corruption distort competition, alter incentives, and impair development. These problems have received sharp public attention which has led to moral outrage in some instances.[1] This has paved the way to a greater emphasis on tackling corruption in a more proactive manner at the global level (IMF, 2016).

The issue of corruption has received considerable attention in the academic literature. One of the most researched aspects of corruption is its impact on economic performance. There is an abundance of studies exploring corruption and economic performance at the country level (Gupta & Abed, 2002; Leite & Weidmann, 1999; Mo, 2001; Del Monte & Papagni, 2001; Hessami, 2014; Baldi, Bottasso, Conti, & Piccardo, 2016; Hessami & Silke, 2016). A general consensus exists in this strand of literature that corruption has detrimental effects on growth rates, private investment, human capital, public expenditure, and other economic indicators.

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[1] Notable instances of corruption that have sparked public outrage include: Enron in 2001 (https://www.economist.com/node/940091); Worldcom in 2001 (http://fortune.com/2017/12/31/biggest-corporate-scandals-misconduct-2017-pr/); Odebrecht in 2015 (https://www.bbc.com/news/business-43825294); Samsung in 2016 (http://www.cbc.ca/news/business/jay-lee-samsung-heir-bribery-moon-1.4261831); Rolls Royce in 2016 (https://www.theguardian.com/business/2017/jan/16/rolls-royce-to-pay-671m-over-bribery-claims). All websites were accessed on June 5, 2018.

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At the micro level, however, the evidence on corruption is mixed. Some studies have found that corruption works to "grease the wheels" of commerce in environments of weak institutions and complex bureaucratic formalities (Lien, 1986; Huntington, 2006). By contrast, other studies have found that corruption acts to "sand the wheels" of commerce by giving rise to malincentives, rent seeking behaviour, misallocation of productive resources, and greater uncertainty about the returns to business undertakings (Shleifer & Vishny, 1993; Kaufmann & Wei, 1999).

Defining and measuring corruption for research purposes is difficult due to its concealed nature. This study uses a definition widely accepted by the International Monetary Fund, the World Bank, Transparency International, and the United Nations Convention against Corruption. According to that definition, corruption is "the abuse of public office for private gain" (IMF, 2016). Measurement of corruption generally focuses on bribery in empirical studies. Bribery is defined as the act of offering and/or being asked to provide informal payments or gifts to public officials to perform some official task. Obtaining survey data on bribery is a daunting task due to the reluctance of parties to admit to involvement out of moral and ethical inhibitions. However, according to Kaufmann, Kraay, and Mastruzzi (2007), measurement can be aided by gathering information from diverse stakeholders, tracking features of the institutional context, and undertaking audits of specific projects. Kaufmann et al. (2007) suggested that no measure of corruption – subjective or objective – is entirely accurate. Given the concealed nature of the actual facts of bribery, recourse may be had to reported perceptions to provide relevant and meaningful insights. Where corruption is deeply ingrained in the environment, agents may be asked directly about their sense of the situation.

This study relies on a dataset widely used in the study of corruption and bribery, the World Bank Enterprise Survey (WBES) dataset. The WBES spans 131,000 firms across 139 countries and contains data on financial performance, business environment, and business-government relations. The survey captures the ground realities of business-government relations with questions that involve many aspects ranging from informal payment requests for licenses to the results of judicial rulings. Of note, the correlations between WBES indicators and other global corruption measures are very high.

This study explores the effects of bribery on firm performance in India, a country known for its widespread corruption. The study builds on the Acemoglu (2006) view of bribery as a profit tax, taking the form of a "vertical transfer" from businesses to states, which creates rent seeking incentives for agents on both sides. The study identifies bribery as the conscious involvement of top management and owners of firms in offering or acquiecsing to bribe payments to government officials. This is in line with the bribery definition used by Sharma and Mitra (2015). The study captures firm performance by using three standard accountancy measures – profitability, productivity, and export activity.

Recent studies have gone beyond a narrow focus on the relationship between bribery and economic outcomes to include interaction with the political system. Electoral systems and political regimes are important influences on corruption since the government is an agent in bribery transactions. In this study, we incorporate the ideological orientation of the party in power and the closeness of election margins as factors shaping the environment for bribery. According to Hessami and Silke (2016), since right leaning parties have stronger connections to and more frequent interactions with business, the prospects for corruption are greater in states with right leaning parties in power. This is because turning down bribes or acting against corruption by officials will lead to backlash by powerful corporate interests that benefit from the influence they gain through a corrupt system. The expectation is, then, that public officials from right leaning parties will be less inclined to stand up against corruption. Moreover, states with right leaning parties in power will offer a more favorable breeding ground for bribery due to the cover for illegal activity afforded by mutual trust and reciprocity between business interests and government.

The notion of close elections as an explanatory factor for corruption is borrowed from Kunicova and Rose-Ackerman (2005). In states with close elections, parties in power face a more serious trade-off between accepting bribes and the prospect of holding onto power. Political opponents behave more competitively in monitoring incumbents and looking for opportunities to expose wrongdoing. Thus, in a country with weak institutions and governance such as India, a close election may provide an incentive for opposition parties to be vigilant in guarding against corruption. This study takes explicit account of both party in power and closeness of elections to account for how conducive the political environment is to corruption.

The enduring and widespread prevalence of corruption in India despite its negative effect on firm performance is due to cultural acceptance. Based on a study of driver's license issuance, Bertrand, Djankov, Hanna, and Mullainathan (2007) described corruption in Indian as the "endogenous red tape" variety.[2] The idea is that many bureaucratic hurdles are constructed to create rent seeking opportunities for public officials (Shleifer & Vishny, 1993). The economic consequence is that businesses expend money and time on bribery thus diverting productive resources away from performance improvement. Broadly speaking, the bribing culture distorts economic incentives and hampers performance.

Two studies have examined the effects of bribery on firm performance in the Indian context. Sharma and Mitra (2015) used the WBES data for 2005-06 to examine the impact of bribery on various performance indicators and by type of firm. The findings suggest that bribery impacts firm performance negatively except with respect to export producers. Further, firms that evaded taxes were found to pay higher bribes. Raj and Sen (2017) used WBES data for 2013-14 with a focus on manufacturing firms to study the impact of institutional quality on firm performance. Compared to other institutional

[2] In their study of driver's license issuance, Bertrand et al. (2007) randomly assigned applicants to three groups: a "bonus group" that was willing to pay extra to obtain their licenses quickly; a "lesson group" that was offered free driving lessons to improve their chances of passing; and a comparison group. The results suggested that "bonus group" members were more likely to get licenses without knowing how to drive. Further, individuals in the "lesson group" made extra-legal payments equivalent on average to those in the comparison group despite being better drivers.

variables, the study found that corruption had a stronger negative impact on firm performance. Both these studies suffered from methodological weaknesses, however, that the current study overcomes. Sharma and Mitra (2015) used ordinary least squares estimation methods to test for a relationship between bribery and firm performance despite an expectation of reverse causality. And Raj and Sen (2017) used only a subset of bribery variables and focused solely on firm productivity to the exclusion of other performance indicators.

This study employs firm level WBES data for India for 2013-14. The approach taken is novel in a number of important aspects. First, since the relationship between firm performance and bribery may be endogenous, the study adopts a two-stage least squares estimation approach with relevant instruments that influence bribing decisions but not firm performance. Second, recognizing the relevance of business-government relations in creating an environment for corruption, the study takes explicit account of political factors in the form of party in power and closeness of elections. Third, the study allows for heterogeneity by considering separate sub-samples of the data according to firm size, experience, and sector of production where sector of production includes services.

The key finding of the study is that bribing by Indian firms "sands the wheels" of business leading to poorer performance with respect to two of the three indicators of performance- profitability and productivity. These result corroborate the negative effects of corruption found in Raj and Sen (2017) and Sharma and Mitra (2015). A novel finding of the paper is that firms employing more than 100 employees and firms starting operations in the last ten years do not suffer from adverse performance due to bribery.

2. Theory and hypotheses

2.1. Bribery and firm performance

The existence of corruption is an indicator of weak institutions. This failure of institutions marks the starting point for two theories involving the effect of corruption on firm performance. The first hypothesis, namely the "grease the wheel" hypothesis (e.g. Leff, 1964; Jiang and Nie, 2014; Huntington, 2006), argues that with low quality of institutions and poor governance, firms face impediments to doing business. Under such circumstances, bribery may grease the wheels to counter distortions and overcome delays thereby improving resource allocation and enhancing performance. The potential for such efficiency gains makes corruption desirable. Beck and Maher (1986) formulated a theoretical model to establish the similarity between bribery and competitive bidding for government contracts. In effect, corruption can lead to the most efficient firm getting the contract through bribery. Similarly, Lui (1985) showed how bribes may lead to a Pareto optimal outcome with more efficient firms paying higher bribes. These studies demonstrated how corruption and bribery may reduce distortions and boost economic performance.

The alternative hypothesis, namely the "sand the wheel" hypothesis, takes the opposite view of the effect of corruption on firm performance. Myrdal (1989) argued that extensive use of bribes may lead to rampant dishonesty by corrupt officials which would delay decision making and result in biased outcomes favoring cronies. According to Baumol (1996), returns to rent seeking activities may dominate returns to productive activities which would distort resource allocation. In fact, widespread prevalence of corruption may induce individuals and businesses to avoid interaction with government which would undermine economic growth as the informal sector predominates and entry of new firms is inhibited. Shleifer and Vishny (1993) pointed out that in economies with high corruption, significant time and resources are spent on gaining preferential treatment as opposed to engaging in productive activity with the result that only the wealthy and well-connected get opportunities and others are shut out. This tends to disincentivise talent growth and increase income inequality.

Empirical studies have provided evidence in support of both the competing hypothesies. Rock and Bonnett (2004); Vial and Hanoteau (2010), and Jiang and Nie (2014) found confirmation for the "grease the wheels" hypothesis. In contrast, Fisman and Svensson (2007); Gaviria (2002), and Faruq, Webb, and Yi (2013) obtained support for the "sand the wheels" hypothesis. This suggests that which hypothesis applies may depend on the economic environment. This study focuses on India, which as Rajan and Zingales (1998) put it is characterised by scarce capital, weak enforceability of contracts, and poor governance implying all kinds of barriers to doing business. However, the positive effect of corruption under such circumstances is conditioned mainly on the more efficient firms paying bribes whereas conversely, if the highest bribe payers are not the ones that create the most economic value, the costs overwhelm the potential benefits. Costs involve public officials misallocating resources and businesses indulging in rent seeking behavior. This leads to economic activity being delayed or completely missed. The problems are aggravated in the Indian case due to the presence of a large informal sector and poor quality institutions.

For purposes of this study, then, the hypothesis is that corruption impacts firm performance adversely, which accords with Sharma and Mitra (2015) and Raj and Sen (2017).

H1. *Bribery affects firm performance negatively.*

2.2. Ideology of the party in power

The ideology of the party in power is expected to influence the effect of corruption on firm performance. Boycko, Shleifer, and Vishny (1996) argued that because agreements related to bribery are unenforceable due to their illegal nature, trust

plays a crucial role in ensuring compliance and secrecy. Further, as Hessami (2012) put it, corruption can be viewed as an act of reciprocity, and experimental evidence suggests that reciprocity is stronger in repeated games than in a single shot game. Hence, mutually beneficial illegal activities such as corruption are more enforceable if public officials and business owners or managers are familiar with each other and interact frequently.

It is common for businesses to donate to political parties for financing election campaigns and conducting rallies. The two main national parties in India – the Bharatiya Janata Party (BJP) and the Indian National Congress Party – derive a substantial share of their funding from private firms. However, according to the Association of Democratic Reforms (ADR) Report in 2018, the more right leaning BJP had received 75 % of the corporate donations since 2004 despite the ten year rule of the Congress Party from 2004 to 2014.[3] Similar observations can be made for other countries, such as United Kingdom and Australia (Hessami, 2012). Although legal, these payments foster a sense of familiarity between businesses and politicians. Thus, since right leaning parties receive higher contributions than their left leaning counterparts, the possibility of a right leaning party turning down a bribe or taking action against such behavior might have adverse effects on future donations. This leads to the conjecture that the effect of corruption on firm performance might be stronger in states governed by right leaning parties.

There is a counterargument, however, that suggests corruption may be higher in left leaning states. The argument rests on the premise that left ideology emphasizes a stronger role of government intervention whereas right leaning governments champion the self-disciplining action of the market. It follows that the frequency of business-government interactions should be higher in states governed by left leaning parties. This raises the possibility that corruption could be higher under left leaning parties.

To summarize, the first argument focuses on the party-business familiarity under right leaning parties while the second argument focuses on the greater bureaucratic weight under left leaning parties. In the Indian context, the influence of political funding by the corporate sector on the nature of relationships is the more plausible force since party ideology is likely to have little consequence for the size of the bureaucracy. Thus, the second hypothesis is as follows.

H2. *The effect of corruption on firm performance is stronger in states governed by right leaning parties.*

2.3. Political competition

The degree of political competition is also expected to influence the effect of corruption on firm performance. The main objective of all politicians, irrespective of ideology, is to stay in power. A close election suggests the first runner up may have a good chance of coming to power in the next election. In such situations, incumbent party members who engage in corrupt activities are taking greater risk that voters will turn against them. This has been widely discussed in the literature (Bussell, 2012; Dininio & Orttung, 2005; Ferraz & Finan, 2008; Montinola & Jackman, 2002). Bussell (2012) examined the effect of electoral competition on corruption in India distinguishing among three levels of corruption – low, medium, and high. She found that volatility with respect to the party in power was strongly associated with low-level corruption, confirming that politicians faced with greater risk of losing office will rein in bureaucrats who might be tempted to abuse their positions.

Based on these observations, the hypothesis is that the effect of corruption on firm performance will be weaker in states where the party in power was elected by a narrow margin.

H3. *Greater political competition reduces the effect of corruption on firm performance.*

3. Data and variables

3.1. Data

The study collates data from multiple sources. Data on enterprises are drawn from the World Bank Enterprise Survey for India. A total of 8500 firms were surveyed from June 2013 to December 2014 using a stratified random sampling design. The sample to be used in this study is limited to only those 4939 firms that sought a government service which might have been associated with an opportunity for bribery. The survey encompasses manufacturing and service sectors and contains questions related to firm characteristics, bribery, and business-government relations. Survey responses are provided by business owners and top managers. The enterprise data are merged with state level political data obtained from the website of the Election Commission of India and political science studies. The dataset used is thus a cross section of firm level data merged with state level political and economic variables.

Various measures of firm performance are to be regressed on a set of independent variables. We categorise these variables under three groups: (i) bribery and business-government relations; (ii) state level political variables; and (iii) firm characteristics and other controls.

[3] Source: https://adrindia.org/content/bjp-received-75-corporate-donations-2004-despite-10-year-congress-rule-report. The data have been compiled by the ADR, a think tank on election studies in India, from income tax returns filed by the political parties. The Election Commission of India has mandated disclosure of all party donations exceeding Rs. 20,000 since 2002.

3.2. Firm performance

The study captures firm performance using three variables: (i) profitability; (ii) labor productivity; and (iii) export performance. Profitability is defined as the ratio of profit to revenue. Labor productivity is the total sales revenue less input cost per million employees.[4] Export performance, which captures firm competitiveness, is defined as the share of revenue that was earned from exports.

3.3. Bribery and business-government relations

With respect to bribery, the WBES survey identifies eight government services for which a bribe might conceivably be applicable. Specifically, the services involve the granting of: operating licenses; import licenses; water connections; electricity connections; new construction approvals; access to finance; tax inspections; and government contracts. For each item, two questions are posed. The first question seeks to determine whether the firm sought such a service in the last two years. Conditional on a positive response to the first question, a second question then ascertains whether an informal gift or payment was expected or requested. The survey does not ask whether a payment was actually made so as to avoid implicating respondents in any untoward behavior.

Firms are included in the study sample only if they answer "yes" to having sought at least one of the government services. This limits the sample to 4939 firms of the 8298 in the WBES database. Selecting a sample based on this criterion could result in bias if the firms that sought the government services differ systematically from those that did not (Seker & Yang, 2012). In particular, since the government services in question are often associated with business expansion, it is possible that firms seeking such services may be more successful. Of note, however, the proportion of firms seeking at least one of the services is high at 60 percent of the total suggesting that the need for such services is quite pervasive. Test results for systematic differences in the three performance variables as well as firm size and age are shown in Appendix Table A1. The findings are for negligible differences.

A bribery score is coded for each of the eight government services that a firm sought. The code takes a value of 0 if no payment was expected or requested, a value of 1 if the respondent was unsure or declined to answer, and a value of 2 if a payment was expected or requested. The assumption is that respondents who did not know or declined to answer were more likely to have encountered a bribe situation than those who denied having encountered one but less likely to have actually paid a bribe than those who acknowledged having encountered the situation. The firm-level bribery indicator is the simple average of bribery scores across those services sought by the firm. The resulting measure is a continuous variable between 0 and 2.

Given the subjectivity involved in the construction of the bribery score, two alternate measures are considered as robustness checks. These are discussed in Section 5.2.

The study uses two additional variables to capture the quality of business-government relations. The variable *Policy obstacle* is derived from four indicators assessed by respondents on a 0–4 scale where 0 denotes no obstacle and 4 denotes major obstacles. The four indicators are: tax rates; tax administration; political instability; and business licensing and permits. The arithmetic mean of the four indicators is taken as the firm-level measure. The variable *Bureaucracy* is defined as the share of time spent by higher management in dealing with requirements imposed by government regulation.

3.4. State level politics

The study employs two variables to capture the political landscape at the state level. The variable *Ideology* is derived from party ideology scores generated by Dash and Raja (2014) which range from 1 for the far right wing to 5 for the far left wing. The assessment is based on election manifestos, policies adopted, actions taken, and reactions to the policies of other parties. The score assigned to the main party in power in 2013 in a particular state is taken as the value of the variable.

Political competition is captured by the variable *Victory margin* which reflects the share of votes by which the party in power won the last election relative to the runner up party. *Margin of victory* varies inversely with political competition.

3.5. Firm characteristics

The study uses a set of firm specific control variables as follows: *Age* (natural logarithm of the number of years in operation); *Size* (natural logarithm of total revenue); *Leverage* (ratio of debt to sales); *Manager experience* (natural logarithm of the number of years of experience of the top manager in the firm); *R&D* (dummy equal to 1 if in the last three years, the firm has invested in or contracted out R&D activities); *Website* (a dummy variable for a website owned and operated by the firm); and *Export zone/industrial park* (dummy equal to 1 if the firm is located in an export processing zone or industrial park). Finally, the study uses 156 region-industry clusters involving interaction between 6 regional dummies and 26 industry dummies to capture unobserved effects. A full listing of regions and industries is given in Appendix Table A2.

[4] To reduce the influence of extreme values of profitability and productivity, the two variables are winsorized at 1 and 99 percent.

3.6. Descriptive statistics

Descriptive statistics for the variables are presented in Table 1. A bribery score with mean of 0.43 on a 0–2 scale and a standard deviation of 0.77 suggests diversity of experience across firms. Similary, the perception of government policy being an obstacle takes a mean of 1.26 on a 0–4 scale with a standard deviation of 0.80 to suggest diversity of impression. The average proportion of time spent by higher management dealing with government regulation is fairly low at 0.04, although again there is diversity of experience with a standard deviation of 0.13 and a maximum value of 1.

Performance indicators are compared in Table 2 for firms that responded "yes" to encountering bribery expectations and those that responded "no". Firms that did not enounter bribery expectations show statistically higher measures of both profitability and productivity than those that did encounter such expectations. No difference in export performance is apparent.

4. Empirical strategy

The empirical strategy to discern the effect of bribery on firm performance must contend with the potential for endogeneity and omitted variable bias. Endogeneity may arise if, for example, firms that perform better are seen as better targets for bribery by corrupt officials. Omitted variables bias could occur if, for example, managers of more upstanding character refuse to engage in bribery and at the same time are more effective in achieving high firm performance. To simply regress firm performance variables on a firm-level bribery indicator without controlling for these influences would yield biased coefficient estimates.

To correct for such bias, a two-stage least squares approach with instrumental variables is adopted. A firm's bribery exposure is assumed to depend on the bribery culture particular to that firm's business environment. The rationale is that if bribery is pervasive within a certain business setting, as defined by industrial sector and locality, the firm will be caught up in that behaviour. The idea is that a culture of bribery reduces the associated stigma and social costs such that individual firms are more inclined to go along with it (Alm, Martinez-Vazquez, & McClellan, 2016). A modeling approach has been developed by Fisman and Svensson (2007) which holds that bribery behaviour by firm i in industry j and state k, given as b_{ijk}, can be decomposed into two components, one specific to the firm, B_{ijk}, and one general to the industry-state cluster, $BAvg_{jk}$:

$$b_{ijk} = B_{ijk} + BAvg_{jk} \tag{1}$$

The component B_{ijk} is idiosyncratic with respect to the firm while $BAvg_{jk}$ is common to all firms in an industry-state cluster. $BAvg_{jk}$ is determined by technology, local policy, established cultural norms, and other characteristics of the environment. Since bureaucrats tend to absorb local conditions in their rent seeking behaviour, bribery culture differs by cluster and takes on a character exogenous to the individual firm. Cluster bribery measures will be correlated with the overall firm bribery measure, b_{ijk}, but not with firm unobservables that could potentially be correlated with firm performance. The cluster bribery measure can therefore serve as an instrument. This approach has been adopted by several papers (Dollar, Hallward-Driemeier, & Mengistae, 2005; Fisman and Svensson, 2007; Aterido, Hallward-Driemeier, & Pages, 2011; Commander & Svejnar, 2011; Seker & Yang, 2012).

Table 1
Descriptive statistics of study variables.

Variable	Measure	Mean	Std. Dev.	Min	Max
Firm performance					
Profitability	profit/total revenue	0.30	0.28	−0.47	0.97
Productivity	revenue net of input cost/ million employee	0.87	1.90	−0.51	12.90
Exports	export revenue/total revenue	0.06	0.20	0	1
Bribery and business-government relations					
Bribery score	2 = yes; 1 = no response; 0 = no	0.43	0.77	0	2
Policy obstacles	4=highest; 0=lowest	1.26	0.80	0	4
Bureaucracy	share of time for government	0.04	0.13	0	1
State level politics					
Ideology	5=left; 1=right	2.63	1.47	1	5
Victory margin	winner vs runner up vote share	0.34	0.19	0.05	0.71
Firm level characteristics					
Size	Log of sales	394.58	222.15	0.03	9000
Age	years since establishment	19.55	14.32	1	151
Leverage	ratio of borrowing to fixed assets	0.10	0.26	0	1
Manager experience	years experience of top manager	13.98	8.95	1	65
R&D	1 = yes	0.34	0.47	0	1
Website	1 = yes	0.53	0.49	0	1
Export zone or industrial park	1 = yes	0.57	0.49	0	1

Table 2
Performance comparison by bribery experience.

	"No" response	"Yes" response	P value
Profitability	0.31	0.27	0.000
Productivity	0.91	0.68	0.000
Exports	0.06	0.06	0.582
Observations	3975	809	

Note: Profitability is the ratio of profit to revenue. Productivity is sales net of input cost per million employees. Exports is the share of exports in total sales. "No" response indicates no expectation of a bribe or informal payment for any government service.

The first stage estimation equation is given as:

$$b_{ijk} = \beta_0 + \beta_1 BAvg_{jk} + \beta_2 BStDev_{jk} + \boldsymbol{\beta x}_{ijk} + \varepsilon_{ijk} \tag{2}$$

where $BAvg_{jk}$ is the bribery score average and $BStDev_{jk}$ its standard deviation for firms in industry j and state k; $\boldsymbol{x}_{ijk}$ is a vector of firm and state specific characteristics; and ε_{ijk} is the error term. Similar to Hanousek and Kochanova (2016), this study makes use of both the average bribery score and its standard deviation at the industry-state cluster level. To ensure exogeneity, the cluster measures for each individual firm exclude values for that particular firm in their construction. For clusters with only one or two firms, the observations were dropped.[5] For the major 23 states of India and 26 industries in the classification system, a total of 344 industry-state clusters are utilized.[6] Values for means and standard deviations by state and industry are presented in Appendix Table A3.

The fitted values from the first stage estimation, $\widehat{b}_{ijk}$, enter the second stage equation to determine firm performance:

$$y_{ijk} = \alpha_0 + \alpha_1 \widehat{b}_{ijk} + \boldsymbol{\alpha x}_{ijk} + \varepsilon_{ijk} \tag{3}$$

where y_{ijk} is the performance indicator and ε_{ijk} is the error term. The first stage fitted values capture the exogenous bribery culture faced by a firm and eliminate any feedback from firm performance to bribery exposure.

The interaction between the bribery score and each of the political variables is included in an alternative specification of the model. Fitted values of the interactive terms are generated by adapting Eq. (2) for the first stage regressions. The predicted values from the regressions are then entered into the second stage regression:

$$y_{ijk} = \alpha_0 + \alpha_1 \widehat{b}_{ijk} + \hat{b*I}_{ijk} + \hat{b*VM}_{ijk} + \boldsymbol{\alpha x}_{ijk} + \varepsilon_{ijk} \tag{4}$$

where $\hat{b*I}_{ijk}$ is the fitted value for the interaction between the bribery score and *Ideology* and $\hat{b*VM}_{ijk}$ is the fitted value for the interaction between the bribery score and *Victory margin*.

5. Results

5.1. Baseline estimation

Table 3 presents results of the first stage instrumental variable regression, as given by Eq. (2), where the firm bribery score is regressed upon the two instrument variables and other control variables. The instrument variables are the mean and standard deviation of the bribery score for the state-industry cluster in which the firm operates. A higher mean bribery score in the local business environment leads to an increase in the individual firm's bribery score. However, the standard deviation of the bribery score in the cluster has no significant effect on the firm bribery score. The tests for validity of these instruments are summarised in Appendix Table A4. As expected, greater policy obstacles and bureaucratic complexities are associated with higher bribery scores.

The results from the second stage regression are presented in Table 4 with three performance measures used as dependent variables. For each performance variable, results are shown both without and with inclusion of the interactive terms between bribery and the political variables. Bribery has a negative and significant effect on firm profitability and productivity. Since a portion of profits is diverted in giving bribes, firm profitability is undercut. This implies that bribes act similar to a tax leading to reduced profits. Further, bribery affects productivity by distorting incentives and inducing wasteful rent seeking. As argued by Aidt and Dutta (2008), widespread corruption at the micro diverts time and resources away from productive activities. Indeed, according to the IMF Discussion Paper (2016), the annual cost of bribery is 2 percent of global GDP. India feels the brunt more acutely since bribes and informal gifts fail to bridge the efficiency gap caused by poor

[5] If there are only two firms in a cluster, constructing the bribery instruments would imply just observing the relevant variables for the opponent which may not be a representative indicator of the prevalence of bribery in the entire cluster. Hence, those observations are dropped and effectively clusters with at least three firms are considered in the analysis

[6] Although 23 states and 26 industries, hypothetically, should yield 598 state-industry clusters, not all 26 industries will be present in each and every state.

Table 3
First stage IV regression results for firm bribery score.

	Firm bribery score
Bribery score mean	0.970***
	(0.017)
Bribery score standard deviation	−0.022
	(0.019)
Policy obstacles	0.091***
	(0.016)
Bureaucracy	0.003***
	(0.001)
Ideology	0.006*
	(0.003)
Victory margin	−0.065***
	(0.027)
Firm controls	YES
Region * Industry FE	YES
Observations	4784

Note: *, **, and *** denote significance at 10, 5, and 1 percent respectively. Standard errors are reported in parentheses.

Table 4
Second stage IV regression results for firm performance.

	Profitability		Productivity		Exports	
	(1)	(2)	(3)	(4)	(5)	(6)
Bribery score (fitted value)	−0.049***	−0.348**	−0.190**	−0.139***	0.478	−0.415
	(0.012)	(0.158)	(0.049)	(0.031)	(1.037)	(0.396)
Policy obstacles	−0.006	−0.057**	−0.001	−0.001	0.226	0.410
	(0.005)	(0.026)	(0.041)	(0.002)	(0.540)	(0.536)
Bureaucracy	0.004**	0.001	0.002	0.005	0.041	0.043
	(0.002)	(0.001)	(0.001)	(0.007)	(0.026)	(0.026)
Ideology	−0.003	−0.001	−0.004	−0.459**	0.272	0.210
	(0.003)	(0.010)	(0.026)	(0.178)	(0.401)	(0.484)
Bribery score*Ideology		0.060		0.688***		0.243
(fitted value)		(0.182)		(0.263)		(0.394)
Victory margin	0.069***	−0.118	0.414**	−0.019	0.152	5.963**
	(0.023)	(0.078)	(0.181)	(0.109)	(0.285)	(2.105)
Bribery score*Victory margin		0.575**		0.078***		0.333
(fitted value)		(0.286)		(0.021)		(0.461)
Size	0.017***	0.040**	0.519***	0.206***	0.165***	0.164***
	(0.002)	(0.017)	(0.033)	(0.040)	(0027)	(0.273)
Age	−0.007*	−0.026	−0.164***	−0.094***	0.129	0.134
	(0.004)	(0.036)	(0.038)	(0.041)	(0.422)	(0.423)
Leverage	0.001	0.004*	0.001	0.005***	0.022	0.023*
	(0.001)	(0.002)	(0.002)	(0.001)	(0.014)	(0.010)
Manager experience	0.012**	0.071**	0.057	0.112**	0.103***	0.106***
	(0.005)	(0.034)	(0.038)	(0.045)	(0.043)	(0.043)
R&D	−0.022***	0.060	−0.003**	−0.007	0.597***	0.605***
	(0.009)	(0.052)	(0.001)	(0.003)	(0.104)	(0.114)
Website	0.030***	−0.132**	0.341***	0.302*	0.454***	0.466***
	(0.008)	(0.070)	(0.063)	(0.068)	(0.086)	(0.082)
EZ/IP dummy					0.263***	0.142
					(0.141)	(0.878)
Region * Industry FE	YES	YES	YES	YES	YES	YES
Observations	4784	4784	4784	4784	4784	4784

Note: *, **, and *** denote significance at 10, 5, and 1 percent respectively. Standard errors are reported in parentheses.

institutional quality and weak governance. Nevertheless, exports performance is not affected adversely by bribery. This may be because exporting firms in India have less interaction with domestic regulatory authorities as part of their output is sold in foreign markets. The negative effects of bribery on profitability and productivity suggest that corruption sands the wheels of business in India. This result is in line with Hypothesis 1 that firms paying bribes suffer lower profitability and productivity. The negative effect of bribery on firm performance in India is consistent with Raj and Sen (2017) and Sharma and Mitra (2015).

The measures for firm-government relations show limited and mixed results. The effect of *Policy obstacles* on profitability is significantly negative, as expected, only when the interactive terms are included. Contrary to expectations, *Bureaucratic complexity* has a significantly positive effect on profitability, although the quantitative magnitude is small.

Table 5
Second stage IV regression results using alternative bribery measures.

	Profitability	Productivity	Exports
Bribery score 2	−0.155**	−0.402**	1.071
	(0.081)	(0.201)	(2.233)
All controls	YES	YES	YES
Observations	4784	4784	4784
Bribery score 3	−0.131**	−0.360**	0.861
	(0.068)	(0.178)	(1.937)
All controls	YES	YES	YES
Observations	4784	4784	4784

Note: The estimation model is given by Eq. (3). *Bribery score 2* takes a value of 1 if the respondent acknowledges the expectation of a bribe, 0 otherwise. *Bribery score 3* takes a value of 1 if the respondent acknowledges the expectation of a bribe or declines to respond, 0 otherwise. *, **, and *** denote significance at 10, 5, and 1 percent, respectively. Standard errors are reported in parentheses.

The direct effect of *Ideology* in the absence of interactive terms is insignificant for all performance measures, as seen in columns (1), (3), and (5). This changes with respect to the productivity measure of performance when the interactive term is included, shown in column (4). The direct effect of *Ideology* becomes negative, meaning that the more left leaning the part in power (higher *Ideology* value), the lower is productivity. The interactive effect with bribery, however, is positive meaning a more left leaning party in power mitigates the negative effect of bribery on productivity with bribery thus having a stronger negative effect when a right leaning party is in power. This validates Hypothesis 2: under a more right leaning party the stronger connections between business and government result in a more negative effect of bribery on productivity. *Ideology* does not register statistically signficant effects on profitability, either directly or interactively in column (2), which is consistent with businesses being able to maintain their profit margins when a right leaning party is in power despite lower productivity. Ideology also does not show an effect on exports, either directly or interactively with bribery in column (6).

The direct effect of *Victory margin* in the absence of an interaction term with bribery is statistically positive for both profitability and productivity, as seen in columns (1) and (3). Once the interactive term is included, however, the direct effect becomes negative but statistically insignificant for both performance measures, shown in columns (2) and (4). The interactive term is statistically positive for both performance measures meaning that a greater victory margin mitigates the negative effect of bribery on firm performance. This finding is contrary to Hypothesis 3 which posits that a lack of close competition for the party in power would amplify the effect of bribery on firm performance.

Among firm specific characteristics, *Size* has a significantly positive effect on firm performance in all model specifications while *Manager experience* and *Website* are significantly positive in all but one specification. *Leverage* is positively and significantly associated with higher performance for all three performance measures only in models that include the interactive terms. Unexpectedly, *Age* and *R&D* are significantly negatively associated with profitability and productivity in some specifications. However, *R&D* is significantly positively associated with exports.

5.2. Model extensions

5.2.1. Two alternative bribery measures

The baseline approach assigns values of 2, 1, and 0 if, in connection with government services, respondents acknowledge expectations of a bribe, decline to answer, or deny such expectations, respectively. To test alternative coding strategies, two alternative bribery scores are constructed. *Bribery score 2* takes a value of 1 if the firm is expected to pay a bribe for even one of the eight government services, 0 otherwise. The mean of this bribe indicator drops to 0.16 from 0.43 for the baseline measure. *Bribery score 3* takes a value of 1 if a bribe is expected or if the respondent declines to answer, and thus a value of 0 only if the respondent denies that a bribe was expected. Table 5 reports coefficient estimates for the alternative bribery scores based on the second stage IV regressions.[7] Consistent with the baseline estimations, for both alternative bribery scores the effects on profitability and productivity are significantly negative while the effects on exports are insignificant.

5.2.2. Manufacturing versus services

Manufacturing and services are very different in structure, regulatory requirement, and operational methods, and hence could present different environments for bribery. The top panel of Table 6 presents coefficient estimates for the bribery score for manufacturing and services sub-samples of the data. For the manufacturing sector, the effect of bribery on both profitability and productivity remains statistically negative as in the full sample. For the services sector, however, the effect of bribery is statistcally negative only for profitability, but not for productivity. For neither sector is there a significant effect of bribery on exports.

[7] Instrument validity tests from the first stage of the IV regressions are satisfied.

Table 6
Second stage IV regression results for sub-samples.

	Profitability	Productivity	Exports
Manufacturing firms			
Bribery score	−0.106*	−0.198*	0.083
	(0.066)	(0.111)	(1.658)
All controls	YES	YES	YES
Observations	3876	3876	3876
Service firms			
Bribery score	−0.099***	−0.458	−1.741
	(0.027)	(0.304)	(1.791)
All controls	YES	YES	YES
Observations	908	908	908
Large firms			
Bribery score	0.047	0.020	3.308
	(0.055)	(0.177)	(3.024)
All controls	YES	YES	YES
Observations	1212	1212	1212
Small firms			
Bribery score	−0.094**	−0.172**	−0.190
	(0.047)	(0.069)	(0.741)
All controls	YES	YES	YES
Observations	3572	3572	3572
Young firms			
Bribery score	−0.145	0.059	−0.650
	(0.123)	(0.100)	(1.168)
All controls	YES	YES	YES
Observations	1196	1196	1196
Old firms			
Bribery score	−0.131**	−0.284***	0.803
	(0.068)	(0.110)	(1.336)
All controls	YES	YES	YES
Observations	3588	3588	3588

Note: Large and small firms are distinguished by a threshold of 100 employees. Young firms and old firms are distinguished by a threshold of 10 years. The estimation model is given by Eq. (3). *, **, and *** denote significance at 10, 5, and 1 percent respectively. Standard errors are reported in parentheses.

5.2.3. Large versus small firms

Beck, Demirgüç-Kunt, and Maksimovic (2005) and Aterido et al. (2011) argue that since large firms have greater bargaining power and influence with public officials, bribery is less of a threat to them. To test for heterogeneous effects, the model is estimated separately for large and small firms with the dividing line drawn at 100 employees. Coefficient estimates for the bribary score are presented in the middle panel of Table 6. Indeed, the bribery score is not statistically significant for large firms whereas it remains so for small firms with respect to both profitability and productivity. This result is in line with existing literature (Aterido et al., 2011; Beck et al., 2005; Schiffer & Weder, 2001). Based on a sample of 10,000 executives worldwide, Schiffer and Weder (2001) found that smaller firms face the brunt of corruption more than larger firms.

5.2.4. Young versus old firms

Typically, firms which have recently started operations will need more licenses and permits, and hence will have more frequent interactions with the government officials. To test for a heterogenous effect of bribery by firm age, the model is estimated separately for young and old firms with the dividing line set at 10 years. Results are reported in the bottom panel of Table 6. Contrary to expectations, young firms show no statistical effect of bribery on performance by any measure. By contrast, a statistically negative effect is found for old firms.

These extensions unravel a very interesting pattern for the effect of bribery on Indian firm performance. The findings indicate that in general bribery has a negative effect on firm performance in India along the lines of the “sand the wheels” hypothesis. Exceptions to this rule are found with respect to newer and larger firms. For those firms bribery does not seem to affect firm performance. However, in no case is there evidence that bribery “greases the wheels” to affect firm performance positively.

6. Conclusion

This study revisits the issue of bribery and its effect on firm performance in India. The study draws data on establishments in India that were surveyed as part of the WBES in 2013-14. Employing tww-state least squares regression with instrumental variables, the study finds evidence for the adverse impact of bribery on firm profitability and productivity. However, a deeper analysis suggests that this negative effect does nto apply to younger firms (within 10 years of establishment) or larger firms (with more than 100 employees). This indicates that not all firms in India bear the brunt of corruption hindering performance.

The study finds some evidence for an impact of political factors on the bribery-performance relationship. For firms operating in a state with a right leaning party in power, the effect of bribery on productivity is found to be stronger than if a left leaning party is in power. This supports the hypothesis that the stronger ties between business and government under right leaning parties afford greater opportunities for bribery. Yet while the impact falls on productivity, profitability seems to escape harm. This suggests that under right leaning parties, resources are diverted from productive activities even as profits are left intact. The hypothesis that a larger margin of victory would aggrevate the negative effect of bribery on productivity was not supported, and indeed the finding was the opposite.

Bribery culture in India dates back to a history "*License Raj*". While the system was abolished in 1991, bribery has continued to be a pervasive part of the Indian economy.[8] The acceptance of bribery in India speaks to a culture that escapes the notions of ethics. Given the culture of bribery, passing an anti-corruption law is not enough to combat the problem. Anti-corruption efforts need to be initiated from firms as well. While bribery may be perceived as a tool to grease the wheels of business by some firm managers, it contributes to the prevalence of a bribery culture that distorts economic incentives and undermines outcomes. To overcome the problem, there is a need for a mix of measures involving internal firm practice, government policy, better quality institutions, stricter penalties, and recognition of international norms. Attention should be given to reducing the complexities of bureaucratic regulations which create opportunities for bribery. Simultaneously, a stricter and more efficient executive wing of the government that implements more effective law enforcement and encourages whistle blowing will act as complementary mechanism to address the problem.

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Appendix A

The study sample is limited to firms that sought a government approval for which a bribe might be applicable. Table A1 indicates that firms included in the study sample do not differ significantly (except for profitability which is significant at 7%) from those in the full World Bank Enterprise Survey database.

Table A1
Firm attribute means for the WBES database and the study sample.

Attribute (measure)	WBES database	Study sample	P value
Firm size (WBES definition)	1.88	1.91	0.123
Firm age (years)	2.72	2.71	0.323
Profitability (profit/revenue)	0.28	0.25	0.070
Productivity (revenue net of input costs/employees)	0.91	0.87	0.110
Exports (exports/revenue)	0.06	0.06	0.204
Observations	8298	4939	

Table A2
Composition of regional and industry dummies.

Panel I: Regional dummies	
Region	States
West	Rajasthan, Gujarat, Goa, Maharashtra
East	Bihar, Orissa, Jharkhand, West Bengal
Northeast	Assam, Sikkim, Mizoram, Meghalaya, Nagaland, Tripura, Arunachal Pradesh, Manipur
North	Jammu & Kashmir, Himachal Pradesh, Punjab, Uttarakhand, Uttar Pradesh, Haryana
South	Andhra Pradesh, Karnataka, Tamil Nadu, Kerala
Central India	Madhya Pradesh, Chhattisgarh
Panel II: Industry dummies	
	Basic metals, Chemicals, Construction, Electronics, Fabricated metal, Food, Furniture, Garments, Hotel and restaurants, Information technology, Machinery and equipment, Leather, Non-metallic products, Paper, Plastics & rubber, Precision instruments, Publishing and recording, Refined petroleum product, Retail, Services of motor vehicles, Textiles, Tobacco, Transport services, Transport machines, Wholesale, Wood

[8] Source: https://www.washingtonpost.com/business/economy/indias-costly-culture-of-corruption/2011/03/28/AFXoUMPC_story.html?noredirect=on&utm_term=.ee9fe3909e08

Table A3
Bribery score mean and standard deviation by state and industry.

State	Mean	St. Dev.	Industry	Mean	St. Dev.
Andhra Pradesh	0.39	0.38	Basic metals	0.51	0.60
North East	0.47	0.83	Chemicals	0.40	0.64
Assam	0.20	0.40	Construction	0.69	0.56
Bihar	0.82	0.92	Electronics	0.53	0.70
Chhattisgarh	0.30	0.54	Fabricated metal	0.46	0.68
Delhi	0.43	0.67	Food	0.38	0.59
Goa	0.45	0.84	Furniture	0.72	0.98
Gujarat	0.18	0.33	Garments	0.65	0.68
Haryana	0.88	0.81	Hotels & restaurants	0.39	0.56
Himachal Pradesh	0.72	0.77	Information technology	0.28	0.50
Jammu & Kashmir	0.66	0.81	Machinery & equipment	0.37	0.53
Jharkhand	1.01	0.71	Leather	0.55	0.41
Karnataka	0.11	0.30	Non-metallic products	0.54	0.65
Kerala	0.28	0.50	Paper	0.43	0.53
Madhya Pradesh	0.46	0.70	Plastics & rubber	0.45	0.72
Maharashtra	0.38	0.57	Precision instruments	0.24	0.49
Orissa	0.29	0.42	Publishing & recording	0.16	0.23
Punjab	0.56	0.75	Refined petroleum products	0.67	0.00
Rajasthan	0.91	0.89	Retail trade	0.57	0.60
Tamil Nadu	0.47	0.76	Services of motor vehicles	0.34	0.48
Uttar Pradesh	0.41	0.42	Textiles	0.40	0.58
Uttaranchal	0.18	0.35	Tobacco	0.76	0.87
West Bengal	0.24	0.55	Transport services	0.31	0.41
			Transport machines	0.50	0.80
			Wholesale trade	0.59	0.59
			Wood products	0.70	0.66

Table A4
Tests for validity of instruments.

Type of tests	Test statistic
F test of excluded instrument	
Sanderson Windmeijer test	347.83
	(0.00)
Under-identification test	
Kleinberg- Paap LM statistic	367.80
	(0.00)
Weak-identification test	
Cragg Donald F statistic	407.22
Critical values	
10 % maximal IV(Acemoglu, 2006) size	19.93
15% maximal IV size	11.59
20% maximal IV size	8.75
25% maximal IV size	7.25
Weak instrument- robust inference	
Anderson Rubin Wald test	10.15
	(0.00)
Stock-Wright LM S statistic	20.85
	(0.00)
Over identification test of all instruments	
Hansen J statistic	0.558
	(0.455)

Note: p values are denoted within parentheses.

Table A2 summarizes the two parts to the regional-industry clusters used in the regression models to control for unobserved factors affecting performance of firms: regions given by geographically grouped states; and industrial sectors given by two digit NIC codes under India's Annual Survey of Industries. The paper uses 6 regions and 26 industry groups to form 110 regional-industry clusters. Note that not all industries are found in all regions.

Table A3 presents the mean and standard deviation of the bribery score for by state and industry. The states of Jharkhand, Rajasthan, Haryana, and Bihar rank the highest in bribery scores while Assam, Gujarat, Uttaranchal, and Karnataka rank the lowest. In the industry classification, tobacco, wood products, construction, and refined petroleum products have high bribery scores while information technology services, precision instruments, and publishing & recording have low scores.

Table A4 shows results of tests for validity of the instruments for the regression presented in Table 3. The tests indicate that the instruments are identified, strong.

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