

Incumbents and protectionism: The political economy of foreign entry liberalization[☆]

Anusha Chari^{a,*}, Nandini Gupta^b

^a*Department of Economics, University of Michigan, 611 Tappan Street, Ann Arbor, MI 48109, USA*

^b*Indiana University, Kelley School of Business, 1309 East 10th Street, Bloomington, IN 47405, USA*

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Abstract

This paper investigates the influence of incumbent firms on the decision to allow foreign direct investment into an industry. Using data from India's economic reforms, the results show that firms in concentrated industries are more successful at preventing foreign entry, state-owned firms are more successful at stopping foreign entry than privately-owned firms, and profitable state-owned firms are more successful at stopping foreign entry than unprofitable state-owned firms. The pattern of foreign entry liberalization supports the private interest view of policy implementation and suggests that it may be necessary to reduce the influence of state-owned firms to optimally enact reforms.

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1. Introduction

Liberalizing international capital flows can increase economic growth (Bekaert, Harvey, and Lundblad, 2005). Yet, many countries restrict inflows of foreign investment. Recent evidence suggests that incumbent firms that receive preferential treatment may oppose policy changes that threaten their favored status.¹ In particular, Rajan and Zingales (2003a, 2003b) and Stulz (2005) argue that entrenched incumbent firms have an

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*Corresponding author.

E-mail address: achari@umich.edu (A. Chari).

¹The evidence suggests that (1) banking deregulation is delayed in U.S. states where incumbent banks have the most to lose from entry (Kroszner and Strahan, 1999); (2) entrenched firms lobby to restrict access to credit after a crisis, forcing poorer entrepreneurs to exit

incentive to oppose the liberalization of international capital flows if liberalization limits their ability to extract monopoly rents. This paper investigates incumbent firm influence on the decision to liberalize foreign direct investment.

Specifically, we examine the Indian government's decision to selectively reduce foreign direct investment barriers in a subset of industries after a balance-of-payments crisis in 1991. The corporate sector in India is characterized by the concentrated control of assets by state- and family-owned firms, much like in the rest of the world (La Porta, Lopez de Silanes, Shleifer, and Vishny, 1999). We adopt a political economy approach to ask the following questions: Did incumbent firms influence the government's decision to liberalize foreign direct investment in some industries and not others? If so, which incumbent firms had the most to lose from foreign entry and the ability to oppose it?

To investigate these issues, we use a rich firm-level data set that provides detailed balance sheet and ownership information for more than 2,100 firms that account for over 70% of India's industrial output. The data are classified into state-owned, group-owned, and privately owned firms. We investigate whether pre-liberalization characteristics such as industry structure and the ownership of incumbent firms can explain the government's decision to selectively open some industries to foreign entry.

The private interest and public interest views of policymaking suggest possible explanations for the government's decision to liberalize some industries and not others. The private interest view characterizes the policy process as one in which special interest groups lobby the government to influence policy decisions in their favor, which may result in non-welfare-maximizing outcomes (Olson, 1965; Peltzman, 1976; Becker, 1983). The public interest view assumes that governments enact welfare-maximizing policy changes to achieve socially efficient outcomes and correct market failures, without regard for private interests (Joskow and Noll, 1981).

Using data on industry structure and firm characteristics, we investigate whether the government randomly liberalized industries, or whether the private or the public interest views better explain the pattern of liberalization. For instance, the private interest view holds that the probability of foreign entry liberalization will be inversely related to industry concentration. Incumbent firms in these industries have a greater ability to lobby the government and prevent policy changes, such as foreign entry, that could adversely affect them (Olson, 1965; Stigler, 1971; Peltzman, 1976). Further, incumbent firms in profitable concentrated industries have a greater incentive to prevent entry in order to protect their monopoly profits (Stigler, 1971). In contrast, from a public interest perspective the government would liberalize entry to reduce deadweight losses in concentrated industries that earn monopoly profits (Pigou, 1938).

The government also may be more receptive to the interests of particular incumbents, such as state-owned firms that occupy a prominent position in many economies around the world (Megginson, 2005). Indian state-owned firms account for over 40% of the total capital stock in the economy (Gupta, 2005). Politicians obtain private benefits from state-owned firms, such as the ability to hire surplus workers (Shleifer and Vishny, 1994). Moreover, the earnings of state-owned firms directly accrue to the government. Therefore, policy makers may have an incentive to protect industries with large or profitable state-owned firms from competition.

Our main results are as follows. First, consistent with the private interest view, the likelihood of foreign entry liberalization in an industry is inversely related to its concentration. On average, the probability of liberalization decreases by 27% for a one-standard deviation increase in the Herfindahl index from its sample mean of 0.45.² Second, consistent with the hypothesis that firms in concentrated industries have an incentive to protect their monopoly profits, the likelihood of foreign entry liberalization is significantly lower for profitable, concentrated industries. Third, regional variation in firm location reveals a negative and significant relationship between geographic concentration and the likelihood of foreign entry liberalization.

Fourth, the results show that industries with a sizable state-owned firm presence are significantly less likely to be liberalized. Whereas industries with state-owned monopolies face a 14% chance of being liberalized,

(footnote continued)

(Feijen and Perotti, 2005); and (3) post-1500, Western European countries with monarchies opposed free entry in profitable industries (Acemoglu, Johnson, and Robinson, 2005).

²The Herfindahl index is an indicator of the degree of competition among firms in an industry. It is defined as the sum of the squares of the market shares of each firm in an industry. The value of the Herfindahl index can range from zero in perfectly competitive industries to one in single-producer monopolies.

industries with no state-owned firms face a 52% probability, making them nearly four times as likely to be liberalized. Also consistent with the private interest hypothesis, the evidence suggests that the government is more likely to protect profitable state-owned firms. The results are robust to industry size, concentration, and workforce.

Four methodological issues may be raised in the context of our empirical analysis. First, the pattern of liberalization may reflect underlying technologies that determine scale rather than barriers to entry created by incumbent firm influence. We examine the difference between Indian and US concentration in the same industries where US concentration captures the “natural” level of concentration in an industry and find that the likelihood of liberalization is negatively correlated with our measure of “excess concentration.” Consistent with [Rajan and Zingales \(2003a, 2003b\)](#), this result suggests that past industrial policies in India created powerful incumbent firms that used their market power to oppose financial market reforms. Second, while industry concentration may proxy for natural monopolies or industries of strategic importance, we find that concentration continues to be significantly and negatively correlated with the probability of liberalization after controlling for industries in these two categories.

Third, industry concentration may proxy for the political connections of certain incumbents like family-owned firms. We find that industry concentration continues to be significantly and negatively related to the probability of liberalization with the inclusion of controls for the stake of privately owned and state-owned firms in an industry, which are proxies for the political influence of these firms. A limitation of this approach is that there may be heterogeneity in the influence of private firms arising out of family connections that are not captured by broad ownership categories.

Fourth, our methodology is related to the literature on the political economy of trade, where politically organized groups lobby politicians for protection as in [Grossman and Helpman \(1994\)](#). For instance, [Goldberg and Maggi \(1999\)](#) and [Bandhyopadhyay and Gawande \(2000\)](#) find that tariffs are higher in industries that are represented by organized lobbies. However, as [Gawande and Krishna \(2004\)](#) point out, one concern in this literature is that industry characteristics are an endogenous outcome of differences in tariff barriers across industries. Our data have the advantage that before 1991, draconian restrictions on foreign entry were uniformly applied across all industries so that foreign investment inflows were negligible. In the four years preceding liberalization, foreign investment inflows accounted for less than 0.3% of gross capital formation on average in India ([World Bank, 1991](#)). We also estimate an instrumental variable specification using industry concentration in the United States as an instrumental variable for the Herfindahl index in India to capture influence arising out of market power rather than past protection. Industry concentration remains inversely correlated with the probability of liberalization.

Our findings contribute to the literature that documents the relation between financial constraints and product market competition ([Cetorelli and Strahan, 2006](#)) and between financial market development and economic growth ([Rajan and Zingales, 1998](#); [Bekaert, Harvey, and Lundblad, 2005](#)). Given the widely documented inefficiencies of state-owned enterprises ([Megginson, 2005](#)) and the deadweight loss associated with industry concentration, selective entry liberalization to protect these incumbent firms may inhibit economic growth. Because entrenched state-owned firms are likely to hinder financial market reforms, a policy implication of our results is that it may be necessary to reduce the influence of these firms, for example, through privatization, to optimally implement reforms.

The remainder of the paper is organized as follows. Section 2 discusses the economic reforms and industrial structure in India. Section 3 provides summary statistics and describes our methodology. Section 4 describes the data. Section 5 discusses the relation between industry and firm characteristics, and the likelihood of foreign direct investment liberalization. Section 6 provides additional robustness checks, and Section 7 concludes.

2. Reforms and industrial structure

2.1. Liberalizing foreign entry in India

In response to a balance-of-payments crisis in 1991, India undertook sweeping economic reforms. A key reform involved reducing restrictions on foreign direct investment in a subset of industries. Specifically,

according to the Industrial Policy Resolution of 1991, automatic approval was granted for foreign direct investment of up to 51% in 46 of 96 three-digit industrial categories (Office of the Economic Advisor, 2001). In the remaining 50 industries, the federal government continued to require that foreign investors obtain approval for entry. Table A1 in the Appendix A provides a list of liberalized industries.

Before 1991, ownership and industry concentration patterns in India were an outcome of state-led industrialization policies rather than market forces. A chronology of industrial policies since India's independence shows that these policies restricted the participation of private and foreign firms in the economy (Appendix A, Table A2). For example, the Industrial Policy Resolution of 1956 reserved certain industries for state-owned firms, prohibiting the entry of any private firms. Until 1991, government approval was required for foreign direct investment in all industries, severely curtailing FDI flows.

To establish that barriers to entry rather than technological factors that determine scale explain the pattern of industrial concentration in India before 1991, we compare the pre-reform industrial structure in India with that of the United States. As an economy with more developed financial markets and fewer regulations than most countries, US data offer a benchmark of industry characteristics that represent underlying technologies rather than regulatory constraints, as in Rajan and Zingales (1998). Panel A of Table 1 shows that in 1990, a year before the reforms, the average Herfindahl index in India was significantly higher (40%) than in the United States (24%) for the same three-digit SIC industries. From Panel B we note that industry concentration in Indian industries that remained protected was significantly higher than that in their US counterparts (54% versus 22%), suggesting that entrenched incumbent firms in India may have successfully opposed foreign entry in these industries.

Firms in profitable concentrated industries may have a particular incentive to oppose foreign entry liberalization. First, around the world, foreign investment and industry concentration are positively correlated (Caves, 1996), and multinational enterprises (MNEs) tend to compete in industries with high seller

Table 1

Comparing concentration ratios in India and the U.S. before foreign direct investment liberalization

Notes: This table compares Herfindahl indices in India with Herfindahl indices of the same industries in the United States in 1990. Variable definitions are provided in Table A3. The first panel shows within-country summary statistics across the same 3-digit industry categories for India and the United States. The second panel compares mean Herfindahl indices in industries that liberalized foreign entry in India in 1991 and those that remained protected with the same industries in the United States. Standard deviations are in parentheses. The third panel describes the correlation between *Firm profits* and the *Concentration ratio* across industrial categories. *** denotes statistical significance at the 1% level.

<i>Panel A: Comparing industry concentration in India and U.S.</i>			
	India	U.S.	Equality of means <i>t</i> -test
Herfindahl index	0.399 (0.034)	0.236 (0.024)	4.338***
Minimum	0.025	0.010	
Maximum	1	1	
<i>Number of industries</i>	75	75	
<i>Panel B: Comparing industry concentration across protected and liberalized industries</i>			
	Herfindahl index		
	India	U.S.	Equality of means <i>t</i> -test
Protected industries	0.539 (0.047)	0.216 (0.035)	6.047***
Liberalized industries	0.255 (0.034)	0.257 (0.031)	-0.041
			<i>Number of industries</i>
			38
			37
<i>Panel C: Correlation between industry concentration and p+AIprofitability</i>			
	Correlation coefficient		<i>p</i> -Value
Full sample	0.061		0.553
Protected industries	0.589		0.000***
Liberalized industries	-0.687		0.000***

concentration (Caves, 1971). Second, MNEs have deeper pockets and greater access to superior technology, which allow them to overcome entry barriers in concentrated industries (Aitken and Harrison, 1999; Caves, 1996). Third, Caves (1996) shows that entry by MNEs can reduce the market share of domestic incumbents, which Aitken and Harrison (1999) refer to as the “market stealing” effect. Moreover, foreign entry can lead to the exit of domestic firms because of increased competition in product and labor markets (Caves, 1996). Lastly, the negative impact of FDI on incumbent firm profits and market share explains why incumbents spend more profits to forestall entry by foreign rather than domestic firms (Geroski, 1991).

Describing the politics of FDI liberalization in the Indian print media industry, a newspaper article states, “The monopoly interests of the bigger Indian publishing houses now stand threatened...trying their best to thwart the entry of bigger foreign players, were the biggies of the Indian publishing world, each with its carefully-nurtured turf to protect” (“Media Giants See Dollar Signs in India,” *Asia Times Online*, May 6, 2004). Thus, foreign multinationals posed a greater threat to Indian incumbents in profitable concentrated industries than potential entrants from the over regulated and capital-starved domestic private sector.

Since foreign firms were granted automatic approval of up to 51% ownership share, the primary mode of foreign entry post-liberalization was in the form of joint ventures with domestic partners. As a result there was considerable heterogeneity in support of liberalization among incumbent firms. For instance, state-owned firms may have opposed foreign entry since MNEs were unlikely to seek out these firms as the local partner in joint venture deals. In contrast, a subset of private firms supported liberalization because of the opportunity to form joint ventures—80% of the joint venture deals in India with foreign firms had a domestic private partner (SDC Thomson Database).³

However, other private firms opposed liberalization if they viewed multinational companies as direct competitors. A newspaper article describes opposition from an incumbent: “Kishore Biyani [chief executive of the largest retailer in India] argues that the retail sector...should not be given away to foreign players while it is too young to compete on a level playing field...He lacks the capital to build even average-sized Wal-Mart stores of 200,000 square feet—four times larger than his flagship Big Bazaar” (“Wal-Mart Assault,” *India Daily*, July 24, 2005).

Kochanek (1996a, 1996b) explains that the heterogeneity in support of reforms extended to family-owned business groups. Tripathi (2004) describes how an organization of business groups known as the “Bombay Club” vigorously lobbied for greater protection against MNEs. In contrast, the Tata and Birla groups were the domestic partner in 45 of 652 joint venture deals with foreign firms.

The 1991 reforms included the removal of barriers to domestic entry such as delicensing and the dereservation of sectors exclusively reserved for state-owned firms. By the 1980s it was widely recognized that the licensing system had failed and delicensing ended the red-tape and corruption associated with the lengthy bureaucratic approval process (Ahluwalia, 2005). Most domestic incumbents did not oppose these reforms (Tripathi, 2004). For example, the Bombay Club, which opposed foreign entry liberalization, welcomed the end of the licensing and reservation policies because it allowed them access to sectors previously kept off-limits to private firms. Finally, it was not politically feasible for state-owned firms to oppose dereservation because of public disillusionment with the dismal performance of these firms (Tripathi, 2004).

2.2. The lobbying process in India

A prominent example of an industry that lobbied successfully to keep out foreign competition is the print media, which is highly concentrated with a sample concentration ratio of 0.89. A fierce campaign was waged against foreign investment by major national newspapers and news agency employees’ organizations who urged the government to ban foreign entry in this sector. Their efforts included campaigning ministers and formal testimony in parliament. A memorandum to the Prime Minister from industry representatives stated,

³Evidence suggests that the Chinese government also protects state-owned firms from foreign competition (Branstetter and Feenstra, 2002).

“The poison of FDI must never be allowed to pollute the Indian press” (“Major media employees’ forums oppose FDI,” *The Hindu*, November 27, 2004). Ramachandra (1999) documents lobbying against foreign entry liberalization in other industries that remained protected, including the petrochemicals and steel industries, which are highly concentrated and dominated by state-owned firms.

State-owned firms are controlled by the government and therefore have a direct influence on the policymaking process. Khanna and Palepu (2004) argue that Indian business groups are also politically connected conglomerates that lobby the government to influence policy like other business groups around the world, as in Fisman (1998) and Morck, Wolfenzon, and Yeung (2004). Given that corporate lobbying contributions are illegal, legal channels for lobbying by private industry include statements in the media, testimony and memoranda to parliament, and the use of industry associations as lobbying vehicles. The three main industry associations that lobby the government on behalf of their members are the Federation of Indian Chambers of Industry and Commerce (FICCI), the Confederation of Indian Industry (CII), and the National Association of Software and Service Companies (NASSCOM). FICCI represents the traditional business groups, whereas CII and NASSCOM represent the newer technology and service sectors that favor foreign entry liberalization and were influential in the introduction of the 1991 economic reforms (Pedersen, 2000). CII is a prominent participant in the debate on the economic reforms (Pedersen, 2000), and the Indian government has been receptive to the organization’s advice due to its close connections to the Ministry of Finance (Kochanek, 1996a, 1996b).

3. Hypotheses and evidence

3.1. Descriptive statistics

Table 2 presents results from tests comparing liberalized industries with those in which foreign entry barriers are retained, revealing some distinct patterns in the data. On several counts, the liberalization of foreign entry appears to be anything but random. First, liberalized industries are significantly less concentrated with an average Herfindahl Index of 29% compared to protected industries, which have an average Herfindahl index of 59% (Table 2, Panel A). Second, Table 2 shows that firm profits are also significantly lower on average in liberalized industries (8.4%) compared to protected industries (27.1%). Third, concentration and profitability are positively and significantly correlated in protected industries (Table 1, Panel C).⁴ Taken together, these facts suggest that protected industries have fewer and more profitable firms than liberalized industries.

Looking across ownership categories in Table 2 reveals that state-owned firms in protected industries have significantly higher market share and are also more profitable than state-owned firms in liberalized industries. If the removal of barriers to foreign entry was not random, what factors drove the government to selectively liberalize some industries and not others? The private and public interest views of policymaking offer possible explanations.

The private interest view described by Olson (1965), Stigler (1971), Peltzman (1976, 1989), and Becker (1983) characterizes the policy process as one of interest group competition where compact, well-organized special interest groups lobby the government to influence policy decisions in their favor. The public interest view assumes that governments enact policy changes to achieve socially efficient outcomes and correct market failures without consideration for private interests.

In the subsections that follow we develop testable hypotheses based on the public and private interest views about industry and firm characteristics that may explain the pattern of selective liberalization. The null hypothesis is that the industry selection was random—industries that were liberalized do not differ in any systematic way from those that were not. We begin with the role of industry concentration.

⁴The results in Table 1, Panel C suggest that concentration and profitability are negatively correlated in liberalized industries. This is because more profitable liberalized industries are less concentrated than less profitable liberalized industries. Specifically, the Herfindahl index for liberalized industries with above the sample median profitability is equal to 0.22 and the Herfindahl index for liberalized industries with below the median profitability is equal to 0.33, with the difference being significant at the 10% level.

Table 2

Comparing industry and firm characteristics across protected and liberalized industries

Notes: This table reports mean values of industry and firm characteristics in protected and liberalized industries from 1988–1990. Variable definitions are provided in Table A3. Standard deviations of means are in parentheses. *t*-Statistics are for one-sided *t*-test of equality of means. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

Variable	(1) All industries	(2) Protected industries	(3) Liberalized industries	(2)–(3) Equality of means <i>t</i> -test (<i>p</i> -value)
<i>Panel A: Full sample</i>				
Herfindahl index	0.450 (0.319)	0.596 (0.309)	0.290 (0.248)	5.326***
Herfindahl index of four largest sales firms	0.444 (0.324)	0.594 (0.311)	0.282 (0.253)	5.360***
Concentration ratio	0.845 (0.208)	0.931 (0.144)	0.751 (0.228)	4.670***
Asset concentration	0.856 (0.193)	0.944 (0.106)	0.760 (0.220)	5.276***
Firm profits	0.182 (0.488)	0.271 (0.653)	0.084 (0.141)	1.901**
Profit of four largest sales firms	0.209 (0.606)	0.292 (0.833)	0.118 (0.064)	1.397*
<i>Panel B: State-owned firms</i>				
SOE sales share	0.349 (0.397)	0.481 (0.424)	0.205 (0.310)	3.610***
SOE asset share	0.384 (0.407)	0.521 (0.424)	0.234 (0.333)	3.672***
SOE firm profits	0.284 (2.131)	0.575 (2.753)	−0.087 (0.740)	1.257*
SOE average product	0.156 (0.638)	0.249 (0.838)	0.032 (0.026)	1.185
SOE wage share	0.005 (0.003)	0.514 (0.417)	0.236 (0.322)	3.634***
SOE labor share	0.751 (0.386)	0.876 (0.314)	0.613 (0.416)	2.759***
SOE wages per worker	0.005 (0.003)	0.006 (0.003)	0.004 (0.001)	1.907**
Private sales share	0.651 (0.397)	0.519 (0.424)	0.795 (0.310)	−3.610***
Private asset share	0.616 (0.407)	0.479 (0.424)	0.766 (.333)	−3.672***
Private firm profits	0.165 (.198)	0.222 (.263)	0.112 (.082)	2.642***
Private average product	0.241 (.900)	0.096 (.068)	0.299 (1.067)	−0.531
Private wage share	0.619 (0.398)	0.486 (0.417)	0.764 (0.322)	−3.634***
Private labor share	0.249 (0.386)	0.124 (0.314)	0.387 (0.416)	−2.759***
Private wages per worker	0.009 (0.019)	0.005 (0.002)	0.010 (0.023)	−0.637

3.2. The role of industry concentration

Collective action theory predicts that the ability of specific industries to resist foreign entry liberalization should be positively related to industry concentration. Incumbent firms in concentrated industries have a greater ability to organize and oppose policy changes that could adversely affect them as in Olson (1965),

Stigler (1971), and Peltzman (1976). Under this view, the likelihood of effective coordination in an industry increases with a decrease in the number of firms. If the private interest view holds, then foreign entry barriers are more likely to be retained in concentrated industries.

On the other hand, concentrated industries are associated with greater deadweight loss (higher prices and lower output) compared with more competitive industries. Therefore, a welfare-maximizing government would enact policies to promote competition by removing entry barriers in concentrated industries. Therefore, if the data are consistent with the public interest view, foreign entry barriers are less likely to be retained in concentrated industries.

While industry concentration measures the *ability* of incumbent Indian firms to organize, what *incentive* did these firms have to oppose foreign entry? We explore the role of industry profitability next.

3.3. *The role of industry profitability*

Neoclassical theory predicts that firms in imperfectly competitive industries are more likely to earn supernormal or monopoly profits (Tirole, 1988). Applied to the Indian context, under the private interest view firms in profitable concentrated industries have an incentive to lobby against foreign entry to protect monopoly profits (Stigler, 1971). Kroszner and Strahan (1999) argue that cash-rich firms in profitable industries have a greater ability to successfully lobby the government relative to cash-poor firms in declining industries. Therefore, if the private interest view holds, profitable concentrated industries are less likely to be liberalized. The public interest view predicts the opposite—a welfare-maximizing government would liberalize imperfectly competitive industries that earn supernormal or monopoly profits.

To investigate whether the government was more receptive to the interests of certain groups of incumbent firms we turn to the subject of state ownership.

3.4. *The role of firm ownership: state-owned firms*

Like many countries around the world, India has a large state-owned sector. Backed by government support, state-owned firms expanded into many industries, relegating the private sector to a secondary role in the economy. In the case of state-owned firms, the special interests include politicians and bureaucrats who have a stake in these firms.

Since politicians directly control state-owned firms, they are in a position to extract many private benefits such as securing employment for their supporters or expropriating funds from these firms as suggested by Boycko, Shleifer, and Vishny (1996) and Shleifer and Vishny (1998). Liberalization would reduce these benefits if foreign entry has an adverse impact on the performance of state-owned firms. For example, government revenues would fall if foreign entry reduces state-owned firm revenues. Indian state-owned firms also tend to be overstaffed, and their employees belong to powerful labor unions. Foreign entry could result in layoffs or lower wages for these workers. State-owned firms were also far less likely to benefit from foreign entry compared to private firms because foreign firms rarely formed joint-venture partnerships with state-owned firms. From a private interest perspective, both politicians and state-owned firm employees have an incentive to oppose liberalization. The public interest perspective does not offer a straightforward prediction about why a welfare-maximizing government would take into account the ownership of incumbent firms. While state-owned firms may fulfill welfare objectives by hiring surplus workers and providing benefits, these objectives may be more effectively pursued through social programs rather than by protecting inefficient firms.

3.5. *The role of industry location*

While the liberalization policy was enacted by the federal government, these politicians are likely to respond to the interests of the electorate in their home states because of the potential electoral impact of these policies. Anecdotal evidence suggests that electoral support at the local level mattered to the policymakers at the federal level. “The PM [Prime Minister] was highly sensitive to the impact of reform on India’s voters. [Prime Minister] Rao felt that an electoral setback even in one state could be interpreted as a verdict against the economic reforms nationwide” (Tharoor, 1997, p. 173).

Politicians seeking reelection also may have a greater incentive to preserve private benefits from state-owned firms in their home states, such as securing employment for supporters. For example, Dinc and Gupta (2007) find that Indian state-owned firms are less likely to be privatized if they are located in a state where the governing party faces more electoral competition from the opposition, and no state-owned firm located in the home state of the Cabinet Minister in charge is ever privatized.

Industries that are geographically concentrated may have a greater ability to lobby politicians from their home state and successfully oppose policy changes such as foreign entry that could adversely affect them. To test this hypothesis, we investigate whether the relative size, concentration, and employment share of an industry in a state, and the employment, sales, and asset shares of state-owned firms in that state, have an effect on the probability of liberalization of that industry.

4. The data

We use firm-level data from the Prowess database collected by the Centre for Monitoring the Indian Economy from company balance sheets and income statements. Prowess covers both publicly listed and unlisted firms from a wide cross-section of manufacturing, services, utilities, and financial industries. About one-third of the firms in Prowess are publicly listed firms. The companies covered account for more than 70% of industrial output, 75% of corporate taxes, and more than 95% of excise taxes collected by the Government of India (Centre for Monitoring the Indian Economy). Prowess covers firms in the organized sector, which refers to registered companies that submit financial statements.⁵

The data provide information on a range of variables such as sales, profitability, employment, and assets for 2,187 firms. Since firms are not required to report employment in their annual reports, we observe employment data for 241 firms. To avoid attrition bias, the estimations do not require that the data be balanced. For all the variables used in the estimations we construct averages for the three fiscal years, 1988–1990, which precede the liberalization of foreign entry in 1991. Therefore, these data do not reflect the consequences of any of the economic reforms undertaken in 1991. The variables used in this analysis are described in Appendix A Table A3.

The main advantage of firm-level data is that detailed balance sheet and ownership information permit an investigation of whether the presence of certain types of incumbent firms in an industry affects the probability of liberalization. In contrast, industry-level databases usually do not provide information about sales, assets, profits, and employment by different ownership categories. The firms in the data belong to two main ownership categories: state-owned firms and private firms. Private firms include family-owned business groups and unaffiliated private firms.

Another advantage of using India as the empirical context is the considerable regional variation in industrial, demographic, and political characteristics across the different Indian states. Using data on firm location, we look at the effect of geographic industrial concentration and state-ownership stake on the probability of liberalization. Prowess has financial data on 536 industry-state observations. Industry location and geographic concentration depends on proximity to natural resources, product markets, and infrastructure. For example, firms in the basic chemicals industry are located in 19 different states, whereas the mining of lignite is concentrated in the state of Gujarat, close to the ore deposits.

The *Industrial Policy Resolution of 1991* (Office of the Economic Advisor, 2001) provides information about the list of industries in which the government liberalized foreign entry. The firms in the sample belong to 96 three-digit industrial categories, of which foreign entry restrictions were reduced in 46 industries. The Indian National Industrial Classification (NIC) (1998) system is used to classify firms in the Prowess data set into industries. The data include firms from a wide range of industries including mining, basic manufacturing, financial and real estate services, and energy distribution.

⁵According to the government, “The organised sector comprises enterprises for which the statistics are available from the budget documents or reports etc. On the other hand the unorganised sector refers to those enterprises whose activities or collection of data is not regulated under any legal provision or do not maintain any regular accounts” (Informal Sector in India: Approaches for Social Security, Government of India, page 2).

Table 3

Industry concentration and ownership composition varies across industries

Notes: This table reports mean values of variables measuring industry concentration and the composition of ownership categories across industries from 1988 to 1990. For exposition we report the average values for two-digit industrial categories, whereas in the regression analysis we use three-digit categories. The four-firm *Concentration ratio* is the ratio of the sum of sale revenues of the four firms with highest sale revenues in each industry to aggregate sales in each three-digit industrial category. *Herfindahl index* is the sum of the squares of the market share of all firms in an industry. *Asset concentration* is the sum of the assets of the four firms with largest asset size in each industry divided by the sum of assets of all firms in that industry. *SOE* refers to state-owned firms and *Private* refers to firms owned by Indian business groups and unaffiliated private firms. *Sales share* is the sum of *Sales* across firms in each ownership category in an industry divided by aggregate sales in that industry. *Firm profits* is the average ratio of *EBITDA* to *Sales* averaged across firms in each ownership category in each industry. Standard deviations are reported in parentheses.

Industry code	Concentration ratio	Herfindahl index	Asset concentration	SOE sales share	Private sales share	SOE firm profits	Private firm profits	Number of 3-digit industries	Number of SOEs	Number of private Firms
100–199	0.878 (0.237)	0.489 (0.296)	0.878 (0.223)	0.316 (0.409)	0.684 (0.409)	1.162 (4.332)	0.127 (0.210)	22	46	357
200–299	0.668 (0.237)	0.264 (0.273)	0.696 (0.221)	0.250 (0.326)	0.750 (0.326)	0.071 (0.138)	0.130 (0.042)	21	85	774
300–399	0.874 (0.152)	0.385 (0.266)	0.876 (0.152)	0.275 (0.397)	0.725 (0.397)	–0.260 (1.095)	0.095 (0.100)	21	35	212
400–499	0.766 (0.162)	0.236 (0.062)	0.847 (0.159)	0.446 (0.186)	0.554 (0.186)	0.126 (0.314)	0.095 (0.148)	3	21	44
500–599	0.865 (0.154)	0.462 (0.357)	0.888 (0.125)	0.261 (0.343)	0.739 (0.343)	0.052 (0.087)	0.154 (0.118)	9	30	94
600–699	0.934 (0.103)	0.541 (0.282)	0.938 (0.089)	0.600 (0.400)	0.400 (0.400)	0.365 (0.282)	0.502 (0.335)	9	51	83
700–799	0.988 (0.027)	0.785 (0.295)	0.980 (0.043)	0.578 (0.494)	0.422 (0.494)	–0.021 (0.183)	0.191 (0.251)	8	10	25
800–999	1.000 (0.000)	0.919 (0.140)	1.000 (0.000)	0.598 (0.528)	0.402 (0.528)	0.234 (0.133)	0.289 (0.056)	3	2	2

The Prowess database provides four- and five-digit industry classifications for most firms. However, because the liberalization policy was enacted at the three-digit level, the explanatory variables such as industry concentration are computed at the three-digit level. As a robustness check we also estimate regressions using concentration at the four-digit industry level.

Table 3 reports average values of the concentration measures and the stakes of the two ownership groups (state-owned firms and private firms) across industrial categories. For expositional purposes, the table collapses the three-digit industrial categories used in the empirical analysis into two-digit industrial categories. The regression analysis employs the three-digit classification. From Table 3 note that the Herfindahl index and the proportion of output produced by state-owned firms varies across the different industrial categories. The cross-sectional variation in industry concentration and the market share of different ownership categories allow us to identify the relative effects of concentration and ownership.

As a robustness check, we control for the effect of foreign trade liberalization on the decision to open up industries to foreign entry. Data on exports and imports at the 3-digit industry level are obtained from the Ministry of Commerce, Government of India. Tariff barriers measuring changes in tariffs between 1986–1990 and 1991–1995 are from Das (2003) and are based on: (1) Customs Tariff Working Schedule, Central Excise and Customs, Government of India and (2) Input–Output Transaction Table: 1983–1984 and 1989–1990, Central Statistical Organization, Government of India.

Lastly, we use SDC Thomson's Joint Ventures database to calculate the number of joint ventures involving domestic incumbents with foreign firms in the five years following liberalization. The names of the Indian partners in the SDC database are used to determine the number of state- and privately owned Indian partner firms in foreign joint ventures.

4.1. Coverage in Prowess

Our measures of industrial structure, such as the Herfindahl index and concentration ratios, rely on firm-level data. It is therefore important to investigate the proportion of industrial activity in the economy covered by Prowess.

To do this we compare the Prowess data with the Annual Survey of Industries (ASI) conducted by the Government of India. The ASI is an annual census collected on a sampling basis of factories employing 100 or more workers. Although the overlap in the list of industries covered by the two data sets is not perfect, the ASI data nevertheless provide a useful cross-industry benchmark for the coverage in Prowess. For instance, the ASI data focus primarily on the manufacturing sector, whereas Prowess covers several additional service sectors including defense, restaurants, hotels, and computer services. We find that in 41 of the 51 three-digit industries covered by both databases, total industry sales in Prowess is on average 77% of the value of total sales for the same industry in the ASI.

Examining the implication of the coverage in Prowess relative to the ASI, we find that eight of the ten industries with low coverage in Prowess liberalized foreign entry. Low coverage refers to industries in which the Prowess data cover less than 10% of ASI output which means that, in these industries, actual industrial output is larger than that recorded in Prowess. Comparing the two data sources, Veermani (2001) finds that industry concentration using Prowess data is higher in industries with low coverage in Prowess, relative to the same industries in the ASI. Since the concentration measures using Prowess are higher than actual industry concentration in these industries, this would bias us against finding a negative correlation between concentration and the probability of liberalization.

We compare industry concentration in India with that in the United States using Compustat data on US firms. Although Compustat is restricted to publicly listed firms in the United States, the advantage is that disclosure requirements require that the publicly available financial data for listed firms be comprehensive. Similarly, Prowess reports data on firms in the organized sector in India, which are governed by regulations and tax laws that require comprehensive financial information. Whereas Compustat excludes private firms in the United States, Prowess excludes firms in the unorganized sector. The main difference in the types of firms covered in Compustat and Prowess is that there are few state-owned firms in the United States.

5. Results

5.1. Do concentrated industries influence the pattern of foreign entry liberalization?

This section addresses the following question: Does the strength of incumbents measured by industry concentration affect the probability that barriers to foreign direct investment will be removed in an industry? We begin with the following probit specification to investigate whether the pattern of industry concentration across liberalized and protected sectors is more consistent with the private or public interest views:

$$Pr(\text{Entry Liberalization}_j = 1) = \Phi(\alpha_0 + \alpha_1 \text{Concentration}_j + \alpha_2 X_j + \varepsilon_j), \quad (1)$$

where Φ represents the standard normal cumulative distribution, j indicates the industry, and X_j represents a matrix of firm- and industry-level characteristics that include industry sales, wages, and measures of openness to trade.

The Herfindahl index, calculated as the sum of the squares of the market shares of the firms in an industry, provides a proxy for industry concentration (Concentration_j). All the specifications correct for heteroskedasticity using the Huber-White estimator of variance, and standard errors are corrected for clustering at the three-digit industry level. Note that we report the marginal probit coefficients and standard errors of the coefficients from the probit regression throughout.

Consistent with the private interest hypothesis, the results reported in Table 4 suggest that the government is significantly less likely to remove foreign entry barriers in concentrated industries. This result is robust to a wide range of industry characteristics including size, profitability, productivity, and employment measures. From the specification reported in column (1) we estimate that the probability of entry liberalization decreases by 27% (from 49% to 22%) for a one-standard deviation increase in the Herfindahl index from the sample

Table 4
Does industry concentration affect the probability of foreign entry liberalization?

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
					Profits < median profit	Profits > median profit				
Herfindahl index	−1.026*** (0.304)	−1.294*** (0.344)	−1.607*** (0.490)	−1.175*** (0.339)	−0.660* (0.365)	−1.505*** (0.372)	−1.500*** (0.494)	−1.625*** (0.492)	−1.394*** (0.479)	−1.184*** (0.344)
Profit of four largest firms		−0.589* (0.344)	−0.857** (0.375)	−0.893* (0.483)			−0.838** (0.373)	−0.648* (0.394)	−0.753** (0.369)	−0.540* (0.337)
Industry average product			−0.132** (0.064)							
Sales growth				−0.187* (0.108)						
Industry employment							0.038 (0.058)			
Capital intensity								−0.164* (0.086)		
Wages per worker									0.346 (8.035)	
Industry sales	−0.059 (0.080)	−0.058 (0.081)	−0.048 (0.107)	−0.056 (0.091)	−0.073 (0.111)	−0.044 (0.080)	−0.080 (0.105)	−0.043 (0.112)	−0.080 (0.104)	−0.052 (0.081)
Industry wages	0.039 (0.079)	0.016 (0.083)	0.016 (0.118)	0.017 (0.088)	0.078 (0.108)	−0.011 (0.093)	0.021 (0.131)	0.009 (0.123)	0.071 (0.114)	0.003 (0.083)
Industry trade openness	0.451 (0.337)	0.476 (0.363)	0.647 (0.466)	0.618 (0.440)	0.103 (0.304)	1.143 (0.820)	0.65 (0.412)	0.615 (0.438)	0.693 (0.465)	
Industry change in tariffs										0.005** (0.004)
LR test $\chi^2(5)$ (Prob > χ^2)						12.040** (0.034)				
Number of industries	95	93	59	91	48	47	59	59	59	94
Pseudo R-squared	0.200	0.270	0.320	0.300	0.110	0.420	0.290	0.320	0.280	0.286

Notes: This table reports the marginal probit coefficients where the dependent variable is equal to 1 if the industry liberalized foreign entry in 1991, and equal to 0 otherwise. The sample period is 1988–1990. *Herfindahl index* is the sum of the squares of the market shares of all firms in each three-digit industrial category. *Profit of four largest firms* is the ratio of *EBITDA* to *sales* for the four firms with the highest sales in an industry. *Industry average product* is the ratio of *Industry sales* to *industry employment* in each industry. *Sales growth* is equal to $(\text{Industry sales} - \text{lagged industry sales}) / \text{lagged industry sales}$. *Industry employment* is the log of the sum of the number of workers across all firms in that industry. *Capital intensity* is the ratio of *Industry assets* to *Industry employment* in an industry. *Wages per worker* is the ratio of wages to the number of workers in each firm averaged across firms in an industry. *Industry sales* is the log of the sum of sales across all firms in an industry. *Industry wages* is the log of the sum of wages across all firms in an industry. *Industry trade openness* is the ratio of exports plus imports to *Industry sales*. *Industry change in tariffs* measures the percentage decrease in tariffs at the three-digit industry level between 1986–1990 and 1991–1995. Probit standard errors in parentheses are corrected for heteroskedasticity and for clustering at the industry level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

mean of 0.45 to 0.75. In the case of monopolies, the probability of liberalization decreases even further to 8.2%, where the remaining covariates in column (1) are evaluated at their mean values.⁶

The finding that entry barriers are more likely to be retained in concentrated industries leads to the question of why incumbent firms in these industries oppose the liberalization of foreign direct investment. In particular, is the government more likely to protect profitable or declining industries? The next subsection addresses this question.

5.2. Why do firms in concentrated industries oppose foreign entry liberalization?

Foreign entry may reduce the monopoly profits of incumbent firms in concentrated industries, which, according to the private interest hypothesis, gives them an incentive to oppose liberalization. Therefore, if the private interest view holds, foreign entry barriers are more likely to be retained in profitable concentrated industries, while the public interest view predicts the opposite.

From the results reported in columns (2) and (3) of Table 4 it appears that the government is more likely to retain foreign entry barriers in more profitable and productive industries. Profitability is measured as the ratio of *EBITDA* to sales for the four firms with the highest sales in an industry (*Profit of 4 Largest Firms*), and productivity is measured as output per worker (*Average Product*), defined as the ratio of aggregate sales to aggregate employment in each industry. The estimation in column (4) shows that entry barriers are significantly less likely to be removed in industries that have higher contemporaneous growth rates (*Sales Growth*), suggesting that declining industries face a higher probability of being liberalized.

Table 4 also shows that the estimated coefficient on the Herfindahl index retains its magnitude and significance when the profitability variables are included in the regression. This suggests that profitability and industry concentration capture two different factors that are correlated with the probability of foreign entry liberalization. While the Herfindahl index captures the effective coordination ability of incumbent firms to organize and influence government policy, profitability measures the incentive of incumbent firms to oppose foreign entry, which may reduce profits.

To investigate the interaction between industry concentration and profitability, the following regressions examine the effect of industry concentration on the probability of liberalization for two sub-samples:

$$Pr(\text{Entry Liberalization}_j = 1) = \Phi(\alpha_0 + \alpha_1 \text{Concentration}_j + \alpha_2 X_j + \varepsilon_j) \quad \text{if } \pi_j > \pi_{\text{median}}, \quad (2)$$

$$Pr(\text{Entry Liberalization}_j = 1) = \Phi(\alpha_0 + \alpha_1 \text{Concentration}_j + \alpha_2 X_j + \varepsilon_j) \quad \text{if } \pi_j < \pi_{\text{median}}, \quad (3)$$

where π_j is average profitability of firms in industry j , and π_{median} is the median profitability across all industries, $\pi_j > \pi_{\text{median}}$ represents industries with above-sample-median profitability, and $\pi_j < \pi_{\text{median}}$ represents industries with below-sample-median profitability. Profitability is measured as the ratio of *EBITDA* to sales averaged across all firms in an industry.

Column (5) of Table 4 shows that for industries with profitability below the sample median, the coefficient on the Herfindahl index is equal to -0.660 and is statistically significant at the 10% level. In contrast, the results in column (6) show that for industries with profitability above the sample median, the coefficient on the Herfindahl index is more negative at -1.505 and significant at the 1% level. A likelihood ratio test suggests that the estimated coefficients are significantly different across these two sub samples and the chi-squared test statistic reported in column (6) is significant at the 5% level.

The results in columns (5) and (6) suggest that as the profitability of concentrated industries increases, the probability of liberalization falls. These results support the private interest view: Barriers to foreign entry are more likely to be retained in industries with a few profitable firms that seek to protect their monopoly profits.

⁶The industry concentration result is consistent with Baldwin (1985), who finds that protection from trade is lower for industries with a greater number of firms.

5.3. Does labor influence foreign entry liberalization?

To investigate whether the Herfindahl index is a proxy for other sources of interest group influence, such as organized labor, we include total employment, capital intensity, and wages per worker in the regressions. From the results reported in columns (7)–(9) of Table 4, it appears that neither total employment nor average wages per worker have a significant impact, and capital-intensive rather than labor-intensive industries are more likely to be protected. This need not imply that organized labor has no influence. For example, part of the influence of the largest firms may be that they are also the largest employers in an industry.

Note that we observe employment in a smaller subset of firms. Also, most manufacturing sector workers are employed in the “small-scale industry” sector (firms with 50 or fewer workers), which is protected from both domestic and foreign entry. Since we do not observe firms of this size in our data, we may be underestimating the impact of employment on the liberalization decision.

5.4. Does the influence of incumbent firms vary by ownership category?

Next, we investigate whether the government is more likely to protect state-owned firms. We estimate the following probit specification to investigate the relative influence of state-owned firms compared to private firms on the liberalization decision:

$$\Pr(\text{Entry Liberalization}_j = 1) = \Phi(\alpha_0 + \alpha_1 \text{SOE Stake}_j + \alpha_2 X_j + \varepsilon_j), \quad (4)$$

where Φ represents the standard normal cumulative distribution, and j represents the industry with a total of $i = 1, \dots, I$ firms, a subset of which are state-owned firms. The estimations are corrected for heteroskedasticity using the Huber-White estimator for variance, and the standard errors are clustered at the three-digit industry level.

The *SOE Stake* variables measure the stake of state-owned firms relative to private firms in an industry, which includes business groups and unaffiliated private firms. These include the ratio of total sales, assets, employment, and wages produced by state-owned firms in an industry to aggregate sales, assets, employment, and wages in that industry, respectively. The relative shares of state-owned firms in an industry, which are likely to be correlated, provide proxies for the influence of these firms on the probability of liberalization. Under the private interest view, we expect the coefficient on *SOE Stake*, α_1 , to be negative—industries with a large state-owned firm presence are less likely to be liberalized. We also include the profitability of state-owned firms in an industry. The X_j vector of control variables includes the Herfindahl index, industry sales, assets, wages, employment, and measures of trade openness.

The results are presented in Table 5. Column (1) shows that the greater the proportion of an industry’s output produced by state-owned firms relative to privately owned firms, the lower the probability of foreign entry liberalization. The same result holds for the share of assets controlled by state-owned firms relative to privately owned firms (column (2)). These results are robust to industry concentration, sales, wages, and industry trade openness.

The effect of state-owned firms on the probability of foreign entry liberalization is also economically significant. From the specification reported in column (1), we estimate that industries with state-owned monopolies face a 14% chance of being liberalized, whereas industries with no state-owned firms face a probability nearly four times as high at 52%, where the remaining covariates are evaluated at their mean values.⁷

Does the government protect state-owned firms from foreign competition because they earn monopoly profits or because they are inefficient? The results in column (3) of Table 5 suggest the former: *SOE Firm Profits* is significantly negatively related to the probability of liberalization. However, *SOE Average Product* does not appear to have a significant effect on the probability of liberalization (Table 5, column (4)).

The results also suggest that state-owned firm workers may be more influential than employees of private firms (Table 5, columns (5)–(7)). The probability of foreign entry liberalization is significantly lower the

⁷Consistent with these results, Branstetter and Feenstra (2002) find that in the case of trade liberalization in China, the government places twice the weight on the welfare of state-owned firms than it does on consumer welfare.

Table 5
Which firms are more likely to oppose foreign direct investment liberalization?

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
								Profits < median profit	Profits > median profit	
SOE sales share	-0.508** (0.209)							-0.269 (0.244)	-0.869*** (0.280)	-0.434** (0.200)
SOE asset share		-0.566*** (0.193)								
SOE firm profits			-0.450* (0.230)							
SOE average product				-0.795 (0.757)						
SOE wage share					-0.577*** (0.207)					
SOE labor share						-0.499** (0.213)				
SOE wages per worker							-0.591** (0.271)			
Herfindahl index	-0.695** (0.313)	-0.712** (0.307)	-0.991*** (0.343)	-0.249 (0.286)	-0.710** (0.307)	-1.486*** (0.496)	-1.745*** (0.539)			-0.674** (0.318)
Industry sales	-0.081 (0.074)	-0.09 (0.073)	-0.053 (0.077)	0.037 (0.046)	-0.114 (0.074)	-0.143 (0.098)	-0.126 (0.105)	0.003 (0.102)	-0.021 (0.062)	-0.07 (0.075)
Industry wages	0.118 (0.083)	0.136* (0.080)	0.066 (0.087)	-0.037 (0.046)	0.157* (0.085)	0.154 (0.108)	0.112 (0.114)	0.072 (0.114)	0.165* (0.085)	0.089 (0.083)
Industry trade openness	0.457 (0.320)	0.474 (0.332)	-0.074 (0.290)	0.055 (0.079)	0.475 (0.328)	0.816* (0.430)	0.468* (0.278)	0.094 (0.302)	1.104*** (0.364)	
Industry change in tariffs										0.006** (0.003)
LR test χ^2 (6) (Prob > χ^2)									16.170** (0.013)	
Number of industries	95	95	66	49	95	59	49	48	47	96
Pseudo R-squared	0.260	0.280	0.290	0.440	0.270	0.320	0.350	0.070	0.520	0.280

Notes: This table reports the marginal probit coefficients where the dependent variable is equal to 1 if the industry liberalized foreign entry in 1991, and equal to 0 otherwise. The sample period is 1988–1990. *SOE sales share* is the total sales for all state-owned firms in an industry divided by *Industry sales*. *SOE asset share* is the total assets for all state-owned firms in an industry divided by *Industry assets*. *SOE firm profits* is the ratio of *EBITDA* to *sales* averaged across state-owned firms by industry. *SOE average product* is the ratio of *Sales* to *employment* averaged across state-owned firms in each industry. *SOE wage share* is the sum of wages across state-owned firms in an industry divided by *Industry wages*. *SOE labor share* is the sum of the number of workers across state-owned firms in an industry divided by *Industry employment*. *SOE wages per worker* is the ratio of wages to number of workers averaged across state-owned firms in an industry. *Herfindahl index* is the sum of the squares of the market shares of all firms in each three-digit industrial category. Industry sales is the log of the sum of sales across all firms in an industry. *Industry Wages* is the log of the sum of wages across all firms in an industry.

Capital intensity is the ratio of *Industry assets* to *Industry employment*. *Industry employment* is the log of the sum of the number of workers across all firms in that industry. *Industry trade openness* is the ratio of exports plus imports to *Industry sales*. *Industry change in tariffs* measures the percentage decrease in tariffs at the three-digit industry level between 1986–1990 and 1991–1995. Probit standard errors in parentheses are corrected for heteroskedasticity and for clustering at the industry level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

greater the proportion of an industry's workers employed in state-owned firms (*SOE Labor Share*), the higher the share of total industry wages paid by state-owned firms (*SOE Wage Share*), and the higher the wages per worker in these firms (*SOE Wages per Worker*). However, we note that labor and wage shares may be a proxy for state-owned firm presence in an industry.

We also investigate the effect of group-owned firms on the probability of liberalization. Due to the heterogeneity of support for the reforms among business groups, there is no straightforward prediction about the influence of these firms on liberalization. Relative to state-owned firms, however, group-owned firms do not appear to significantly reduce the probability of liberalization. To save space, we do not report these results.

To investigate the interaction between state-owned firm stake and profitability and its effect on probability of liberalization, we estimate the specification in column (1) of Table 5 for two sub samples: industries with above-median firm profitability and industries with below-median firm profitability. We do not include industry concentration in these regressions because the multicollinearity between the Herfindahl index and *SOE Sales Share* in the smaller sub-samples makes inference difficult. The results reported in column (8) show that for industries with below-median state-owned firm profitability, the coefficient on *SOE Sales Share* is not significant. In contrast, the results in column (9) show that for industries with above-median firm profitability, the effect of state ownership stake on the probability of liberalization is negative and significant at the 1% level. Comparing the coefficient estimates across the two sub samples, the reported likelihood ratio test statistic has a *p*-value of 0.013, which shows that the estimated coefficients in columns (8) and (9) differ significantly across the two sub samples. These results are consistent with the private interest hypothesis that the government has an incentive to protect large state-owned firms that earn monopoly profits.

We also find but do not report results showing that *SOE Sales Share* continues to be negatively correlated with the probability of liberalization when we control for industry assets and industry employment.

5.5. Does industry location explain the pattern of liberalization?

An advantage of Indian data is the considerable regional variation in industrial, demographic, and political characteristics across the different Indian states. We can use this variation to investigate whether the decision to liberalize is influenced by the location of the incumbent firms. Using data on 26 states and 96 industries, we estimate the following specification:

$$\Pr(\text{Entry Liberalization}_j = 1) = \Phi(\alpha_0 + \alpha_1 \text{Industry Share}_{j,k} + \alpha_2 \text{Concentration}_{j,k} + \alpha_3 \text{SOE Share}_{j,k} + \alpha_4 X_{j,k} + \varepsilon_{j,k}), \quad (5)$$

where Φ represents the standard normal cumulative distribution, *j* indicates the industry, and *k* indicates the state in which the industry is located. The *Industry Share* variables measure the proportion of output (workers, assets, and wages) produced by each three-digit industrial category in each state as a share of total output (workers, assets, and wages) across all industries in that state. This captures the relative importance of a particular industry in each state. The *Concentration* and *SOE Share* variables capture the geographic concentration and stake of state-owned firms in each state by industry. Finally, $X_{j,k}$ represents a matrix of industry- and state-level characteristics, including state-wise industry profitability and size, state per capita income, and industry trade openness. Prowess has financial data on 536 industry-state observations, but including the additional industry and state control variables in the regressions reduces the number to 469 industry-state observations, and adding industry employment further reduces the number to 141 observations.

From the results reported in Table 6 we note that the probability of entry liberalization is negatively correlated with the share of total state industrial output produced by an industry. The same result is obtained for the asset, wage, and employment shares, Herfindahl index, and the profitability of an industry in a state. We also find that the stake of state-owned enterprises in each state by industry has a negative and highly significant impact on the probability of liberalization. These results suggest that the influence of incumbent firms may depend on their location: If an industry is a significant employer and producer in a state, it is less likely to be liberalized.

Table 6

The role of industry location

Notes: This table reports the marginal probit coefficients where the dependent variable is equal to 1 if an industry in this state liberalized foreign entry in 1991, and equal to 0 otherwise. The sample period is 1988–1990. Variables are calculated for each industry-state observation. Industry Share variables measure the proportion of sales (workers, assets, and wages) produced by each three-digit industrial category in each state as a share of total sales (workers, assets, and wages) across all industries in that state. The *SOE share* variables are the ratio of total sales, assets, employment, and wages produced by state-owned firms in an industry to aggregate sales, assets, employment, and wages in that industry, by state. *State industry assets* and *State industry sales* are the log values of aggregate assets and sales in each industry by state. The *Herfindahl index* is the sum of squares of the market shares of all firms in each industry by state. *Profit of four largest firms* is the average ratio of *EBITDA* to *sales* of the four highest sales firms in each industry by state. *State per capita Income* is the log of per capita GDP of each state. *State industry wages* is the log of aggregate wages in each industry by state. *Industry trade openness* is the ratio of exports plus imports to *Industry sales*. Probit standard errors in parentheses are corrected for heteroskedasticity and for clustering at the industry level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

	(1)	(2)	(3)	(4)
Industry share in state sales	-0.416*			
	(0.236)			
SOE sales share	-0.307***			
	(0.063)			
Industry share in state assets		-0.394		
		(0.247)		
SOE asset share		-0.300***		
		(0.063)		
Industry share in state employment			-0.613*	
			(0.342)	
SOE labor share			-0.460***	
			(0.12)	
Industry share in state wages				-0.526**
				(0.251)
SOE wage share				-0.322***
				(0.062)
State industry assets	-0.078***			
	(0.021)			
State industry sales		-0.087***	-0.203***	-0.095***
		(0.023)	(0.076)	(0.023)
Herfindahl index	-0.260**	-0.273**	-0.036	-0.277**
	(0.109)	(0.110)	(0.182)	(0.109)
Profit of four largest firms	-0.443***	-0.416***	-1.092***	-0.459***
	(0.140)	(0.146)	(0.281)	(0.148)
State per capita income	-0.018	-0.01	0.125	-0.003
	(0.073)	(0.074)	(0.180)	(0.075)
State industry wages	0.026	0.028*	0.079**	0.034**
	(0.016)	(0.016)	(0.038)	(0.017)
Industry trade openness	0.209	0.208	0.057	0.207
	(0.167)	(0.165)	(0.337)	(0.166)
Number of industry-states	469	469	141	469
Pseudo <i>R</i> -squared	0.14	0.14	0.25	0.15

6. Additional tests and robustness checks

6.1. The impact of contemporaneous reforms

Foreign entry liberalization was implemented as part of a broader reform package in 1991. It is therefore important to control for the effects of other aspects of the 1991 reforms. In particular, trade liberalization can affect the competitive dynamics in industries and the viability of state-owned firms.

We include two measures to control for trade liberalization. The first variable (*Industry Trade Openness*) is the ratio of exports plus imports to total sales in an industry, which captures the degree of trade openness at the three-digit industry level. The second variable (*Industry Change in Tariffs*) measures the percentage

decrease in tariffs at the three-digit industry level between 1986–1990 and 1991–1995. Foreign direct investment was liberalized in 28 of the 38 industries in which tariff levels were reduced.

Controlling for trade liberalization at the industry level using *Industry Trade Openness*, the probability of liberalization remains significantly negatively related to industry concentration (Table 4), to state-owned firm presence in an industry (Table 5), and to geographic concentration (Table 6). The coefficient on *Industry Change in Tariffs* is positive and significant (Tables 4 and 5, column (10)), suggesting that industries in which tariff barriers are reduced are also more likely to be liberalized to foreign entry. Furthermore, industry concentration and state ownership have a more pronounced impact on the probability of liberalization in profitable industries after controlling for trade openness in Tables 4 and 5.

Two other reforms implemented in 1991 were the removal of licensing requirements allowing domestic entry (delicensing) and allowing private-sector firms to enter industries previously reserved for state-owned firms (dereservation). Licensing and reservation requirements were relaxed in nearly all industries so the limited cross-sectional variation does not allow us to test whether particular industries opposed these policy changes.

6.2. Alternative measures of industry concentration

One concern is that the pre-reform industrial structure may be a function of the past political influence of industries. In this case our results may be capturing protection given by the government to industries that were protected in the past, rather than the ability of these firms to mitigate foreign competition based on their current market power and ownership. To capture influence arising out of industry concentration rather than past political ties, we use industry concentration in the United States as an instrumental variable for industry concentration in India. Column (1) of Table 7 shows that the coefficient on the Herfindahl index remains negative and significant when we treat it as endogenous in an instrumental variable specification.

An alternative approach is to use “excess concentration,” the difference between Indian concentration and US concentration in the same industries, which measures market power above the natural level of concentration in a well-developed financial market such as the United States. Column (2) of Table 7 examines whether excess concentration has explanatory power in determining the pattern of liberalization in India. We find that the greater the excess concentration in India, the less likely it is that an industry will be liberalized. Consistent with Rajan and Zingales (2003a, 2003b), the results in columns (1) and (2) suggest that the state-led industrial policies of the past have created powerful incumbent firms that use their current market power to oppose liberalization of foreign entry.⁸

Table 7 also uses the four-firm sales concentration ratio and the four-firm asset concentration ratio as alternative measures of industry concentration (columns (3) and (4)). The results are similar to those described previously: the estimated coefficients on the four-firm sales and the four-firm asset concentration ratios are negative and statistically significant.

Although the liberalization policy was implemented at the three-digit level of industry classification, our data provide industry classification at the four-digit level for many firms. As a robustness check, we compute industry concentration disaggregated at the four-digit level. The results are reported in column (5) of Table 7. The variable four-digit Herfindahl Index remains negative and statistically significant. By adjusting the standard errors for clustering at the three-digit level, we are able to estimate unbiased coefficients for the relationship between industry concentration at the four-digit level and the probability of liberalization at the three-digit level.

As a final robustness check of our industry concentration measure, we construct the Herfindahl index based on the four largest firms in a particular industry. Column (6) of Table 7 presents the results. Industry concentration continues to be negatively correlated with the probability that an industry is liberalized. The coefficient is significant at the 1% level.

⁸In both the excess concentration measure and the instrumental variable specification, the U.S. measure is used to capture lobbying ability arising out of industry concentration, or the ability to overcome the free-rider problem in industries with fewer firms as in Olson (1965). Peltzman (1977) and Curry and George (1983) show that industry concentration is highly correlated with market power in U.S. industries.

Table 7

Using alternative measures of industry concentration

Notes: This table reports the marginal probit coefficients where the dependent variable is equal to 1 if the industry liberalized foreign entry in 1991, and 0 otherwise. The sample period is 1988–1990. The specification in column (1) is an instrumental variable probit regression with Herfindahl index in the U.S. as the instrumental variable for the Herfindahl index in India, where *Herfindahl index* is the sum of squares of the market shares of all firms in each three-digit industrial category. *Excess industry concentration* is the difference between *Herfindahl index* in India and the U.S. for the same industry. *Concentration ratio* is the ratio of the sum of sales of the four highest sales firms in an industry to *Industry sales* in each three-digit industrial category. *Asset concentration* is the ratio of the sum of assets of the four largest assets firms in an industry to *Industry assets* in each three-digit industrial category. *Four-digit Herfindahl index* is the sum of squares of the market shares of all firms in each four-digit industrial category. *Herfindahl index of Four largest sales firms* is the sum of squares of the market shares of the four highest sales firms in each three-digit industrial category. *Profit of four largest firms* is the ratio of *EBITDA* to *sales* for the four highest sales firms in an industry. *Industry sales* is the log of the sum of sales across all firms in an industry. *Industry wages* is the log of the sum of wages across all firms in an industry. *Industry trade openness* is the ratio of exports plus imports to total sales in an industry. Probit standard errors in parentheses are corrected for heteroskedasticity and for clustering at the 3-digit industry level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

	(1)	(2)	(3)	(4)	(5)	(6)
Herfindahl index (IV)	−4.058*** (0.976)					
Excess industry concentration (India-U.S.)		−0.994*** (0.289)				
concentration ratio			−1.226** (0.510)			
Asset concentration				−1.823*** (0.608)		
Four-digit Herfindahl index					−0.669*** (0.202)	
Herfindahl index of four largest sales firms						−1.007*** (0.302)
Profit of four largest sales firms	−2.281*** (0.866)	−0.828** (0.396)	−0.630* (0.333)	−0.575* (0.321)	−1.144*** (0.329)	−0.766** (0.324)
Industry sales	−0.005 (0.217)	0.102 (0.102)	0.027 (0.083)	0.012 (0.082)	−0.023 (0.078)	−0.031 (0.085)
Industry wages	−0.085 (0.207)	−0.059 (0.099)	−0.006 (0.081)	−0.003 (0.083)	−0.007 (0.078)	0.025 (0.083)
Industry trade openness	0.537 (0.993)	−0.011 (0.489)	0.405 (0.293)	0.474 (0.292)	0.109 (0.297)	0.310 (0.315)
Number of industries	75	75	94	94	131	94
Pseudo <i>R</i> -squared	—	0.260	0.210	0.250	0.200	0.240
Prob > χ^2	0.000	0.000	0.000	0.000	0.000	0.000

6.3. Natural monopolies and strategic industries

Finally, it also may be the case that the government does not reduce entry restrictions in some concentrated industries because they are natural monopolies or of strategic national interest. As an additional robustness check, we investigate the effect of concentration on the likelihood of entry liberalization by excluding industries that belong to these categories from the estimations. Specifically, the estimations exclude firms belonging to the electric, gas, and water utility companies; financial services industries; and industries on the government's strategic list. The results reported in column (1) of Panels A and B of Table 8 show that industry concentration continues to have a significant and negative effect on the probability of entry liberalization when natural monopolies and strategic industries are excluded. Note that in both panels of Table 8 the effect of industry concentration on the probability of liberalization is more negative in profitable industries (columns (2) and (3)).

The result that state ownership reduces the likelihood of liberalization is robust to excluding natural monopolies and strategic industries (column (1)). Controlling for the presence of natural monopolies and

Table 8

Natural monopolies and strategic industries

Notes: This table reports the marginal probit coefficients where the dependent variable is equal to 1 if the industry liberalized foreign entry in 1991, and equal to 0 otherwise. The sample period is 1988–1990. In the natural monopoly category we exclude the following industries: air, water, and land transportation; electric, gas, and water production and distribution; and financial intermediation and insurance. In the strategic industries category we exclude the following industries: arms and ammunition, atomic energy, mineral oils, mining of coal and lignite, mining of various minerals, and railways. The *Herfindahl Index* is the sum of the squares of the market shares of all firms in each 3-digit industrial category. *Industry Sales* is the log of the sum of sales across all firms in an industry. *Industry Wages* is the log of the sum of wages across all firms in an industry. Probit standard errors in parentheses are corrected for heteroskedasticity and for clustering at the industry level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

	(1)	(2) Profits < median	(3) Profits > median	(4) Profits < median	(5) Profits > median
<i>Panel A: Excluding natural monopolies and financial services</i>					
Herfindahl index	−0.636** (0.302)	−0.593* (0.350)	−1.484*** (0.501)		
SOE sales share	−0.398** (0.202)			−0.192 (0.229)	−0.993*** (0.255)
Industry sales	−0.055 (0.076)	−0.106 (0.110)	0.146 (0.184)	−0.03 (0.103)	0.057 (0.087)
Industry wages	0.102 (0.087)	0.116 (0.111)	−0.083 (0.142)	0.099 (0.114)	0.14 (0.105)
Number of industries	87	44	43	44	43
Pseudo R-squared	0.24	0.11	0.42	0.06	0.47
<i>Panel B: Excluding strategic industries</i>					
Herfindahl index	−0.731** (0.308)	−0.585 (0.390)	−1.629*** (0.597)		
SOE sales share	−0.397* (0.208)			−0.159 (0.255)	−1.134*** (0.293)
Industry sales	−0.115 (0.088)	−0.037 (0.118)	−0.15 (0.188)	0.036 (0.110)	−0.119 (0.166)
Industry wages	0.141 (0.094)	0.049 (0.112)	0.09 (0.176)	0.036 (0.120)	0.273 (0.170)
Number of industries	86	43	43	43	43
Pseudo R-squared	0.21	0.1	0.34	0.06	0.38

strategic industries, the results in Table 8 also confirm that the probability of liberalization is significantly lower in industries with profitable state-owned firms (columns (4) and (5)).

The inverse relation between entry liberalization and industry concentration continues to hold when we include a dummy for strategic industries in the full sample. These results are not reported to save space. A dummy for natural monopolies cannot be included in the regressions because no natural monopolies were liberalized, and the dummy variable would perfectly predict the probability of liberalization.

7. Concluding remarks

A large theoretical and empirical literature characterizes foreign direct investment as the “good cholesterol” in international capital flows (Hausmann and Fernandez-Arias, 2000; Albuquerque, 2003). Yet many governments delay or fail to liberalize foreign direct investment. Political economy explanations suggest that governments make suboptimal choices when policymakers face pressures other than that of welfare maximization (Olson, 1965; Stigler, 1971; Peltzman, 1976). In democracies, for instance, private interests may lobby the government to maintain their status or to secure concessions in the face of big changes (Dahl, 1961; Tocqueville, 1835).

In 1991, the federal government of India granted automatic approval for foreign direct investment of up to 51% in 46 of 96 three-digit industrial categories. The liberalization of foreign direct investment is likely to

invoke considerable opposition from domestic firms and presents an ideal opportunity to examine the effect of domestic incumbents on the policy process.

Our results suggest that the concentrated control of industrial assets and output by a few firms, as well as the identity of incumbent firms, has a statistically significant influence on the pattern of entry liberalization. Specifically, the government is more likely to retain foreign entry barriers in concentrated industries and in industries with substantial state-owned presence. The results also suggest that incumbent firms seek to protect monopoly profits because the likelihood of foreign entry liberalization is significantly lower in concentrated industries that are profitable and in industries with profitable state-owned firms.

In the last decade, many economies have implemented economic and financial sector reforms, including stock market liberalization, privatization, and the liberalization of foreign direct investment. There is a large literature that evaluates the effects of these reforms on firm performance and economic growth. Thus, the question arises whether these reforms are random, as assumed by much of the literature, or are an outcome of incumbent firm characteristics as shown in this paper.

Appendix A

List of liberalized industries, key changes in India's industrial policy regime and description of variables are given in Tables A1–A3.

Table A1

List of industries liberalized to foreign direct investment in 1991

The *Industrial Policy Resolution of 1991* (Office of the Economic Advisor, 2001) provides information about the list of industries in which the state liberalized foreign entry. Foreign entry restrictions were reduced in 46 three-digit industries. The Indian National Industrial Classification (1998) system is used to classify firms in the Prowess data set into industries. Column 1 presents the NIC code. Column 2 presents the industry description. Column 3 presents the number of firms in each 3-digit NIC category.

NIC code	Industry description	Number of firms
151	Production, processing and preservation of meat, fish, fruits, vegetables, oil	39
152	Manufacture of dairy products	4
153	Manufacture of grain mill, starches, starch products, animals feeds	8
154	Manufacture of other food products	89
155	Manufacture of beverages	23
202	Manufacture of products of wood, cork, straw and plaiting materials	7
210	Manufacture of paper and paper products	52
241	Manufacture of basic chemicals	145
242	Manufacture of other chemical products	107
243	Manufacture of man-made fibers	56
251	Manufacture of rubber products	27
252	Manufacture of plastic products	50
261	Manufacture of glass and glass products	17
269	Manufacture of non-metallic mineral products nec	81
271	Manufacture of basic iron and steel	100
272	Manufacture of basic-precious and non-ferrous metals	35
273	Casting of metals	12
281	Manufacture of structural metal products, tanks, and steam generators	12
289	Manufacture of other fabricated metal products; metal working activities	19
291	Manufacture of general purpose machinery	36
292	Manufacture of special purpose machinery	62
293	Manufacture of domestic appliances, nec	14
300	Manufacture of office, accounting, and computing machinery	8
311	Manufacture of electric motors, generators and transformers	16
312	Manufacture of electricity distribution and control apparatus	5
313	Manufacture of insulated wire and cable	18
314	Manufacture of accumulators, primary cells, and primary batteries	8

Table A1 (continued)

NIC code	Industry description	Number of firms
315	Manufacture of electric lamps and lighting equipment	3
319	Manufacture of other electrical equipment nec	7
321	Manufacture of electronic valves and tubes and other electronic components	19
322	Mfg of TV, radio transmitters, & apparatus for line telephony & telegraphy	11
323	Mfg of TV and radio receivers, sound or video recording apparatus	12
331	Manufacture of medical appliances and instruments	15
332	Manufacture of optical instruments and photographic equipment	2
333	Manufacture of watches and clocks	2
341	Manufacture of motor vehicles	7
342	Manufacture of bodies (coach work) for motor vehicles; mfg of trailers & semis	1
343	Manufacture of parts and accessories for motor vehicles and their engines	74
351	Building and repair of ships & boats	6
352	Manufacture of railway and tramway locomotives and rolling stock	9
359	Manufacture of transport equipment nec	15
369	Manufacturing nec	8
551	Hotels and restaurants	29
721	Computer and related activities	1
722	Software consultancy and supply	13
729	Other computer-related activities	1

Table A2

Key changes in India's industrial policy regime evolution of industrial concentration and state ownership

Policy reform	Features
Industries (Development Regulation) Act of 1951	Specified the industries in which licenses were required for firms with fixed investment above a certain level of investment or import content of investment above a certain level.
Industrial Policy Resolution, 1956	Articulated the role of public investment in planned development and specified Schedule A industries reserved exclusively for state enterprises and Schedule B industries where further expansion would be by state enterprises.
Monopolies and Restrictive Trade Practices Act (MRTP), 1969	All applications for a license from companies belonging to a list of big business houses and subsidiaries of foreign companies were to be referred to a "MRTP Commission" which invited objections and held public hearings before granting a license for production.
Industrial Policy Notification, 1973	Made licensing mandatory for all industries above certain investment limits. Specified industry Schedules IV and V, where licensing was mandatory for all firms regardless of size.
Industrial Policy Statement, 1973	Specified the criteria and list of "core" industries to which large business houses and foreign firms were to be confined.
Foreign Exchange Regulation Act, 1973	Foreign companies operating in India were required to reduce their share in equity capital to below 40%. Exceptions were decided on a discretionary basis if: (i) The company was engaged in "core" activities. (ii) The company was using sophisticated technology or met certain export commitments.
Policy Statements, 1985	Business houses were not restricted to Appendix I industries as long as they moved to industrially backward regions.
New Industrial Policy, 1991	Abolished licensing for all except 18 industries. Number of industries reserved for the public sector cut from 17 to 8. Limits on foreign equity holdings were raised from 40% to 51% in a wide range of industries.

Source: Adapted from Sivadasan (2004).

Table A3
Description of variables

Variables	Definition
<i>State-Owned (SOE)</i>	Firms majority-owned by the federal and state governments.
<i>Private</i>	Includes firms majority-owned by a business group and private firms not affiliated to a group. Indian business groups or family-owned firms are groups of companies that are controlled by the same shareholders, usually all members of a family.
<i>Sales</i>	Sales generated by a firm from its main business activity measured by charges to customers for goods supplied and services rendered. Excludes income from activities not related to main business, such as dividends, interest, and rents in the case of industrial firms, as well as non-recurring income.
<i>Market share</i>	Ratio of Sales to Industry Sales for a firm.
<i>Herfindahl index</i>	Sum of the squares of the <i>Market Share</i> of all firms in an industry in each three-digit industry.
<i>SOE share</i>	The ratio of total sales, assets, employment, and wages produced by state-owned firms in an industry to <i>Industry Sales</i> , <i>Industry Assets</i> , <i>Industry Employment</i> , and <i>Industry Wages</i> in that industry.
<i>Private share</i>	The ratio of total sales, assets, employment, and wages produced by private firms in an industry to <i>Industry Sales</i> , <i>Industry Assets</i> , <i>Industry Employment</i> , and <i>Industry Wages</i> in that industry.
<i>Industry sales</i>	Log of sum of <i>Sales</i> across all firms in that industry.
<i>Assets</i>	Gross fixed assets of a firm, which includes movable and immovable assets as well as assets that are in the process of being installed.
<i>Industry assets</i>	Log of sum of <i>Assets</i> across all firms in that industry.
<i>Employment</i>	Number of employees in a firm.
<i>Industry employment</i>	Log of sum of <i>Employment</i> across all firms in that industry.
<i>Wages</i>	Salaries paid to workers.
<i>Industry wages</i>	Log of sum of <i>Wages</i> across all firms in that industry.
<i>Wages per worker</i>	Ratio of <i>Wages</i> to <i>Employment</i> in each firm averaged across firms in that industry.
<i>Average product</i>	Ratio of <i>Sales</i> to <i>Employment</i> .
<i>Industry average product</i>	Ratio of <i>Industry Sales</i> to <i>Industry Employment</i> in that industry.
<i>EBITDA</i>	Excess of income over all expenditures except tax, depreciation, interest payments, and rents in a firm.
<i>Firm profits</i>	Ratio of <i>EBITDA</i> to <i>Sales</i> in a firm, averaged across firms in that industry.
<i>Profit of four largest firms</i>	Ratio of <i>EBITDA</i> to <i>Sales</i> of the four firms with the highest sales in that industry.
<i>Industry trade openness</i>	Ratio of exports plus imports to <i>Industry Sales</i> in that industry.
<i>Industry change in tariffs</i>	Percentage decrease in tariffs at the three-digit industry level between 1986–1990 and 1991–1995.
<i>Sales growth</i>	$(\text{Industry Sales} - \text{Lagged Industry Sales}) / \text{Lagged Industry Sales}$ in that industry.
<i>Capital intensity</i>	Ratio of <i>Industry Assets</i> to <i>Industry Employment</i> in that industry.
<i>Excess industry concentration</i>	The difference between <i>Herfindahl Index</i> in India and the U.S. for the same three-digit industry.
<i>Concentration ratio</i>	Ratio of the sum of <i>Sales</i> of the four firms with the highest sales in an industry to <i>Industry Sales</i> in each 3-digit industrial category.
<i>Asset concentration</i>	Ratio of the sum of <i>Assets</i> of the four firms with the largest assets in an industry to <i>Industry Assets</i> in each 3-digit industrial category.
<i>4-digit Herfindahl index</i>	<i>Herfindahl Index</i> in each four-digit industrial category.
<i>Herfindahl index of four largest firms</i>	<i>Herfindahl Index</i> of the four highest sales firms in each three-digit industrial category
<i>NIC code</i>	Three-digit industry code includes manufacturing, financial, and service sectors.

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