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# Who Benefits From Economic Reform? Firms and Distributive Politics

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*While the distributional consequences of economic reform have captivated political scientists, few studies have investigated the ability of different firms to reap gains from policy change. Reforms indeed create winners and losers, but there is scant evidence on specifically which firms benefit and which firms lose out. We propose that the benefits from liberalizing reform accrue mostly to firms that are not vulnerable to extortion by the state and that have past experience with lobbying through a business association. This theory goes against the common intuition that liberalization reduces the importance of the state in the distribution of gains from economic activity. To test the theory, we examine how India's national electricity reform in 2003 changed the quality of power supply for 1,094 manufacturing firms between 2002 and 2005. We find that liberalization produced highly skewed benefits and identify the politically salient characteristics that drive firm-level distributional inequality.*

Economic reforms that liberalize production and consumption have important distributional consequences.<sup>1</sup> The costs and benefits of reform are not uniformly distributed across social interests, and different groups engage in bargaining over the implementation of reforms. Trade liberalization, for example, may benefit consumers and firms that rely on imported intermediate goods, while hurting import competitors. These interactions have motivated a large body of literature on the distributive politics of liberalization (Fernandez and Rodrik 1991; Gawande, Krishna, and Olarreaga 2009; Gehlbach and Malesky 2010; Haggard and Kaufman 1995; Hellman 1998; Schamis 1999; Hiscox 2002; Przeworski 1991; Rodrik 1996; Roland 2002).

However, our understanding of how liberalizing reforms affect the competition for benefits at the firm level is incomplete. On the one hand, some scholars have maintained that liberalization generally reduces the importance of politics in the distribution of gains (Djankov et al., 2002; Krueger 1974; Milner and Kubota 2005; Shleifer and Vishny 1994). In this telling, liberalization ties the heavy hand of the state, instead allowing the forces of competition to

determine payoffs. Under successful efficiency-enhancing reforms, the winners are those firms with the greatest flexibility, market skills, and ability to adjust to the improved economic environment, while the losers are those privileged by the previous status quo and incapable of operating at a profit under real competition (Fernandez and Rodrik 1991). When it comes to politics, all firms enjoy a more level playing field for competing for the benefits of a reduced state role in the economy.

On the other hand, reform policies can be designed to direct the benefits to certain constituencies (Hellman 1998; Murillo and Martínez-Gallardo 2007; Schamis 1999), including preferred firms within a sector. Liberalization itself is a political act that governments can manipulate to achieve their preferred distribution of gains (Brooks and Kurtz 2007). The political standing of a firm, and not necessarily its economic capacity for thriving when markets are freed, still dictates its ability to benefit from liberalizing reforms, even those producing overall efficiency gains for the economy. Though the political science literature makes few predictions on which exact firms will be successful in capturing these payoffs, the implication of this

<sup>1</sup>An online appendix for this article is available at <http://dx.doi.org/10.1017/S0022381614000061>. The data are from the World Bank Enterprise Surveys at [www.enterprisesurveys.org](http://www.enterprisesurveys.org). Supporting materials to reproduce our numerical results will be available at Harvard DataVerse Network ([www.thedata.harvard.edu](http://www.thedata.harvard.edu)) no later than the publication of the article.

reading of reform is that political maneuvering continues far beyond the moment when liberalization has been passed.

We propose that of the two approaches, the one emphasizing the continued relevance of distributive politics has more explanatory power. If the state liberalizes policies within a sector, it can target the benefits of the reform to firms with political clout, while imposing the adjustment costs on less powerful firms. Far from suppressing politics, liberalizing reform changes the form and nature of politics within the sector. In sectors characterized by heavy state intervention, firms compete for direct rents provided by the government. During and after liberalization, firms compete for potential efficiency gains and to avoid adjustment costs.

Although several statistical studies have analyzed the political influence of different firms (Clarke and Xu 2004; Faccio 2006; Khwaja and Mian 2005; Svensson 2003), they have not considered the role of firm characteristics in determining the winners and losers of economic reform. We know considerably more about how firm heterogeneity affects the decision to lobby (see Grossman and Helpman 2001) than about the actual outcomes firms experience following large-scale economic reforms (Fidrmuc and Noury 2003). The literature has especially neglected *variation within sectors* in the effects of liberalization. While the privatization of infrastructure services may improve quality for some, it may also hurt others. A firm that enjoyed access to a reliable supply of power from a public utility, for instance, may find itself in trouble if privatization prompts the closure of power plants in its vicinity.

To resolve this, we examine how the benefits of the 2003 national electricity reform in India were distributed among firms. The Indian electricity sector is a salient case because of its notorious inefficiency and the importance of electricity for industrialization (Arnold, Mattoo, and Narciso, 2008; Victor and Heller, 2007). Designed to improve the reliability of electricity supply, the Electricity Act of 2003 reduced licensing requirements and dismantled regulatory barriers to private producers entering the electricity generation market (Sharma, Nair, and Balasubramanian, 2005). These reforms reduced state control over generation, while retaining the state's primary role in the transmission and distribution of electricity (Mathavan 2008). As documented below, state governments have since been caught illegally favoring certain constituencies over others in terms of power supply.

The Indian power sector is an excellent case study for several reasons. First, the national reform was

intended to improve power supply uniformly across firms, greatly reducing concerns about endogeneity and selective implementation across firms. Second, the reform was implemented between two rounds (2002 and 2005) of a panel survey of Indian enterprises conducted by the World Bank, which allows us to compare power supply to firms before and after reform. The panel structure of the data allows us to control for prereform conditions and examine if political factors modified the liberalization payoff in terms of improved power supply to different firms. Finally, different Indian states had, for political reasons, differing capacity to implement the electricity liberalization over time, allowing us to compare across states as well. One would expect the effects of liberalization to be particularly pronounced in states that were in a good position to implement the reforms, and this expectation allows for further empirical testing.

While the reform improved power supply overall, politically vulnerable firms benefited less from reform than their stronger counterparts. Our measure of political vulnerability captures whether a firm was extorted into paying bribes to state officials in 2002. The substantive effects of political vulnerability are large. Of the mean improvement in the quality of power supply, one-half melts away for firms that were subjected to extortion in the past. Firms that cannot resist the encroachments of venal bureaucrats are later disadvantaged in the competition for the emergent benefits of the reform process. At the same time, firms with lobbying experience through a business association benefit one-third more than other firms. These organizations can better lobby and influence politicians at the behest of their member firms, especially with regards to improving access to the grid, obtaining a lower electricity tariff—consumer price of a unit of power—and securing consistent power supply.

Since the electricity reform was national, it remains to determine if the policy itself had benign effects or simply occurred at a time of unrelated positive changes. In Indian electricity politics, a central obstacle to reforms is the power of the agricultural lobby, which opposes liberalization because farmers benefit from artificially low electricity tariffs for groundwater extraction (Dubash and Rajan 2001; Santhakumar 2008). We show that the effects of the political variables identified in our empirical analysis are driven by changes in states with *high* agricultural electricity tariffs. Where the agricultural lobby was weak, it would not be able to prevent the implementation of reforms. In other words, our results on

political variables are driven by changes in states that were able to implement the national electricity reform, while such changes were limited in states that had powerful agricultural opponents of reform. Lastly, the dynamics we identified in postreform firm positioning appear confined to the electricity sector and the passage of the Electricity Act and not reflective of other larger trends in the development of the business climate. This variation in implementation capacity allows us to investigate the distributive politics of a national reform across subnational jurisdiction, an approach that could be readily applied to many other reforms and countries as well.

Intersectoral considerations withstanding, economic reform has differential effects on individual firms, depending on their political standing. Though previous works have argued that reforms create both winners and losers (Gehlbach and Malesky 2010; Hellman 1998; Schamis 1999), we identify specific firm-level political characteristics that help or hinder firms advance their interests. These previous works assume that winners and losers exist without trying to theorize about their characteristics, and we show how said winners and losers are identified at the level of the firm.

We also introduce empirical evidence for the incomplete contracts model developed by Gehlbach (2006). Firms that are vulnerable to bureaucratic predation may be unable to enter the type of mutually beneficial exchange relationship with the state at work in transitioning economies, thereby receiving fewer collective goods during liberalization (Frye 2002). Our findings lend some of the first empirical support behind an alternative model of business-state relationships (“business capture”) when firms may be locked into an unfavorable position relative to the state (Yakovlev 2006).

Our findings contrast with other studies of corruption in that the level of bribes paid by firms may denote weakness, not strength, in accessing the benefits of reform (Barber and Wibbels 2012). The necessity of making informal payments due to extortion disadvantages firms within the reform process (Fisman and Svensson 2007). Our modeling strategy moves beyond the direct effect of liberalization on firms operating in infrastructure sectors by focusing on downstream end-user effects (Bacon and Besant-Jones 2001). As to the case of the 2003 electricity reform (Dubash and Rajan 2001; Kale 2004; Santhakumar 2008), we put the debate on a more solid foundation of evidence, demonstrating the importance of political connections and lobbying for firm performance within a given sector.

## Theory and Hypotheses

When governments implement liberalizing reforms, they make available benefits to some individuals and organizations, while imposing costs on others. We explain the distribution of these costs and benefits to firms. Economic reform itself is considered to be exogenous. The previous actions of no one firm can determine either the passage or level of implementation of a given reform package. Similarly, it is not our intent to explain sectoral preferences or costs and benefits. Instead, we focus on understanding how individual firms within an industry differ in their benefits.

We use the example of liberalization of infrastructure services as an extensive running example. Since our empirical case is power-sector reform in India, it is useful to illustrate our abstract concepts with infrastructure reform. Growing evidence suggests that effective public goods provision can spur positive development outcomes (Alby Dethier, and Straub 2010; Straub 2011). States that improve the quality of infrastructure, such as transportation networks and telecommunications, experience higher and more stable growth rates. When firms cannot get reliable public services such as electricity or water, their total factor productivity is reduced and investment plans potentially put on hold. According to surveys of entrepreneurs conducted worldwide, deficient infrastructure is consistently ranked among the most important obstacles to business growth (Straub 2011).

In developing countries, liberalization has been a key mechanism to improve infrastructural quality. Reform programs are comprised mainly of the privatization of infrastructural utilities, the introduction of independent regulators, and the opening of markets to increased competition (Estache, Goicoechea, and Trujillo 2009). The expectation has been that liberalization would help remove some of the bottlenecks, corruption, and inefficiency that plague state-owned enterprises. Moreover, liberalization of utilities has become an important component of economic adjustment policies in the post-Cold War era, advocated strongly by international financial institutions and donors worldwide.

Following an exogenous impetus to reform, policies change in different sectors of the national economy. Within each sector, a heterogeneous set of firms are affected. This heterogeneity is both *economic* and *political*. Economically, some firms are simply in a better position to benefit from reforms. In the case of successful infrastructure liberalization, for

example, some firms are endowed with capital that allows them to easily increase their production to exploit the infrastructure improvements, while others are unable to expand their capacity despite improved infrastructure services from reform.

The other important source of heterogeneity is political. When reforms are implemented, the benefits must be somehow distributed across firms. Reforms are multidimensional and can be implemented in different ways. During their implementation, government officials must take numerous decisions with distributive effects (Brooks and Kurtz 2007; Hellman 1998). This allows firms to exploit political channels to pursue their interests. For example, the liberalization of infrastructure services could prompt affected industrial customers to demand that the government prioritize reforms in their areas. If licensing requirements are relaxed in electricity supply to increase the supply of power, a major industrial customer could mobilize to demand prompt and complete delicensing in its jurisdictions.

Liberalization can create opportunities for the private sector. While privatization can enhance efficiency, it can also open loopholes for collusion between public officials and private-sector providers, with consumers paying the cost in terms of significantly higher prices not subject to regulation (Martimort and Straub 2009). The magnitude of rents endemic to the utility sector appears to draw out the worst in economic behavior from private actors, particularly where incomplete, nontransparent, or poorly conceived liberalizing reforms increase the likelihood of post-privatization corruption (Estache, Goicoechea, and Trujillo 2009; Gasmi, Om, and Virto 2009). However, much of the research on the distributional consequences of utility liberalization has been confined to the altered incentives for private and the remaining public providers and not to the individual firms and consumers vying for the potential benefits of privatized services.

What are the variables that determine a firm's ability to influence the reform? We focus on two such variables. The first is *political vulnerability*, by which we refer to a firm's inability to withstand extortion by state officials. Since this variable is given a pride of place in many studies of lobbying, corruption, and privatization (Barber and Wibbels 2012; Frye 2002; Gehlbach 2006; Shleifer and Vishny 1994), it is natural to expect that it influences the distribution of gains from reform as well. The second variable is *lobbying experience through a business association*, by which we refer to past acts of political influence through a collective organization for businesses. Focusing on this

variable also seems warranted, given how many studies of lobbying emphasize the importance of collective action in special-interest politics (Gawande, Krishna, and Olarreaga 2009; Grossman and Helpman 2001). Moreover, the two variables capture two sides of the same coin: political vulnerability focuses on the state as the dominant and active side in state-business relations, while lobbying represents the firm's efforts to improve its bargaining position and pursue its goals.

We expect political vulnerability to prevent firms from benefiting from liberalizing reform to the same extent as politically powerful firms. While the statement is intuitive, capturing it theoretically and empirically presents a challenge. We examine demands from state officials to pay bribes, or *extortion*, as an indicator of political vulnerability. Here, we build on the idea that the political weight of firms is a strong determinant of their access to preferential treatment in the provision of public goods (Barber and Wibbels 2012; Malesky, Jensen, and Gueorguiev 2011). Firms that are politically valuable to politicians because of their contributions to the tax base, private payments, or strong connections have been shown to benefit disproportionately from all types of reforms (Faccio 2006; Gehlbach 2006).

Due to extortion, some firms are prone to having to pay bribes for service. If a firm lacks political clout and connections, it cannot resist extortion. When a government official demands a bribe for a service, a politically vulnerable firm must choose between making the payment and not receiving the service. Conversely, a politically influential firm can protect itself from extortion. If a government official demands a bribe, the firm can complain to another official at a higher level, or simply refuse to pay, countering the threat with reduced campaign contributions or voter mobilization in the workplace.

Factors that determine a firm's vulnerability include the level of bureaucratic control over its operations, profitability, and experience in the market (Clarke and Xu 2004; Svensson 2003). High levels of asset specificity, few political connections, and operating in a sector especially prone to regulation can weaken a firm's position vis-à-vis politicians and bureaucrats (Faccio 2006; Frye 2002; Gehlbach 2006). None of these factors is a completely reliable predictor of political vulnerability, but they increase the likelihood that a firm is subjected to extortion. In turn, past extortion is an excellent indicator of political vulnerability. It captures a salient aspect of business-state relations in a capitalist society. At the very least, we can maintain that if a firm is subjected to extortion, it cannot be among the politically most influential firms in the country.

Consider the case of infrastructure reform. The ability of individual firms to capitalize on efficient service reforms greatly depends on the level of political interference in the reform process. Liberalization is the product of an intensely political bargain with important distributional consequences for society. Even if private providers are now responsible for infrastructure services due to privatization, they are rarely obliged by law to evenly confer the benefits of more efficient provision on all consumers. Moreover, the state often maintains a monopoly on the distribution of infrastructure services. For example, power-sector reform often results in the privatization of generation, while distribution and transmission remain a state monopoly (Bacon and Besant-Jones 2001). In corrupt states, the collusion between officials and private providers ensures that some infrastructure users receive privileged access, whether for political or economic reasons.

In this situation, some firms have less recourse and political pull to demand improved access to privately provided infrastructure. A strong determinant of a firm's ability to take advantage of improvements is its previous relationship with state officials. Such vulnerabilities to predation weaken the bargaining position of firms when liberalizing reforms are implemented, leaving them outside the improved business environment. Their inability to resist the encroachments of venal bureaucrats disadvantages them in the fight to pursue their interests in the reform process. Public sector officials feel little need to cater to firms without political protections, thereby redirecting the benefits of liberalizing reforms to more valuable firms. In the case of India's electricity reform, we clearly see this logic in action. Although the power-sector reform privatized generation, both transmission and distribution remained in the hands of the state (Mathavan 2008). If a firm is politically vulnerable, government officials can simply direct power to its more influential counterparts unless the weak firm offers a considerable bribe for the service. Given India's acute power deficit, the competition for power is intense among different stakeholders.

*Hypothesis 1* (political vulnerability and benefits from reform): All else constant, the effect of reform is more positive for firms that are not politically vulnerable.

Next, we consider past experience with lobbying through a business association. Just as some firms face greater obstacles to gaining access, other firms can use a variety of tools to curry favor with officials and tap into concessions. For example, firms with strong institutional and lobbying connections can

more easily translate reform into productivity gains (Gawande Krishna, and Olarreaga 2009; Grossman and Helpman 2001). Around the world, entrepreneurs employ various means to gain individual political favors, from contributing to political parties, hiring former politicians, to even running for office themselves (Faccio 2006; Gehlbach, Sonin, and Zhuravskaya 2010; Khwaja and Mian 2005). Strong political connections can significantly advantage a firm's economic performance across a variety of indicators, including access to infrastructure. We argue that when liberalizing reforms are implemented, political influence is vital in order to secure gains for individual firms.

Firms are increasingly turning to collective organizations such as trade associations to represent their political interests. By aggregating interests, resources, and market power, business associations can more effectively lobby on behalf of their members for improved treatment and stronger business environments (Schneider 2009). Following periods of economic reform, membership in such business associations may be even more critical. By definition, liberalization upends previous connections between bureaucrats and firms by opening up markets to private actors. Because new incentives for cooperation and collusion emerge quickly, firms do not have time to engage in the costly investment of developing new political connections. The influence of preexisting business associations can more easily secure access to private networks as well as help defend against state officials. Associations can form powerful lobbies that privilege the interests of their members against nonaffiliated firms.

Given the political benefits of business associations, firms have incentives to join. However, securing membership can be difficult. Due to the problem of collective action, some groups of firms may fail to form any kind of an association (Olson 1982). Other firms may have such specialized needs that the critical mass of numbers needed for an effective association does not exist in their domain of activity. Yet others may face difficulties in paying membership fees, perhaps because of their small size. At the same time, small firms may need a business association more than large firms. Finally, some firms may even not be allowed to become members due to their bad reputation or weak relationship with government officials.

For empirical identification, the role of business associations is best measured by looking at past experience. Firms that have used business associations for lobbying in previous instances have a natural channel of influence for the present reform. If a firm is already a member of a business association with

lobbying capacity and experience, the firm's ability to reap gains from liberalization should grow.

*Hypothesis 2* (lobbying experience through a business association and benefits from reform): All else constant, the effect of liberalization is more positive for firms that have experience in lobbying through a business association.

It is important to distinguish between the access that a *particular firm* gains through lobbying access and *industry* influence by virtue of having an association. Business associations may provide political influence through channels other than lobbying. Below, we explicitly test and reject this possibility.

### Electricity Reform in India

We analyze India's 2003 national electricity reform. In addition to the analytical merits of the case, it is important to consider the external validity of lessons learned. These criteria are threefold. First, the theory requires national economic reforms with potentially heterogeneous effects on firms. In the power sector alone, 92 countries have implemented a variety of reforms between 1982 and 2008 (Erdogdu 2011). Since these reforms were similar to India's, our theory can be applied to explain them. In virtually all sectors of infrastructure, ranging from water and oil/gas supply to postal services and railways, liberal reforms of regulation have advanced across both industrialized and developing countries during the past three or four decades (Dubash and Morgan 2012). In addition to power, firms depend on these services for their productivity, meaning that our theory is broadly applicable. Second, government officials must have the ability to distribute the gains from liberalization selectively to influential firms. In most of the reforms cited above, comprehensive privatization was not implemented, allowing the government to exercise political control. Power plants, water utilities, national oil and gas companies, railway operators, and postal offices are but some examples of service providers that the government can regulate and control.

In general, many industries in India—and elsewhere—are dependent on inexpensive power for profitable production. A successful electricity reform reduces the cost of power generation, increases supply, and mitigates the problem of outages. But who benefits from these improvements? Even if power *generation* is liberalized, the Indian state continues to control the *transmission and distribution* of electricity. In Uttar Pradesh, for example, Golden and Min (2013) document “electoral cycles” in electricity provision, with politicians giving free electricity to important

districts during election time. Quite literally, the state can direct the supply of electricity to different firms. If officials decide that a firm should no longer receive the power it needs, they can interrupt the transmission of power to that firm. Although Indian firms generally receive more power than, say, rural households, the supply is highly dependent on officials.

The electricity reform consisted of privatization and deregulation, especially in regard to power generation (Mathavan 2008; Sharma, Nair, and Balasubramanian 2005). The policy changes encouraged private power generators to enter the liberalized market, and this was expected to enhance the supply of electricity to industrial and other users. The further introduction of open access in transmission and distribution would give firms options outside of the public sector to secure electricity as well as increase competition in pricing and provision. The “multibuyer, multiseller” model envisioned dramatically limited the scope for state monopolization of the power sector. Given frequent power outages in most Indian states, such changes would have been highly welcome for industrial users across different industries. Additionally, the reforms proposed the gradual abolition of cross subsidies, whereby large-scale industrial consumers paid higher tariffs that subsidized rural and residential users. The cost of electricity on average was 24% higher for manufacturing firms than the actual cost of supply, making any policy attempt to level out tariffs across users an attractive proposition for businesses (Bhattacharya and Patel 2007). Since our sample focuses on manufacturing industries, the importance of electricity for their profitability and growth is also indisputable (Arnold, Mattoo, and Narciso 2008).

Indian firms have recourse to use political action to improve the access to electricity. Electricity regulators also face considerable pressure from industry groups in the form of official “comments”—objections to tariff orders that are submitted to regulatory commission—and the use of the media to criticize policies and air grievances (Dubash 2008). Organized interest groups (both of industrial and agricultural producers) have also effectively lobbied the government for subsidized tariffs, quicker connections to the electricity grid, and prioritized access to power supply during times of volatility or excessive demand (Jain 2006). Indian firms often cite their political importance during elections as justification for privileges in reducing the burden of cross-subsidizing other consumers. Joseph (2010) also claims that because large industrial consumers in India must secure consistent and reliable power supply, they have in the past employed creative solutions to influence politicians to achieve their goals.

For example, firms might turn to captive power generation in order to place pressure on the state system to increase its effectiveness and implement reforms. Firms have a variety of options to influence and/or capture regulators and politicians once reforms have been undertaken.

Though transformational in its scope and intended effect, the 2003 Electricity Act followed a decade of piecemeal reforms at all levels of government since the broader turn to economic liberalization in 1991 (Bhattacharya and Patel 2007). Historically oriented towards state control of electricity since the beginning of Indian independence, by the mid-1990s a strong consensus was growing among international and domestic stakeholders to rethink the status quo and to fix financially insolvent state electricity boards (SEBs) (Dubash and Rajan 2002). Under guidance from the World Bank, an experiment to introduce competition into generation, transmission, and distribution was undertaken first in Orissa and then scaled up to varying degrees in other Indian states (Joseph 2010). However, at the turn of the century, severe payments crises across SEBs prompted concerted federal action by the central government, leading to the development of the 2003 Electricity Act described above (Bhattacharya and Patel 2007).

While early attempts at reform saw wide input from international actors, the writing of the 2003 Act was led primarily by the Ministry of Power, which then submitted the bill to the Indian Parliament for deliberation and passage. Intense negotiating in the Parliamentary Standing Committee on Energy ensued during 2003, which received consultations from a wide range of actors including state governments, unions, business groups, and academics (Shahi 2007). National associations also mobilized quickly to influence the public debate, while individual firms delegated lobbying to these collective groups. The battle lines fell quite sharply. On one hand, utility employee unions as well as general trade unions opposed the Act on the grounds that introducing private-sector competition would result in higher tariffs, increased unemployment across sectors, and the displacement of domestic businesses by multinationals. Conversely, high-level industry groups such as the Confederation of Indian Industry (CII) united in their support of the Act and organized conferences to prepare their members for the new regulations (Raghunathan 2003). By the end of the year, more balanced legislation had been passed.

This lobbying was about the national policy, *not* about implementation in the states. This accords with our assumption that from the perspective of any

given firm, the electricity reform was exogenous. While the all-India, all-industry pushed for liberalization, it did not lobby for variation in implementation across states. This part of the lobbying, which is the focus of our theory, was left to more localized industry associations and individual firms.

## Research Design

The unit of analysis is an *Indian firm*. We examine changes in the quality of power supply from 2002 to 2005 in a sample of 1,094 firms based on repeated observations in the World Bank's Enterprise Surveys. We examine any potential selection biases from attrition in the online appendix, finding that none of the variables of interest are correlated with firm exit from the survey. The 2002 sample was interviewed only a year before the national electricity reform, offering us an ideal glimpse into pre-reform conditions. Since the thrust of the 2003 reform was the deregulation of power generation, we do not expect anticipatory adjustments by firms before the reform was implemented. Before deregulation, it was not possible for privatization to enhance the quality of power supply.

In the online appendix, we present the sectoral breakdown of the firms surveyed in the 2002 and 2005 rounds. As the survey is representative of all manufacturing firms working in India at the time, nearly one-quarter of respondents represent the textiles industry. Slightly fewer firms produce machinery, such as for use in automobile production. We also present the regional distribution of firms. Eighteen Indian states, out of 28 states and seven small Union Territories, were included in the survey, with the number of firms surveyed ranging from 18 in Chandigarh to 203 in Karnataka. Neither the Seven Sister States nor the northernmost states are included in the survey.

We control for initial conditions and explore the distribution of supply improvements across the sample, while controlling for a wide variety of confounding factors. The 2005 sample was interviewed approximately two years after the reform. This means that the full effects of the reform were yet to be felt, but the delay is long enough to allow for some change. Two years is more than enough for a private power generator for the owner of an existing plant to significantly boost production in view of an improved business environment. While we would ideally have a third round of surveys several years later, it does not exist.

Except for Jammu and Kashmir, all Indian states were subject to electricity reform. Accordingly, our main analysis is a before-after comparison of the quality of power supply to different firms. Controlling form



firm characteristics and including both state and industry fixed effects, we examine how the quality of electricity supply to different types of firms changed from 2002 to 2005. Given that the electricity reform applied to all states, we cannot explicitly compare firms with and without reform. However, we can test the importance of reform by distinguishing between firms in states that were politically capable of implementing the reform and those that were not. Utilizing data on prior agricultural electricity tariffs, we show that our hypotheses only apply in states that were politically able to implement reforms. While suggestive at best, this evidence is consistent with the notion that the heterogeneity in power-supply improvements across firms were related to the 2003 national reform, instead of general trends unrelated to policy.

### Statistical Model

Since we have repeated observations from the same firms, we estimate a panel regression. The dependent variable is the change in the power quality to a firm between 2002 (pre-reform) and 2005 (postreform). To avoid endogeneity bias, the key independent variables are measured in 2002. We also control for some trends between 2002 and 2005 to deal with omitted variable bias. Given that the distribution of the change in the value of the dependent variable is approximately normal and contains only a handful of boundary values, the assumptions for an unbiased linear regression are met. Since the firms are grouped by state and district, we must also account for this clustering, which do both through the inclusion of state or district fixed effects and by clustering standard errors. We also include industry fixed effects to avoid conflating variation across industries with firm heterogeneity. Since the surveys we have do not contain sampling weights, we cannot adjust the observations for their differing sampling probabilities. This is not a major problem, since our focus is on hypothesis testing rather than descriptive statistics (Solon, Haider, and Wooldridge 2013).

The linear regression is specified as follows:

$$\Delta Y_i = \alpha + \beta_1 \text{Vulnerability}_i + \beta_2 \text{Lobby}_i + \gamma \text{Controls}_i + \eta_j + \theta_k + \epsilon_i. \quad (1)$$

In this equation,  $\Delta Y_i$  is the change in the quality of power supply, ranging from  $[-10, 10]$ . We use the first difference as the dependent variable because we are interested in changes over time, but the results are identical if we use the level of the variable in 2005 instead. In practice, the boundary values  $-10$  and  $10$

are never met, and so the least squares estimator is not biased.  $\beta_1$  is the coefficient for political vulnerability,  $\beta_2$  for lobbying experience, and  $\gamma$  a vector of coefficients for control variables. Vectors  $\eta_j$  and  $\theta_k$  denote state ( $j$ ) and industry ( $k$ ) fixed effects. This is essential because we are interested in variation among individual firms, not across states or industries. The fixed effects hold constant state policy and industry features, including earlier reform efforts in select states (Sharma, Nair, and Balasubramanian 2005). For example, industries may differ in terms of power consumption. States may vary in terms of their ability to implement reforms, and they may have various histories of success or failure in reforming the power sector. The online appendix also reports results with district fixed effects, with no change in results. Throughout, we estimate robust standard errors clustered at the state level.

### Dependent Variable

The dependent variable captures the change in the quality of power supply from 2002 to 2005. The World Bank's survey contained a question on the quality of power supply in 2002 and 2005: "How would you rate quality of power?" While the question does not specifically mention the grid, as opposed to self-generated electricity, the question is located in a section that focuses on infrastructure. The scale was 1–10 in both surveys, with higher numbers indicating better supply. The question was asked in an identical fashion in both versions of the questionnaire. With first differences, we arrive at our dependent variable. If we use the level in 2005, the coefficients are exactly identical, meaning that the choice of specification is irrelevant. Overall, power supply improved from 2002 to 2005 by 0.97 on a scale from 0 to 10. At the same time, variation in the dependent variable remains large, with some firms reporting the worst possible service (1) and others the best (10). Our hypotheses pertain to the *distribution* of these overall efficiency benefits.

The main disadvantage of the variable, which summarizes different components of power-supply quality in one indicator, is subjectivity. This is not an obstacle to analytical hypothesis testing, but one wonders if subjective perceptions are correlated with reality. While we do not have detailed data on the myriad dimensions of power-supply quality, the questionnaire does have a question on the number of power outages in the last year. Since it captures only one dimension of the concept of interest, it is not suitable as a dependent variable. However, the correlation between power-supply quality and the logarithmized number of outages is  $r = 0.38$  in

2005 and  $r = -0.43$  in 2002, both significant at the  $p < 0.001$  level, suggesting that subjective perceptions have a strong positive association with objective reality. Similarly, a question about losses from outages as a percentage of sales is correlated at  $r = -0.22$  in 2005 and at  $r = -0.33$  in 2002, both significant at the  $p < 0.001$  level. These four correlations all indicate that our dependent variable accurately captures the severity of a real problem.

### Independent Variables

The first independent variable reflects a firm's *political vulnerability*, measured as *extortion*. We build our variable from a question asked in the 2002 Enterprise survey about the "Total gifts, bribes, etc. paid (Rs) by your firm in response to officials demands during visits." Because the amount of the bribe surely depends on the market size of the firm, an ideal measure of a firm's vulnerability would be to use a ratio of the payment to the firm's revenue. Unfortunately, due to problems with missing data, full information on firm revenue is unavailable. Instead, we employ a dummy variable indicating 1 if a firm gave any bribe, gift, or payment to officials upon demand and 0 otherwise. This independent variable therefore measures how the previous likelihood that a given firm could not resist pressure from an official to engage in illicit payments at the time of the reform in 2003. Past extortion need not have a causal effect on future political vulnerability, but it is a useful *indicator* for such weakness.

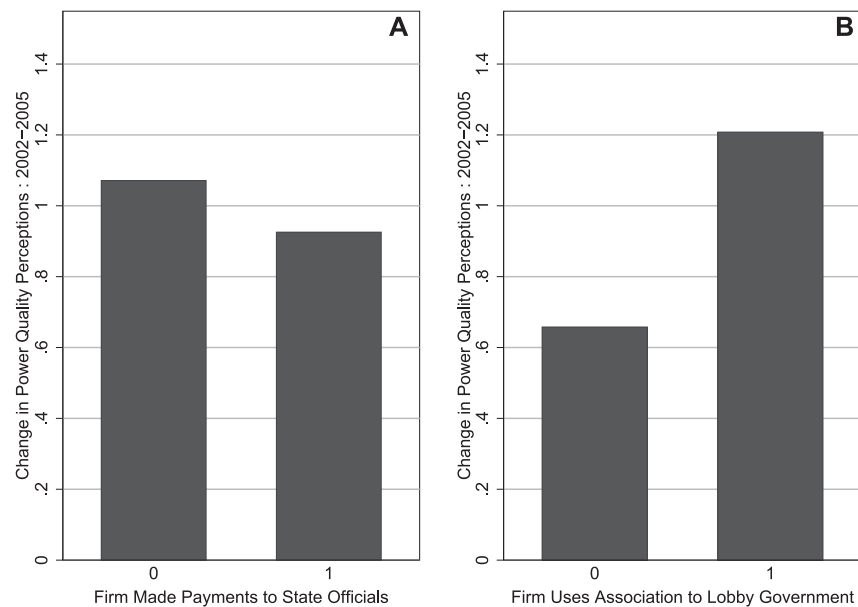
Some works examine survey questions about the incidence of informal payment that do not explicitly distinguish between the firm initiating the transaction to "grease the wheel" or the bureaucrat demanding bribes from a firm in order to access basic public goods (Barber and Wibbels 2012; Svensson 2003). We believe this linguistic distinction is important because having to pay bribes can be a signal of political vulnerability. The standard question in numerous World Bank Enterprise surveys asks firms whether or not they are "sometimes required" to make informal payments to "get things done." This wording masks whether pressure is being placed on the firm to pay or risk paying the consequences or whether firms themselves opt for using informal payments as a tool to better navigate an inefficient bureaucratic system. The survey question we use here instead specifically emphasizes that the demand is made by an official. This allows us to identify instances of extortion and avoid conflating this concept with willingness to bribe.

One could worry that our measure of extortion fails to distinguish between "forced" bribery due to pressure by government officials and active solicitation of favors by firms willing to engage in corruption. Fortunately, our data allow us to check this assumption with many alternative measures of political vulnerability. In Table A8 of the online appendix, we employ a range of alternative measures that capture the same type of political vulnerability relative to state officials in charge of public goods provision. We look at whether a firm has outstanding legal cases with the state government, an indicator of conflict and a possible source of leverage for the government. Another measure captures whether a firm experiences political pressure from the government to maintain employment at levels higher than desired. Lastly, we also look at the firms perceptions of overall corruption as an obstacle for their business as well as their subjective confidence in the judicial system to protect their business interests. Firms worried about corruption or unsure about their legal protections may be weakened during postreform lobbying. To foreshadow, our main findings are robust to this array of alternative measures.

Firms may misrepresent their behavior in the survey. Some firms could falsely say they have not made payments (Jensen, Li, and Rahman 2010). If these firms are similar to the firms that honestly reveal their behavior, then our empirical method *understates* the effect of political vulnerability on power supply. If, on the other hand, these firms are powerful, then our model *overstates* the effect. Since this cannot be directly tested, it is important to recall that there is residual nonstatistical uncertainty in the reported results. Nonetheless, the survey wording is a significant advance over conventional approaches that fail to distinguish between willingness to bribe and pressure to do so.

The second independent variable reflects a firm's *lobbying experience through a business association*. We should emphasize that we are *not* trying to capture the endogenous act of lobbying on electricity supply following the reform. The causal effect of such endogenous behavior is difficult to capture, and our theory focuses on a firm's past experience with lobbying. Instead, we seek to capture the past experience of a firm having worked through collective-trade organizations to pursue its business interests. Business associations though vary greatly in their functions and objectives. We operationalize a dummy variable that measures whether a given association performs the function of "representation of members' views and concerns to the Government" (indicated by 1), conditional on that firm belonging to a business

FIGURE 1 Change in Power Quality by Firm Type



association. Values of this independent variable take a 0 for firms not belonging to business associations or being members of associations that do not perform this lobbying function. As a robustness check, we control for membership in any association in order to isolate the effect of the lobbying function. This question again comes from the 2002 Enterprise Survey described above.

To illustrate the relationships between our explanatory variables and the dependent variable, we present two bivariate graphs depicting changes in perceptions of the quality of power supply in Figure 1. Without controlling for any confounding characteristics, politically vulnerable firms (those that made informal payments to officials in the past) saw on average roughly 0.2 less improvement in supply on the original 10-point scale than those that did not make payments. This difference is not statistically significant at conventional levels. On the other hand, firms that used associations to lobby the government saw nearly a 0.6 increase in their supply more than firms not using such organizations, a difference that is significant at the 99% level. Next, we introduce and control a range of other variables that we might expect to affect electricity provision in order to better identify the effect of our explanatory variables of interest.

### Control Variables

In addition to state and industry fixed effects, we include control variables to deal with confounding factors. While the fixed effects account for factors

such as the industry's electricity intensity and state capacity, there are a number of other factors that could influence both the independent and dependent variables. Most importantly, we control for initial conditions by including the quality of each firm's power supply in 2002. The improvements in power supply between 2002 and 2005 clearly depend on the initial situation, as firms with a good supply in 2002 improve less than firms with a poor supply at that time. By accounting for initial conditions, we obtain sharper coefficient estimates.

To account for infrastructural factors more generally, we control for the quality of roads in 2002. This variable ranges from 0 to 10, with higher values indicating better quality. We include it because we want to control for the possibility that some firms are located in economically progressive areas of India, where infrastructure is improving fast, irrespective of the 2003 electricity reform. The quality of roads also may have a direct impact on the construction of electric lines to improve firm connectivity to the grid.

Firm size, measured as the logarithm of total number of workers employed in 2002, is also included. Large firms may benefit more from improved power supply, if only because the importance of electricity for their production is more salient. Alternatively, large firms may have access to their own captive power, meaning that they are less dependent on the electricity reform (Reinikka and Svensson 2002; Rud 2012). To distinguish between the effect of size and labor intensity, we control for the percentage of unskilled workers. Firms with low skill levels may manufacture

products that are less dependent on good electricity supply. This type of production process relies on older technology with a stronger emphasis on manual labor. In some specifications, we also use the total amount of assets, measured in thousands of rupees and logged, as an additional measure for firm size. Though we do not have a measure of tax payments, total firm assets also may capture a firm's economic standing within its state, including the level of influence it wields purely as a function of its size.

We include exporter status to the estimations, for exporters may benefit in particular from improved electricity due to the intense competition they face in international markets. Exporting firms may also command more influence with policy makers who see this type of sales activity as particularly beneficial for economic growth and customs receipts. We include a control for firm age to account for the possibility that new firms experience rapid improvements as they develop (Reinikka and Svensson 2002). We also include an indicator for the ownership of a generator to account for the possibility that self-reliant firms do not perceive quality improvements as readily as other firms (Rud 2012). Possessing a generator might also make a firm less dependent on the electric grid and thus less interested in attempting to capture the benefits of efficiency-producing reforms.

We control for several factors that may affect a firm's propensity to engage in lobbying behavior. Recent dips in firm performance may incentivize firms to look for government assistance in order to return profitability to previous levels. We measure change in performance in the previous period as Percentage Change in Sales 2000/2001 and include it as a control in many of the models. Besides firm size, controlled for above with measures of the number of workers and amount of assets, the regulatory burden of a firm may play a decisive role in making lobbying attractive (Grier, Munger, and Roberts 1994). We include a measure of the number of licenses a firm has to renew each year as a control.

We also control for manager characteristics, because competent managers may benefit more from the opportunities created by infrastructure reform. We include an indicator for whether the manager is also the principal owner of the firm, so as to deal with principal-agent issues. We measure the education level of the manager and include a count of the manager's years of experience. Both variables reflect overall managerial competence, potential fluency with the policymaking environment, and knowledge of various strategies to improve firm performance.

## Results

We begin with the main findings and then conduct additional tests.

### Main Findings

The main results from the analysis are provided in Table 1. Model 1 contains two main explanatory variables and the controls for power and road quality, while Models 2 and 3 provide the two explanatory variables separately. This is important because they are negatively correlated. Models 4–6 include both explanatory variables and different control variables. All models include state and industry fixed effects.

As to the effect of political vulnerability, the results show that firms that had to make payments to state officials in the past experience *less* improvement in power supply during the reform. The coefficient is negative and statistically significant at the  $p < 0.10$  level in all models. Moreover, the value of the coefficient is stable. To quantify the substantive effect, the coefficient in the baseline model is  $-0.49$ . If a firm that did not make payments achieved the mean improvement in the sample, 0.97, the improvement would be twice that achieved by a firm that was politically vulnerable. This suggests that a significant proportion of the gains from the 2003 electricity reform accrued to firms with a lot of political clout.

Furthermore, past experience with lobbying allows firms to reap gains from reforms. The coefficient ranges from 0.28 to 0.55 and is statistically significant at the  $p < 0.05$  level in all but one model, where the variable on political vulnerability is excluded. While the uncertainty surrounding the exact size of this effect trumps that surrounding the effect of political vulnerability, the estimated coefficient is of the same magnitude. According to the first model, one-third of the sample mean for the improvement in power supply melts away if one compares a firm without lobbying experience to one with such experience.

Given that our outcome data is for the year 2005, we cannot quantify the long-run effects of electricity reform on distributive politics. However, there is little qualitative evidence to suggest that liberalization would have mitigated distributive politics over time. The electricity sector remains intensely politicized, and the outcome of the 2003 electricity reform is best described as a partial reform that “allows politicians to maintain the support of key constituencies who do not support reforms, while at the same time [increasing]

TABLE 1 Effect on Corruption and Lobbying on Power Quality

	(1) Model	(2) Model	(3) Model	(4) Model	(5) Model	(6) Model
Firm made payments to state officials	-0.49** (0.20)	-0.40 (0.19)		-0.51** (0.20)	-0.51** (0.22)	-0.53** (0.20)
Firm uses BA to lobby government	0.32** (0.13)		0.28 (0.17)	0.36** (0.12)	0.35** (0.12)	0.41*** (0.13)
Perception of power quality in 2002	-0.86*** (0.05)	-0.85*** (0.05)	-0.87*** (0.05)	-0.86*** (0.06)	-0.85*** (0.06)	-0.85*** (0.06)
Perception of road quality in 2002	-0.03 (0.04)	-0.04 (0.04)	0.04 (0.04)	-0.02 (0.04)	-0.03 (0.04)	-0.05 (0.04)
Total number of workers (logged)				-0.04 (0.07)	-0.07 (0.13)	-0.08 (0.13)
Percentage of unskilled workers				-0.62 (0.40)	-0.63 (0.44)	-0.40 (0.45)
Percentage change in sales 2000/2001				-0.06 (0.04)	-0.06 (0.04)	-0.05 (0.05)
Total assets (logged)					0.06 (0.08)	0.07 (0.08)
Exporter					-0.23 (0.15)	-0.19 (0.14)
Firm age					-0.00 (0.01)	-0.00 (0.01)
Firm owns generator in 2002					0.04 (0.15)	0.03 (0.17)
Number of licenses firm has to renew each year						0.00 (0.03)
Firm manager: Principal owner						0.27 (0.14)
Firm manager: Education						0.06 (0.16)
Firm manager: Years of experience						-0.00 (0.01)
Sector Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	708	722	1067	678	673	626

Note: Standard errors in parentheses and clustered at state level. Dependent variable: Change in power quality perceptions : 2002-2005. \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

private sector involvement in the electricity market” (Joseph 2010, 510).

The results on the control variables also warrant a brief discussion. Unsurprisingly, the previous quality of power supply is a key predictor of improvement. All else constant, a unit increase in the quality of the 2002 power supply reduces the expected improvement by approximately 0.85 units. Of all the variables in the estimation, this is by far the most important predictor of improvement.

Of the other control variables, surprisingly few predict improvements in power supply. Road quality is irrelevant, suggesting that the general quality of infrastructure in 2002 is not a good predictor of future improvements in electricity, controlling for the quality of power supply. There is some suggestive evidence that

firms with a lot of unskilled labor experience smaller improvements, which is intuitive because they may not pay as much attention to electricity supply as other firms do. However, the coefficient is only significant in one of the three models. Worsening firm performance is generally associated with decreased power quality, but the point estimates are not significant. Finally, firms with manager-owners seem to improve more than firms with professional managers, suggesting that the principal-agent problem may be at play.

### Placebo Tests: Electricity Reform or Something Else?

We conducted a series of placebo tests reported in Table 2. This placebo test should help determine

TABLE 2 Change in Power Quality: Infrastructure Placebo Analysis

	(1) Model	(2) Model	(3) Model	(4) Model	(5) Model	(6) Model
Firm made payments to state officials	-0.47 (0.28)	-0.50 (0.36)	0.03 (0.18)	0.03 (0.21)	0.00 (0.23)	-0.10 (0.25)
Firm uses BA to lobby government	0.11 (0.23)	0.31 (0.29)	0.08 (0.14)	0.14 (0.15)	0.04 (0.19)	0.22 (0.20)
Perception of power quality in 2002	-0.04 (0.03)	-0.07 (0.04)	0.02 (0.04)	0.02 (0.04)	-0.03 (0.03)	-0.04 (0.03)
Perception of rail quality in 2002	-1.00*** (0.04)	-0.98*** (0.05)				
Perception of telephone quality in 2002			-0.97*** (0.03)	-0.96*** (0.03)		
Perception of Internet quality in 2002					-0.91*** (0.05)	-0.88*** (0.04)
Total number of workers (logged)		-0.15 (0.17)		-0.04 (0.12)		-0.08 (0.14)
Percentage of unskilled workers		-1.24 (0.63)		1.07 (0.54)		0.08 (0.70)
Percentage change in sales 2000/2001		-0.06 (0.10)		-0.02 (0.09)		-0.26 (0.18)
Total assets (logged)		0.05 (0.10)		0.00 (0.09)		0.08 (0.06)
Exporter		0.12 (0.31)		-0.27 (0.16)		-0.28 (0.20)
Firm age		-0.01 (0.01)		0.01 (0.01)		0.01 (0.01)
Number of licenses firm has to renew each year		-0.05** (0.02)		0.00 (0.01)		0.01 (0.02)
Firm manager: Principal owner		0.20 (0.27)		-0.05 (0.17)		0.03 (0.27)
Firm manager: Education		0.34 (0.34)		0.18 (0.15)		0.03 (0.36)
Firm manager: Years of experience		-0.01 (0.01)		0.00 (0.01)		0.01 (0.01)
Firm owns generator in 2002		-0.42 (0.34)		0.01 (0.14)		-0.14 (0.12)
Sector fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	449	395	710	627	503	450

Note: Standard errors in parentheses and clustered at state level. Dependent variable, Models 1 and 2: Change in rail quality perceptions : 2002-2005. Dependent variable, Models 3 and 4: Change in telephone quality perceptions : 2002-2005. Dependent variable, Models 5 and 6: Change in Internet quality perceptions : 2002-2005.

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

whether the effect of political vulnerability or lobbying are isolated to electricity sector—the public good specifically targeted by reforms between the two waves of our panel survey—or are capturing other larger dynamics about the ability of firms to receive effective public goods provision. With that aim, in Models 1 and 2, we employ a different dependent variable, Changes in the Perception of Rail Quality 2002–2005, and find that extortion and lobbying do not significantly predict changes in the quality of this

other important public good for business. The signs are in the same direction, but do not approximate statistical significance. While railway construction is a network industry and the benefits of reform to an individual firm are difficult to disentangle from benefits to other firms, it is nonetheless reassuring that we do not see strong effects of power-sector reform in this sector. Even stronger evidence for the specific effect within the electricity sector are the results from Models 3-6 on perceptions of telephone and

internet quality. Extortion or lobbying are not correlated with perception in any of these sectors.

In the online appendix, we verified that being member of a business association itself does not influence the change in power quality, again suggesting the importance of actual lobbying experience. Next, we showed that our key explanatory variables do not predict generator ownership in 2002. This allows us to verify that our results are not driven from endogeneity bias, with some firms purchasing generators because they worry about their inability to improve power quality. To the extent that such strategic decisions are made, they are not associated with our explanatory variables. Finally, we examined if our explanatory variables explain the perception of power quality in 2002 or not. They should have no explanatory power, because the national reform was yet to be implemented. While extortion does predict the perception of power quality, lobbying experience through a business association has the opposite sign than in our main analysis.

**Alternative Measures of Political Vulnerability.**

Our argument suggests forced bribery is a sign of political weakness, not strength. However, political vulnerability can take numerous forms. To strengthen our argument that forced bribery reflects a firm's weak position vis-à-vis the government, we ran several models with complementary measures of a firm's vulnerability. Reassuringly, other measures of weakness that might hinder a business's ability to extract benefits are similarly related to worse outcomes in the postreform period.

In the supplementary appendix, we present results from models that include four additional measures of political vulnerability. First, we included a variable for whether or not a firm had an outstanding legal cases with the state government. Firms in conflict with the state over contracts or other issues might find themselves in a weaker position to gain access to public goods. Next, we included a variable that indicated whether or not a firm's decisions about employment levels were made under political pressure. If a firm would presumably fire workers if it found itself in a different political environment, this would be evidence of political weakness in its inability to retain control over all business-related decisions. Lastly, we add variables capturing the firms' perceptions of corruption as an obstacle for their business as well as the judicial system to protect their business interests. Greater political vulnerability as captured by each of the four measures is correlated with diminished access to electricity. Additionally, lobbying improves power outcomes, even when controlling for these other indicators of political weakness.

**Importance of Electricity Reform.** As discussed above, one weakness of our before/after comparison is the difficulty of connecting the variation in power supply improvement across firms to the act of liberalization. While we have made the case for the importance of the reform above, we now also test the hypothesis quantitatively.

The test is based on the idea that although reform itself is *national*, it is implemented by different *states*. Given this variation in implementation, we can distinguish between states that were able to implement the reform and those that were not. Here, we rely on the idea that the key opponents of the reform were agricultural producers, who expected to lose from deregulation and the liberalization of the tariff structure (Dubash and Rajan 2001; Santhakumar 2008). To measure the power of the agricultural lobby, we computed the mean agricultural tariff for the 2000–2002 period for each state. The data for agricultural electricity tariffs is in constant 2002 rupees and from the Planning Commission's 2002 Annual Report on the Working of State Power Utilities and Electricity Departments.

We split the sample into states with high and low tariffs, varying the threshold for robustness. High tariffs indicate a powerless agricultural lobby, which allows implementation of the reform. Low tariffs indicate a powerful lobby that is capable of preventing liberalization. If our findings are caused by reform, instead of general national trends, we would expect the effects of political vulnerability and lobbying experience to be stronger in states with high tariffs. Because of the small number of states, using a multilevel interaction effect may be ill-advised. Correlation between individual-level (firms) and group-level indicators (states) can result in inefficient and incorrect pooled estimators (Erikson, Pinto, and Rader 2010).

The results are reported in Table 3. Models 1, 3, and 5 are for states with high tariffs. Models 2, 4, and 6 are for states with low tariffs. The table shows that the effects of political vulnerability and lobbying experience only hold for states with high tariffs, consistent with our argument. To begin, compare models 1 and 2, which distinguish between states with agricultural electricity tariffs above and below median, respectively. The coefficient on having paid bribes in the past is negative in both models, but it is larger and statistically significant in states with high tariffs. The coefficient for experience with lobbying through a business association is positive but not statistically significant in each model. Contrary to our expectations, the coefficient is more negative in states with low tariffs.

TABLE 3 Change in Power Quality: Conditional on Agricultural Lobby Strength

	(1) Model	(2) Model	(3) Model	(4) Model	(5) Model	(6) Model
Firm made payments to state officials	-0.58** (0.24)	-0.39 (0.36)	-0.57** (0.24)	-0.23 (0.32)	-0.54** (0.23)	-0.29 (0.62)
Firm uses BA to lobby government	0.21 (0.12)	0.47 (0.35)	0.34 (0.16)	0.01 (0.15)	0.34** (0.13)	0.14 (0.34)
Perception of power quality in 2002	-0.83*** (0.06)	-0.92*** (0.09)	-0.87*** (0.07)	-0.85*** (0.07)	-0.87*** (0.06)	-0.84 (0.10)
Perception of road quality in 2002	-0.03 (0.05)	0.02 (0.06)	-0.04 (0.05)	0.03 (0.09)	-0.04 (0.04)	0.02 (0.13)
Sector fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	430	278	480	228	571	137

Note: States with low tariffs (below the median level of all states) are Andhra Pradesh, Bihar, Haryana, Karnataka, Orissa, and Tamil Nadu. States with high tariffs (above the median level of all states) are Chandigarh, Delhi, Gujarat, Jharkhand, Kerala, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Uttar Pradesh, and West Bengal. Of the states with low tariffs, Orissa and Andhra Pradesh have been more ambitious in their reforms than one would expect based on the agricultural tariffs. Standard errors in parentheses and clustered at the state level. Dependent variable: Change in power quality perceptions : 2002-2005. Model (1): State agricultural tariffs above median. Model (2): State agricultural tariffs below median. Model (3): State agricultural tariffs above mean. Model (4): State agricultural tariffs below mean. Model (5): State agricultural tariffs above lowest quintile. Model (6): State agricultural tariffs below lowest quintile. \*\* $p < 0.05$ , \*\*\* $p < 0.01$ .

To resolve the issue, models 3 and 4 distinguish between states based on the threshold of the mean agricultural tariff. The mean is lower than the median, and so fewer states are characterized as unable to implement. Using this more demanding criterion, in states with high tariffs, the coefficients for past bribes and experience with lobbying through a business associations have the expected signs and are statistically significant. For states with low tariffs, the coefficients have the expected signs but are much smaller and not statistically significant. This is consistent with the idea that implementing reform is more difficult in these states. Finally, models 5 and 6 replicate this exercise using the lowest quintile as the threshold. The results are similar to those from models 3 and 4, also suggesting electricity reform is driving the results.

**Energy Intensity, Generator Ownership, and the Nature of Extortion.** Even within one sector, firms can display varying needs for electricity connections to the electricity grid, which may have an effect on how they perceive the quality of service provision. For example, firms not at all dependent on the state for power, either because they engage in captive generation or produce goods that are not energy intensive, may be less vulnerable to the dictates of predatory government bureaucrats. Similarly, less dependent firms may see decreased incentives for utilizing business associations to lobby their interests for power. We present evidence in the supplementary appendix that for firms more dependent on the public grid, either through connection or in the

amount of power utilized, political vulnerability and the ability to lobby have even stronger effects on perceived power quality after the 2003 reforms. Having to turn to the state for power can make politics matter more for securing consistent access.

Next, we examine firms that engage in the manufacture of goods with varying levels of electricity intensity, coding intensity according to sector and based off of Fredriksson, Vollebergh, and Dijkgraaf (2004). As expected, we find that political vulnerability and lobbying behavior have stronger negative and positive effects, respectively, on power supply for energy intensive firms than for firms where electricity is not as large of an input. We interpret the above findings as additional evidence that politics matters greatly for firms vying for improved access to energy. As expected, the more dependent a firm is on the public sector for either access in general or for large amounts of electricity, political considerations increase in importance.

**Further Robustness Tests.** The supplementary appendix characterizes some additional tests. First, we analyzed only those firms that had made bribes and that had lobbying experience through a business association. Since our two explanatory variables are positively correlated, it was important to verify that (1) bribing firms also benefit from lobbying experience and (2) vice versa. The statistical significance of the results decreases somewhat due to a smaller sample, but the signs and magnitudes of the relevant coefficients are stable.



We also excluded firms that did not even belong to a business association, so as to show that even among members, actual lobbying experience is important. As stated above, business association can be influential even *without* lobbying. This would bias our estimates. Since the business association has no effect on power-quality improvement in the absence of lobbying, however, this alternative logic can be rejected. The evidence suggests that business associations offer benefits to their members through lobbying access and experience in particular. Not all members of business associations benefit, again highlighting the importance of investigating variation across firms in explaining the distributive effects of liberal reform.

We also excluded all firms with unusually large changes in the quality of power. While selecting on the dependent variable in this fashion causes some bias, the changes in power quality for some firms were so high that one may question their realism. We found that excluding these firms, the number of which was small, did not change any of our results. Lastly, we coded whether or not states had engaged in active electricity sector reform prior to the 2003 legislation and ran analysis on subsamples of our data (results in online appendix). Our results are robust to the exclusion of these first-movers, indicating that in places having experimented little with liberalization, politics may be more prominent in postreform competition for public goods. We caution, however, that identifying clear mechanisms is made difficult by the small number of states.

***Determinants of Missingness, Extortion, and Association Membership.*** We examined determinants of missingness to see if there is concern about bias from nonrandom missing values. In predicting missing values for extortion or power quality in the 2005 survey, none of the covariates used in the analysis were statistically significant. Virtually every firm that responded in 2002 and 2005 answered both questions about bribe activity and perceptions of power quality. We also analyzed the determinants of extortion. First, we found a positive association between lobbying and extortion. This is as expected, since lobbying can be a response to extortion by state officials. We have shown above that our results on extortion hold if we exclude lobbying firms. Second, firms that were extorted also had worse power quality in 2002. This is as expected, given the weakness of said firms. This relationship is not an obstacle to hypothesis testing either. Given a negative association between previous power quality and extortion, firms that were forced to bribe should, in the absence of political effects, have seen *more* improvement in their power quality by 2005. We found the

exact opposite, suggesting that any bias understates the negative effect of political vulnerability on reform outcomes.

Lastly, we ran a set of models looking at the determinants of membership among the firms in our sample. Influential associations may selectively accept more powerful firms to improve their lobbying ability. We study possible gatekeeping in the online appendix by looking at the effects of firm size, exporter status, foreign ownership, performance, and state dependence. Only firm age and the education of managers significantly predict membership association. Firms led by more experienced managers may recognize the potential benefits of collective action. However, we find no other systematic evidence that larger and more powerful firms have a greater ability to utilize these associations.

## Conclusion

Economic reforms are politically controversial because of skewed costs and benefits. Even if the government is committed to liberalization, it can do so in several ways, with different distributional implications. While there is a large body of literature on the interests of different social groups and sectors (Fernandez and Rodrik 1991; Hellman 1998; Przeworski 1991; Rodrik 1996; Roland 2002; Schamis 1999), scholars have devoted less attention to politics within sectors. Given how heterogeneous firms in the same sector can be, it is important to analyze the distributional consequences of liberalization within sectors.

We have argued that when the government liberalizes policy, the role of politics as a determinant of firm success is *not* diminished. Initially, it seems plausible that liberalization diminishes the importance of politics because state intervention decreases, as several authors have proposed (Krueger 1974; Shleifer and Vishny 1994). We have claimed this intuition is mostly wrong. The government's flexibility in the implementation of liberal policies means that, conditional on liberalization, there is a lot of room for political maneuvering. Politically influential firms can secure better outcomes during and after liberalization. Far from removing politics from the equation, liberalization simply changes the form and nature of politics.

Empirically, we have exploited data on the effect of India's 2003 electricity reform on the quality of power supply for more than 1,000 manufacturing firms across all major Indian states and dozens of

industries. Within each industry, a history of having to pay bribes to the state predicts less improvement in the quality of power supply. Similarly, previous experience with lobbying through a business association has strong positive effects on the improvement in the quality of power supply. These findings are consistent with the notion that political vulnerability to extortion by state officials prevents a firm from capitalizing on opportunities provided by liberalization, whereas lobbying experience amplifies such opportunities.

Liberalizing reforms thus do not occur in a political vacuum. Preexisting relationships between firms and the state can strongly influence who wins and who loses from new economic policies. By looking at the downstream effects of infrastructural reform, this article has identified a clear obstacle, vulnerability to bureaucratic and political predation, that prevents the benefits of liberalization from being passed down evenly to all firms within a given sector. Reducing the role of the state in public goods provision may not in itself eliminate the deleterious consequences of business capture.

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