The Influence of Domestic Firms on Foreign Direct Investment Liberalization

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Question

- Do incumbent firms influence the State's decision to allow foreign direct investment in some industries and not others?

Recent Literature

- Corporate assets tend to be controlled by politically-connected incumbent firms
  (Johnson and Mitton 03, Claessens et al, 02)

- Incumbents get preferential treatment
  (Khwaja and Mian 05; Sapienza, 04)

- Incumbent firms act to maintain favored status
  (Kroszner and Strahan, 99; Perotti and Volpin, 05; Rajan and Zingales, 03).

- Ability of incumbents to extract rents becomes limited when international capital flows are mobile
  (Rajan and Zingales, 03; Stulz, 05).

Two Competing Views of the Reform Process

- "…every industry or occupation that has enough political power to utilize the state will seek to control entry." Stigler (1971).

- *Private Interest View*: Characterizes the regulatory process as one of interest group competition in which compact, well-organized groups are able to influence the government to capture rents at the expense of more dispersed groups (e.g.,Stigler, 1971; Peltzman, 1976, 1989; and Becker, 1983).

- *Public Interest View*: The government designs reforms based on efficiency and social welfare criteria.

What does this paper do?

- We develop and test hypotheses arising out of the private and the public interest views.

- Using firm-level data we identify interest groups that are likely to be affected by liberalization and the power to influence the government.

Identification strategy

- In 1991 in response to a BOP crisis, India *selectively* removed barriers to foreign direct investment in a subset of industries.

- Automatic approval of foreign direct investment up to 51% in 46 of 97 (3-digit) industrial categories.

- We investigate whether *ex ante* characteristics of incumbent firms can explain the pattern of liberalization across industries.

Testable Hypotheses

- Does industry concentration matter?
  - Private interest view → More concentrated industries are likely to successfully lobby the government to restrict entry (Olsen, 1965; Stigler, 1971).
  - Public interest view → Liberalization is more likely in more concentrated industries because these industries are associated with greater deadweight loss (Pigou, 1938; Becker, 1983).

Testable Hypotheses

- Does the government protect profitable or declining industries?
  - Private interest view → Liberalization is less likely in profitable, concentrated industries because firms have an incentive to protect their monopoly profits (Stigler, 1971).
  - Public interest view → Liberalization is likely to occur in profitable, concentrated industries to reduce deadweight loss.

Testable Hypotheses

- Does the ownership of incumbent firms matter?
  - Politicians enjoy rents from controlling state-owned enterprises→ "grabbing hand" (Shleifer and Vishny, 1998, Megginson, 2005).
  - Business groups or family-owned firms are also influential incumbents (Morck, et al., 2005).
  - Private interest view→ Likelihood of entry deregulation is negatively related to the presence of state-owned enterprises if allowing FDI contributes to the decline of these firms.

Data

- Firm level data from balance sheets and income statements on 2187 firms→ CMIE Prowess Database.
  - Over 70% of economy-wide industrial output
  - Data on sales, profit, employment, assets, and ownership.

- List of liberalized 3-digit industrial categories (Industrial Policy Resolution of 1991).

- Measures of Industry Concentration
  - Herfindahl index
  - Four-firm concentration ratio (sales)
  - Relative asset share of the four largest (asset size) firms in an industry

- Measures of Profitability and Productivity
  - Return on Sales (EBITDA/Sales)
  - Average Product (Output per worker)
  - Current and Future Sales Growth

Is Industrial Concentration in India an Outcome of Technological Factors?

- Average 4-firm CR is higher in India than in the US.
  - *(Table 1)*
  - Protected industries more concentrated in India
- Industry concentration outcome of past industrial policy, rather than technological factors

	India	**US**
Concentration Ratio	**.797**	.679
	(.230)	(.228)

	Concentration Ratios	
	India	**US**
Protected Industries	**.899**	.637
	(.028)	(.041)
Liberalized Industries	.692	.723
	(.039)	(.032)

Results

$$\Pr(\textit{Entry Deregulation}_j = 1) = \Phi(\alpha_0 + \alpha_1 \textit{Concentration}_j + \alpha_2 X_j + \varepsilon_j)$$

- Likelihood of barriers to foreign entry being reduced is **lower** in
  - Industries that are more concentrated
  - Industries that are more profitable
  - Concentrated industries that are more profitable
  - *Probability of liberalization (Herfindahl index):*
    Least concentrated industry (0.025) → 80%
    Monopoly (1) → 10%

Table 4: Does Industry Concentration Affect the Probability of Foreign Direct Investment Liberalization?									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Herfindahl Index	-0.880***	-0.981***	-0.988***	-1.552***	-0.925***	-1.267***	-1.406***	-1.676***	-1.313***
	(0.213)	(0.288)	(0.300)	(0.536)	(0.293)	(0.343)	(0.532)	(0.542)	(0.509)
Firm Profits		-0.616*							
		(0.377)							
Profit of 4 Largest Firms			-0.931***						
			(0.350)						
Industry Average Product				-0.136**					
				(0.062)					
Sales Growth					-0.105**				
					(0.046)				
Future Sales Growth						-0.992***			
						(0.281)			
Industry Employment							0.024		
							(0.060)		
Capital Intensity								-0.196***	
								(0.071)	
Wages per Worker									0.912
									(8.497)
Industry Sales		-0.034	-0.025	-0.067	-0.022	-0.078	-0.097	-0.023	-0.096
		(0.077)	(0.084)	(0.108)	(0.084)	(0.089)	(0.105)	(0.113)	(0.104)
Industry Wages		0.012	0.022	0.033	0.012	-0.004	0.054	-0.025	0.087
		(0.078)	(0.083)	(0.115)	(0.082)	(0.087)	(0.132)	(0.123)	(0.111)
Number of Industries	96	96	94	59	94	96	59	59	59
Pseudo R-squared	0.180	0.230	0.230	0.250	0.210	0.270	0.220	0.280	0.210
Prob > chi-squared	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Results

$$\Pr(\textit{Entry Deregulation}_{i,j} = 1) = F(\alpha_0 + \alpha_1 x_{i,j} + \alpha_2 \textit{Owner}_i + \alpha_{12} x_{i,j} \times \textit{Owner}_i + \mathbf{X}_j \boldsymbol{\beta} + \varepsilon_{i,j})$$

- Likelihood of barriers to foreign entry being reduced is **lower** in
  - Industries where the stake of state-owned firms is high.
  - Industries where SOEs are profitable.
  - *Probability of liberalization in an industry:*
    State owned monopolies → 13%.
    Industries with no SOEs → 52%

Table 5: Is the State more receptive to the interests of some firms over others?

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	State-Owned Firms						
Sales Share	-0.414**						
	(0.211)						
Asset Share		-0.554***					
		(0.187)					
Firm Profits			-0.428**				
			(0.204)				
Average Product				-.526**			
				(.253)			
Wage Share					-0.940***		
					(0.325)		
Labor Share						-0.463**	
						(0.216)	
Wages per Worker							-.624**
							(0.288)
Herfindahl Index	-0.684**	-0.662**	-1.004***	-1.571***	-1.185**	-1.324***	-1.752***
	(0.309)	(0.292)	(0.340)	(0.503)	(0.577)	(0.488)	(0.557)
Industry Sales		-0.079	-0.056		-0.146*	-0.128	-0.061
		(0.073)	(0.079)		(0.082)	(0.098)	(0.080)
Industry Assets	-0.095			-0.188**			
	(0.071)			(0.089)			
Industry Wages	0.134*	0.127	0.069	0.19		0.127	
	(0.078)	(0.081)	(0.089)	(0.121)		(0.106)	
Industry Employment					0.177**		0.023
					(0.073)		(0.055)
Number of Industries	96	96	66	49	59	59	49
Pseudo R-squared	0.250	0.260	0.290	0.370	0.340	0.280	0.320
Prob > chi-squared	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 5: Is the State more receptive to the interests of some firms over others?

	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Group-Owned Firms						
Sales Share	0.247						
	(0.175)						
Asset Share		0.380**					
		(0.170)					
Firm Profits			-0.231				
			(0.354)				
Average Product				4.819			
				(3.824)			
Wage Share					0.638**		
					(0.299)		
Labor Share						0.460**	
						(0.217)	
Wages per Worker							6.187
							(4.799)
Herfindahl Index	-0.882***	-0.868***	-0.950***	-0.341	-1.342**	-1.327***	-0.503
	(0.295)	(0.294)	(0.348)	(0.520)	(0.555)	(0.488)	(0.688)
Industry Sales		-0.079	-0.032		-0.126*	-0.126	0.031
		(0.075)	(0.083)		(0.074)	(0.098)	(0.146)
Industry Assets	-0.121*			-0.185			
	(0.065)			(0.125)			
Industry Wages	0.125	0.082	0.023	0.204		0.126	
	(0.076)	(0.078)	(0.086)	(0.159)		(0.106)	
Industry Employment					0.121*		-0.036
					(0.064)		(0.087)
Number of Industries	96	96	80	28	59	59	28
Pseudo R-squared	0.230	0.230	0.170	0.130	0.280	0.280	0.080
Prob > chi-squared	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Robustness

- Industry concentration not a proxy for natural monopolies or strategic industries. *(Table 8)*

- Results hold with alternative measures of industry concentration. *(Table 9)*
  - Excess industry concentration (India – US)
  - Four-firm Sales and Asset Concentration

Table 6: Does Geographic Concentration Matter?				
Industry Share in State Output	-0.567**			
	(0.290)			
Industry Share in State Assets		-0.429*		
		(0.267)		
Industry Share in State Employment			-0.597**	
			(0.282)	
Industry Share in State Wages				-0.669**
				(0.300)
Herfindahl Index	-0.240**	-0.246**	-0.085	-0.248**
	(0.107)	(0.106)	(0.185)	(0.106)
State Industrial Output	-0.098***	-0.092***	-0.159**	-0.105***
	(0.023)	(0.022)	(0.074)	(0.024)
SOE Sales Share	-0.355***			
	(0.067)			
SOE Asset Share		-0.334***		
		(0.066)		
SOE Labor Share			-0.442***	
			(0.125)	
SOE Wage Share				-0.356***
				(0.066)
Profit of 4 Largest Firms	-0.476***	-0.435***	-0.802***	-0.479***
	(0.127)	(0.132)	(0.305)	(0.129)
Future Sales Growth	-0.039**	-0.039**	-0.342*	-0.039**
	(0.020)	(0.020)	(0.200)	(0.020)
State Per Capita Income	0.049	0.038	0.034	0.053
	(0.078)	(0.078)	(0.189)	(0.079)
Industry Wages	0.047***	0.044**	0.046	0.055***
	(0.017)	(0.017)	(0.040)	(0.018)
Number of Industry-States	474	474	141	474
Pseudo R-squared	0.16	0.16	0.25	0.16

Table 7: Effect of Foreign Entry Liberalization on Market Share and Profit Margins

	Before Entry Deregulation	After Entry Deregulation	Before-After Difference of Means (t-test)
	Full Sample		
Market Share	**0.039**	0.033	6.911***
	(.003)	(.002)	
Number of Firms	1231	1231	
Firm Profits	0.115	0.094	1.359
	(.010)	(.019)	
Number of Firms	1231	1231	
Herfindahl Index	**0.281**	0.236	6.296***
	(.037)	(.036)	
Number of Industries	46	46	
	State-Owned Firms		
Market Share	**0.084**	0.072	3.806***
	-0.015	-0.013	
Number of Firms	115	115	
Firm Profits	**-0.072**	-0.218	1.706*
	(.085)	(.137)	
Number of Firms	115	115	
SOE Sales/Industry Sales	**0.206**	0.185	4.247***
	(.046)	(.043)	
Number of Industries	46	46	
	Group-Owned Firms		
Market Share	**0.043**	0.038	4.071***
	(.004)	(.003)	
Number of Firms	700	700	
Firm Profits	0.143	0.127	0.71
	(.007)	(.024)	
Number of Firms	700	700	
Group Sales/Industry Sales	0.622	0.639	-1.3302
	(.049)	(.044)	
Number of Industries	46	46	

Summary

- Influential incumbent firms can slow down the liberalization of foreign direct investment.
- Foreign direct investment liberalization is less likely in concentrated and profitable industries.
- Profitable state-owned firms are particularly successful at preventing the liberalization of foreign direct investment.

Incumbents and Protectionism: The Political Economy of Foreign Entry Liberalization

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Abstract

This paper investigates the influence of incumbent firms on the decision to allow foreign direct investment into an industry. Based on data from India's economic reforms, the results suggest that firms in concentrated industries are more successful at preventing foreign entry, that state-owned firms are more successful at stopping foreign entry than similarly placed private firms, and that profitable state-owned firms are more successful at stopping foreign entry than unprofitable state-owned firms. These results continue to hold when we control for industry characteristics such as the presence of natural monopolies and the size of the workforce. When foreign entry is allowed in an industry, incumbent firms experience a significant decline in market share and profits. The pattern of foreign entry liberalization supports the private interest view of policy implementation.

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I. Introduction

Many countries restrict the inflow of foreign investment despite evidence that liberalizing capital flows can increase economic growth (Bekaert, Harvey, and Lundblad, 2003). Why do governments postpone liberalization policies that can benefit the economy? Recent evidence suggests that incumbent firms that receive preferential treatment may oppose financial market reforms that threaten their favored status (Kroszner and Strahan, 1999; Johnson and Mitton, 2003; Acemoglu, Johnson, and Robinson, 2005; Feijen and Perotti, 2005).[1] Rajan and Zingales (2003 a, b) and Stulz (2005) argue that entrenched incumbent firms have an incentive to oppose the liberalization of international capital flows since liberalization limits their ability to extract monopoly rents. In this paper we investigate whether entrenched incumbent firms influence the decision to liberalize foreign direct investment.

To do so, we consider the Indian government's decision to selectively reduce barriers to foreign direct investment in a subset of industries after a balance of payments crisis in 1991. The Indian corporate sector is characterized by the concentrated control of assets by state-owned and family owned firms, much like 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 state's decision to liberalize foreign direct investment in some industries and not others? And if so, which incumbent firms had the most to lose from the liberalization of foreign entry and the ability to oppose it?

To answer these questions we use a rich firm-level dataset that provides detailed balance sheet and ownership information for about 2,187 firms that account for more than 70 percent of India's industrial output. We investigate whether the pre-liberalization characteristics of incumbent firms can explain the government's decision to selectively open up some industries to foreign entry and not others. The data also have the advantage that incumbent firms can be classified into state-owned, business-group

[1] The evidence suggests that (i) banking deregulation is delayed in U.S. states where incumbent banks have the most to lose from entry (Kroszner and Strahan, 1999); (ii) entrenched firms lobby to restrict access to credit after a crisis, forcing poorer entrepreneurs to exit (Feijen and Perotti, 2005); and (iii) Post-1500, Western European countries with monarchies opposed free entry in profitable industries (Acemoglu, Johnson, and Robinson, 2005).

owned, or privately owned firms. Hence, the data permit an investigation of whether incumbent firm ownership categories influence the decision to liberalize an industry.

From a private interest perspective the policy process can be characterized as one of interest group competition where policies reflect the incentives of interest groups and their ability to successfully organize. If winners and losers emerge from liberalizing foreign entry, the policy decision is likely to be subject to the political influences of these different groups. It follows that incumbent groups that have the most to lose from foreign entry are likely to lobby against it. For instance, concentrated industries are less likely to be liberalized since these firms have an incentive to protect their monopoly profits (Stigler, 1971). Also, incumbent firms in concentrated industries are better able to overcome the free-rider problem and successfully organize to lobby the government compared to industries with many small firms (Olson, 1965; Stigler, 1971; Peltzman, 1976; Becker, 1983; Grossman and Helpman, 2001).

In contrast, from a public interest perspective the government ought to deregulate industries according to efficiency and social welfare criteria without regard for political influence. For instance, the government should liberalize foreign entry into concentrated industries so that foreign competition can reduce deadweight losses in these industries (Pigou, 1938).

Politicians also may be more receptive to the interests of particular incumbent firms over others. For example, in the case of state-owned firms the state is itself an incumbent. State-owned firms occupy a prominent position in countries across the world (Megginson, 2005) and may be disproportionately influential because their earnings accrue directly to the government or because politicians obtain private benefits from controlling these firms (Shleifer and Vishny, 1998). Therefore the state may have an incentive to protect an industry from foreign competition if allowing foreign direct investment in that industry contributes to the decline of state-owned firms.

In many countries, business groups or family owned firms also tend to be large and politically influential incumbents (Morck et al., 2005). India is no exception. Indian business groups are controlled by members of the same family and are generally the largest non-state-owned firms in an industry. Business groups are typically diversified across different industries and are more efficient than state-

owned firms. Thus, business groups may have favored an easing of restrictions on foreign direct investment under the presumption that they would emerge as winners from liberalization. Indeed in the years immediately following liberalization, foreign direct investment in India occurred primarily through joint ventures with group-owned firms.

Our main results are as follows. Consistent with the private interest hypothesis, the likelihood of barriers to foreign entry being reduced in an industry is inversely related to its concentration. On average, the least concentrated industry in the sample with a Herfindahl index of 0.025 faces an 80% chance of being opened to foreign entry.[2] In contrast, for a monopoly the probability of foreign entry liberalization is on average just 9.6%. Also consistent with the hypothesis that firms in concentrated industries have an incentive to protect monopoly profits, the results suggest that the likelihood of foreign entry liberalization is significantly lower for more profitable concentrated industries. Since geographic concentration also may determine the pattern of liberalization, we exploit regional variation in firm location and find a significant negative relationship between regional industrial concentration and the likelihood of foreign entry liberalization.

The results also show that the state is more responsive to the interests of certain incumbent firms. In particular, the state is significantly more likely to retain foreign entry barriers in industries with sizeable state-owned firm presence. For example, while industries with state-owned monopolies face a 13% chance of being liberalized, the probability of entry liberalization is more than twice as high at 27% for industries with group-owned monopolies, and 52% for industries with no state-owned firms. Additionally, we find that the state is more likely to protect profitable rather than declining state-owned firms. On the other hand it appears that group-owned firms were not opposed to deregulating foreign entry. These results are robust to industry size, concentration, and workforce.

Our data have the advantage that restrictions on foreign entry were uniformly applied across all industries before 1991. By focusing on a discrete policy change rather than changes in a continuous

[2] The 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 individual firm in an industry. The value of the Herfindahl index can range from 0 in perfectly competitive industries to 1 in industries with a single producer monopoly.

measure of protection, we avoid the causality problem that industry characteristics have evolved endogenously in response to existing differences in barriers to foreign entry across industries. [3]

The results identify profitable concentrated industries and state-owned firms as politically influential incumbents who affect the pattern of liberalization. One issue is whether the new policy protects politically influential firms that have been protected all along, or whether current industry and firm characteristics contribute to the ability of these firms to keep out foreign competition. If, however, the government was simply protecting the same firms it has protected in the past, other reforms such as trade and domestic entry liberalization should display a similar pattern. Instead, import restrictions were removed in all industries except consumer products, and tariffs were reduced for almost all capital goods (Ahluwalia, 1995). In the case of domestic entry liberalization or "delicensing," the government removed entry barriers in all but a few industries which were identified as being of strategic interest (Office of the Economic Advisor, 2001). In contrast, foreign direct investment was liberalized in just 46 of 97 three-digit industrial categories. Note also that in 1991 the prevailing industrial structure in India was in large part an outcome of state-led "commanding heights" industrialization policies.

To further disaggregate the influence of incumbent firms we use "excess concentration," the difference between Indian concentration and U.S. concentration in the same industries, where U.S. concentration captures the "natural" level of concentration representing underlying technologies in a developed financial market with few regulations. We find that the likelihood of liberalization is negatively correlated with excess industry concentration. Consistent with Rajan and Zingales (2003 a, b), the result suggests that the industrial policies of the past have created powerful incumbent firms who use their current market power and connections to the state to oppose financial market reforms.

An alternative explanation for the above pattern of selective liberalization is that industry concentration is a proxy for natural monopolies or industries of strategic importance. We find that concentration continues to be significantly negatively correlated with the probability of liberalization after

[3] In studies that examine the political economy of trade in the U.S. there is a concern that industry characteristics are an endogenous outcome of differences in tariff barriers across industries (Gawande and Krishna, 2004).

excluding industries that can be classified as natural monopolies and industries on the government's strategic list.

The paper also contributes to the literature that documents the relationship between financial constraints and product market competition (Chevalier and Scharfstein, 1995, 1996; Cetorelli and Strahan, 2005) and the relationship between financial market development and economic growth (Bekaert, Harvey, and Lundblad, 2005; Rajan and Zingales, 1998). Given the widely documented inefficiencies of state-owned enterprises (Li, 1997; Gupta, 2005; Megginson, 2005), and the deadweight loss associated with industry concentration, selective entry liberalization to protect these incumbent firms may inhibit economic growth. Since 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, in order to optimally implement reforms.

We do not observe voting records in parliament or lobbying contributions that are often used to measure political activity. Detailed parliamentary records for the liberalization measure studied in this paper are not available, and corporate lobbying contributions are illegal in India. A potential concern with using data on lobbying contributions, if available, is that the political activities of incumbents and the policy positions of politicians may be simultaneously determined. It is, however, difficult to make a similar claim for the ex-ante stake of incumbent firms that lies at the core of the identification strategy in this paper.

An alternative approach is to investigate the impact of foreign entry liberalization on incumbent firms. If reducing foreign entry barriers contributes to a decline in market shares and profit margins, incumbent firms may be more likely to lobby against liberalization. Descriptive statistics confirm this hypothesis.

In Section 2 we discuss the economic reforms and industrial structure in India. In Section 3 we provide testable hypotheses and describe our methodology. Section 4 describes the data. Section 5 discusses the relationship between industry characteristics and the likelihood of foreign direct investment liberalization. Section 6 describes the relationship between the likelihood of liberalization and the

ownership of incumbent firms in that industry. Section 7 provides summary statistics describing the effects of foreign entry liberalization on incumbent firms. In Section 8 we provide additional robustness checks, and Section 9 concludes.

2. Reforms and Industrial Structure

In this section we discuss the economic reforms undertaken by the Indian government in 1991 and the foreign direct investment liberalization measure studied in this paper. We also describe the policies governing the evolution of India's industrial structure prior to the 1991 reforms. Finally, we compare concentration ratios in Indian industries with concentration ratios of the same industries in the U.S. as a benchmark.

2A. Liberalizing Foreign Entry in India

In competitive markets ownership patterns and industrial concentration are determined by the interaction between technological characteristics and the competitive process in an industry. Before 1991, ownership and industry concentration patterns in India were an outcome of state-led industrialization policies rather than of market forces. Table A1 presents a chronology of industrial reforms that confirm that the evolution of India's industrial structure was in large part determined by industrialization policies that restricted the participation of private and foreign firms in the economy. For example, the Industrial Policy Resolution of 1956 reserved certain industries for state-owned firms, prohibiting the entry of all private firms in these sectors. In addition, a draconian regulatory framework, popularly known as the "License Raj," required government approval for the entry of new firms and even the expansion of existing establishments.

Before 1991, government approval also was required for foreign direct investment in all industries. The complex system of controls severely restricted foreign direct investment flows. To illustrate, in 1991 total foreign direct investment flows into India were $73.5 million. In contrast, China

received $4.4 billion in foreign direct investment that year (World Development Indicators, The World Bank, 1991).

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. As part of a bailout package, the International Monetary Fund pushed for liberalization following the crisis, but it did not design the specific reforms. Instead, the architects of the 1991 reforms were Government of India bureaucrats, similar to Mexico's foreign investment liberalization policies of 1989 and 1993, which were also designed by government technocrats. According to the *Industrial Policy Resolution of 1991* (Office of the Economic Advisor, 2001), which outlined the reforms, automatic approval was granted to foreign direct investment of up to 51% in 46 of 97 three-digit industrial categories; government approval was no longer required for the expansion and diversification of foreign firms in these industries. In the remaining 51 industries the state continued to require that foreign investors obtain approval for any investment. Table A2 provides the list of liberalized industries.

The liberalization of foreign direct investment has had a notable impact on gross capital formation in India. In 1991, foreign direct investment as a fraction of gross capital formation was close to zero. Ten years later, in 2001, foreign direct investment accounted for four percent of gross capital formation in the Indian economy (World Development Indicators, The World Bank, 1991).

2B. Comparing Industry Concentration Between the United States and India

To investigate whether in the pre-reform period India's industrial structure was similar to that of other economies, we compare industrial concentration for the same industries in India and the United States. As an economy with well-functioning financial markets and fewer regulations than most countries, the U.S. offers a benchmark of industry characteristics that represent underlying technologies rather than institutional constraints (Rajan and Zingales, 1998). Data on U.S. industry concentration is calculated using firm-level data from Compustat, and the data on Indian firms is described below.

From Table 1 we see that in 1990, a year prior to the reforms in India, average industry concentration in the U.S., measured by the Herfindahl Index, was significantly lower at about 24%, compared to 40% in the same three-digit SIC level industries located in India.[4] Note that the average Herfindahl index in Indian industries that retained barriers to foreign direct investment was significantly higher at 54% compared to 22% for the same industries in the United States. Equality-of-means tests show that both differences are statistically significant at the 1% level.

Given that average industry concentration is significantly lower in the U.S., the statistical comparison suggests that Indian industries were more concentrated due to barriers to entry, rather than technological factors that determine scale. Moreover, since Indian industries that retained barriers to foreign direct investment are significantly more concentrated than their U.S. counterparts, the comparison also suggests that removing entry barriers is likely to reduce the market power of incumbent firms in these industries.

3. Hypotheses and Methodology

The private interest view holds that interest groups such as incumbent firms may influence the government to enact policies that benefit them. In contrast, the public interest view assumes a welfare-maximizing government. Below we contrast the two views to generate testable hypotheses about industry characteristics that are likely to influence the decision to remove barriers to foreign investment in an industry.

3A. Concentrated Industries

Firms in concentrated industries are more likely to earn monopoly profits (Tirole, 1988) and therefore have an incentive to oppose entry liberalization if an increase in competition leads to a decline in these profits (Stigler, 1971). Models of collective action also suggest that concentrated industries are

[4] Effective concentration in local markets is likely to be even higher in India due to an underdeveloped transportation infrastructure.

better able to overcome the free-rider problem and successfully organize to lobby the government (Olson, 1965; Stigler, 1971; Peltzman, 1976). Hence, under the private interest hypothesis entry barriers are more likely to be retained in concentrated industries because these incumbents have both an incentive to oppose entry liberalization and the ability to successfully influence the government.

However, concentrated industries also are associated with greater deadweight losses compared to competitive industries (Pigou, 1938; Becker, 1983). From a public interest perspective the government should enact policies to promote competition by removing entry barriers in more concentrated industries. Therefore, under the public interest hypothesis entry barriers are less likely to be retained in concentrated industries because entry will improve welfare by reducing the deadweight loss in these industries. We use the Herfindahl index and the four-firm concentration ratios for the relative sales share and the relative asset share of the four largest firms in an industry to measure industry concentration.

3B. Profitable and Declining Industries

Incumbent firms have an incentive to oppose liberalization if entry causes a decline in profits (Stigler, 1971). However, while firms in industries with declining growth rates and profitability may have an incentive to oppose entry liberalization, they may lack the ability to influence the government (Kroszner and Strahan, 1998). Conversely, cash-rich incumbent firms in high-growth or profitable industries may be more influential. From the private interest perspective, the pattern of liberalization will therefore depend on the relative lobbying strength of incumbent firms in profitable versus declining industries.

According to the public interest hypothesis, a welfare-maximizing government should liberalize entry in uncompetitive industries that earn monopoly profits. However, from a welfare perspective declining industries also may benefit from more competition; hence neither the private nor the public interest views yield a straightforward prediction for the unconditional effect of profitability.

Conditioning profitability on industry concentration presents a potential avenue for distinguishing between the private and public interest hypotheses. Under the private interest hypothesis, concentrated

industries that are more profitable are more likely to oppose liberalization to protect monopoly profits. In contrast, the public interest hypothesis suggests that industries that earn monopoly profits are the ones that ought to be liberalized. We test the profitability hypotheses using several measures of profitability such as return on sales and revenues per worker.

3C. State-Owned Enterprises

In the U.S., special interest politics are typically modeled as interest groups lobbying the government where the politician benefits indirectly, for example, through campaign contributions, but is not an explicit stakeholder in the policy outcome.

However, the presence of state-owned firms gives the government an explicit stake in the outcome of a policy change. Politicians enjoy rents from controlling state-owned firms (Boycko, Shleifer, and Vishny, 1998; Shleifer and Vishny, 1998). This could be a result of the status associated with being in charge of the largest petroleum company in the country, or the power to secure employment for one's supporters, or, in the case of corrupt politicians, siphoning funds from the company. Also, since the earnings of state-owned firms accrue to the government, if deregulating an industry contributes to the decline of a state-owned firm, then government revenues will be adversely affected (Megginson, 2005). If private benefits to politicians and revenues that accrue to the government are proportional to firm size, the influence of state-owned enterprises on the decision to allow foreign investment in an industry is likely to depend on their relative stake in that industry. Hence, under the private interest hypothesis, the likelihood of entry liberalization should be inversely related to the relative stake of state-owned enterprises in that industry.

From a public interest perspective it may be argued that if state-owned firms employ more unskilled workers, the government may choose to protect workers in these firms. In this case, controlling for employment, the likelihood of entry liberalization should not be related to the presence of state-owned enterprises in that industry. To test for the importance of state-owned enterprise influence we use the share of industry output, assets, employment, and wages produced by state-owned firms.

3D. The Role of Business Groups

Indian family owned firms or business groups have historically enjoyed a close relationship with the government (Khanna and Palepu, 2004) and may have opposed foreign investment for the same reasons as other incumbent groups. However, there is also reason to expect that group-owned firms may have been in favor of liberalizing foreign entry. First, under state-led industrialization efforts since independence, the private sector was relegated to a secondary role in the economy. While the state-owned sector reaped the benefits of preferential access to credit and entry, business groups were subject to a complicated system of quotas that severely restricted their ability to participate in industrial production.[5] For example, the Monopoly and Restrictive Trade Practices Act of 1969 required that "all applications for a license from companies belonging to a list of big business houses…were to be referred to a 'MRTP Commission' which invited objections and held public hearings before granting a license for production" (see Table A1.) Business groups may therefore have favored foreign entry liberalization under the premise that they would emerge as winners if state-owned presence in the economy declined.

Second, business groups were more efficient than their state-owned counterparts and therefore less likely to be adversely affected by entry. In fact, business groups may have been in favor of foreign investment because of the potential for forming joint ventures with foreign firms.[6] Third, business groups were well diversified and may not have opposed entry liberalization if they had a minor presence in any given 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. The data provide information on a

[5] Rodrik and Subrahmanian (2004) argue that a pro-business climate did not prevail in India until late in the reform process because of the large state-owned presence in the economy.
[6] While many business groups entered into joint ventures with foreign firms, few state-owned enterprises did.

range of variables such as sales, profitability, employment, and assets for about 2,187 firms.[7] The companies covered account for more than 70% of industrial output. For all the variables used in the estimations we construct averages for the three fiscal years, 1988-1990, preceding the liberalization of foreign entry in 1991.

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 three main ownership categories: state-owned firms, business group (family owned) firms, and unaffiliated private firms.

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. The firms in the sample belong to 97 three-digit industrial categories, of which foreign entry restrictions were reduced in 46 industries. The Indian National Industrial Classification (1998) system is used to classify firms in the Prowess dataset into industries. Appendix B provides a list of industries in which foreign entry restrictions were removed. The data include firms from a wide range of industries including mining, basic manufacturing, financial and real estate services, and energy distribution.

Table 2 reports average values of the concentration measures and the stakes of the two main ownership groups (state-owned firms and business groups) 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.

The concentration ratio describes the market share of the four largest firms in an industrial category. The Herfindahl index is the sum of the squares of the market shares of all the firms in an industry. From Table 2 note that the proportion of output produced by state-owned firms compared to

[7] Since firms are not required to report employment information in their annual reports, we observe employment data for only 241 firms. To avoid attrition bias the estimations do not require that the data be balanced.

business groups varies across the different industrial categories. In five of the eight two-digit industrial categories, state-owned firms do not produce the largest share of output. The cross-sectional variation in market share across ownership categories allows us to identify the relative effects of size and ownership.

Table 3 reports results from univariate tests comparing industries that remove barriers to foreign entry with industries that do not. First, state-owned firms have a higher market share and control a larger share of fixed assets in industries which retain entry barriers, compared to state-owned firms in liberalized industries. Second, state-owned firms appear to be significantly more profitable in industries where foreign entry barriers were retained. Third, barring market share, group-owned firms do not vary significantly in terms of size and profitability across liberalized and protected industries. In contrast to state-owned firms, the market share of group-owned firms is significantly lower in industries that retained barriers to foreign direct investment.

In summary, the univariate analysis suggests that there are significant differences between firms in the industries where barriers to foreign investment were removed relative to the industries that were kept off-limits. The regression analysis below investigates the role of incumbents in a multivariate regression framework, which permits the inclusion of other factors that may affect liberalization.

5. Do Concentrated Industries Influence the Pattern of Foreign Direct Investment 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 specification:

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

where Φ represents the standard normal cumulative distribution, j indicates the industry, and X_j represents a matrix of firm and industry-level characteristics. The main analysis uses the Herfindahl index (sum of the squares of the market share) to measure industry concentration. A probit model is estimated and marginal effects are reported for each coefficient. All the specifications correct for heteroskedasticity

using the Huber-White estimator of variance, and the standard errors are corrected for clustering at the three-digit industry level.

Consistent with the private interest hypothesis, the results reported in Table 4 suggest that the state is significantly less likely to remove foreign entry barriers in concentrated industries. The 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 while the probability of entry liberalization is 9.6% in the case of a monopoly, the least concentrated industry in the sample with a Herfindahl index of 0.025 faces an 80.3% chance of being liberalized, where the remaining covariates are evaluated at their mean values.

To investigate whether industry concentration is a proxy for natural monopolies and strategic industries we conduct additional robustness checks in Section 8 below. We also use alternative measures of industry concentration including "excess concentration," measured by the difference between Indian concentration and U.S. concentration by industry, and the four-firm sales and asset concentration ratios.

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.

5A. Why Do Incumbent Firms 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. Alternatively, unprofitable industries also have an incentive to oppose foreign entry because they may be unable to compete with foreign firms.

From the results reported in columns (2) - (4) of Table 4 it appears that the state is more likely to retain foreign entry barriers in more profitable and productive industries, measured as the ratio of *EBITDA* to sales for the four firms with the highest sales in an industry (*Profit of 4 Largest Firms)*; the

ratio of *EBITDA* to sales for all firms (*Firm Profits)*; and output per worker (*Average Product)*, respectively. The remaining specifications in Table 4 all include the variable *Profit of 4 Largest Firms*, except the specification with *Firm Profits* because the two variables are highly correlated. The results reported in columns (5) and (6) suggest that entry barriers are significantly less likely to be removed in industries that have higher contemporaneous growth rates (*Sales Growth)* and also face better future growth opportunities (*Future Sales Growth)*. The latter variable is measured as the growth rate of sales between 1992 and 1994. Hence, declining industries appear to face a higher probability of being opened up. These results are consistent with the private interest hypothesis that industries with profitable, cash-rich firms have more bargaining power than firms in declining industries (Kroszner and Strahan, 1999).

However, protecting profitable industries also is consistent with the efficiency-maximizing objective of increasing competition in less-efficient industries. One way of distinguishing between the private and public interest hypotheses is to investigate the relationship between profitability and concentration. If profitable industries are also more concentrated from a public interest perspective, the state should liberalize these industries. In Table 1 we show that industry concentration and profitability are highly positively correlated in industries that retained barriers to entry. To investigate this issue further we include the interaction between the Herfindahl index and firm profits (ratio of *EBDITA* to Sales) and the Herfindahl index and future sales growth in equation (1).

Distinct from a linear regression specification, the coefficient of the interaction term in a probit specification may not give the correct interaction effect. The conditional mean of the dependent variable is given by the following equation:

$$\begin{aligned} E[Entry\ Liberalization_j \mid Herf_j, \pi_j] &= F(\alpha_0 + \alpha_1 Herf_j + \alpha_2 \pi_j + \alpha_{12} \pi_j \times Herf_j) \\ &= F(u) \end{aligned} \tag{2}$$

where F represents the standard normal cumulative distribution and u is the index. The interaction effect is the change in the predicted probability that *Entry Liberalization* = 1 for a change in both the Herfindahl index and the industry-level profitability measure, π_j ,

$$\frac{\Delta^2\left(\frac{\partial F(u)}{\partial x_{i,j}}\right)}{\Delta\pi_j} = \frac{\Delta[(\alpha_1 + \alpha_{12}Herf)\,f(u)]}{\Delta\pi_j} = (\alpha_1 + \alpha_{12})\,f\,((\alpha_1 + \alpha_{12})\pi_j + \alpha_2) - \alpha_1 f\,(\alpha_1 Herf_j) \qquad (3)$$

where *f (u) = F'(u)*. Note that even if the coefficient of the interaction term, α_{12}, is equal to zero, the interaction effect may not be zero. Since the marginal effect of the *dprobit* routine in Stata will not provide the true marginal effect of the interaction term, equation (2) is estimated using the interaction effects routine developed by Norton, Wang, and Ai (2004). The results are reported graphically in Figures 1 and 2.

In a non-linear probit specification the mean interaction effect will vary over the distribution. Figures 1a and 2a graph the coefficient of the correct mean interaction effect, represented by the dotted line, over the distribution of the dependent variable for *Firm Profits* and *Future Sales Growth*, respectively. Figures 1b and 2b graph the z-statistic of the coefficient of the correct mean interaction effect over the distribution of the dependent variable, also represented by the dotted line. The graphs show that the coefficients of the interaction terms between industry concentration and the profitability and growth opportunity variables are negative and highly statistically significant over a considerable range of the distribution. In industries with similar levels of concentration, higher profitability and higher future sales growth appears to reduce the likelihood of entry liberalization.

The industry level results support a private interest story: Barriers to foreign entry are more likely to be retained in industries with a few, profitable firms that seek to protect their monopoly profits.

5B. Does Labor Influence Foreign Entry Liberalization?

To investigate if the Herfindahl index is a proxy for other sources of interest group influence, such as organized labor, the regressions include total employment and wages by industry. From the results reported in columns (7) - (9) of Table 4, it appears that neither total employment nor average wages have a significant impact, and that 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 due to the fact that they are also the largest employers in an industry. Below we show that the influence of labor may depend on the ownership of the incumbent firms. Also, since firms are not required to report employment in annual reports, we observe employment for a smaller subset of firms. Another institutional issue is that the majority of manufacturing sector workers are employed in the "small-scale industry" sector, which includes firms with 50 or fewer employees. Industries in this category are primarily in the textile sectors and are 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 decision to liberalize entry.

6. Does the Influence of Incumbent Firms Vary by Ownership Category?

6A. State-Owned Firms

We begin by estimating the following probit specification to include the role of different ownership groups:

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

where *F* represents the standard normal cumulative distribution, *j* represents the industry with a total of *i*=1…*I* firms, a subset of which are state-owned firms. Note that we estimate the impact of state-owned firms and group-owned firms separately since the shares of these two categories of firms collectively account for a very large fraction of total industrial output in many industries (Table 2). The *SOE Stake* variables measure the relative stake of state-owned firms in an industry. 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. We also include the profitability of state-owned firms in an industry. The $\mathbf{X}_j$ vector includes the Herfindahl index, industry sales, assets, wages, and employment. A heteroskedasticity adjustment is done using the Huber-White estimator for variance, and the standard errors are clustered at the three-digit industry level. The results are presented in columns (1) - (7) of Table 5.

From column (1) of Table 5 note that the greater the proportion of an industry's output produced by state-owned firms, the lower the probability of entry liberalization. The same result holds for the share of assets controlled by state-owned enterprises (column 2). These results are robust to industry concentration, size, and wages.

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 13% chance of being liberalized while the probability of entry liberalization is four times as high at 52% for industries with no state-owned firms, where the remaining covariates are evaluated at their mean values.

Does the government protect state-owned firms from foreign direct investment because of the monopoly profits they earn or because the firms are inefficient? The results in columns (3) and (4) for returns to sales and output per worker in state-owned firms suggest the former: Industries with profitable and productive state-owned enterprises are more likely to be protected.

The results also suggest that state-owned firm workers may be more influential than employees of private firms. The probability of foreign entry liberalization is significantly lower the greater the proportion of an industry's workers employed in state-owned firms and the higher the share of total industry wages paid by state-owned firms (columns (5) and (6)). However, industries with higher average wages per worker are significantly less likely to be liberalized, which is consistent with the private interest hypothesis that workers earning high wages are more likely to seek protection.

6B. Family Owned Firms

To look at the potential influence of incumbent firms owned by Indian business groups we estimate the probit specification below:

$$\Pr(\textit{Entry Liberalization}_j = 1) = \Phi(\alpha_0 + \alpha_1 \textit{Group Stake}_j + \alpha_2 X_j + \varepsilon_j) \qquad (5)$$

where the *Group Stake* variables measure the proportion of industry sales, assets, employment, and wages produced by group-owned firms, and the remaining variables are the same as defined above.

In Columns (8) - (14) of Table 5 the coefficients on the variables measuring group-owned firm presence are positive and statistically significant only for the shares of assets, wages, and labor. From the specification in column (8) the probability of entry liberalization is estimated as 27% for a group-owned monopoly, more than double that of 13% for a state-owned monopoly as reported above. Compared to state-owned firms, either family owned firms were in favor of foreign entry liberalization, or they did not lobby the state to prevent it. Therefore, family owned firms may have sought to reduce the influence of the state or gain access to capital and technology from foreign entrants through liberalization.

6C. Does Geographic Concentration 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 likely to be affected by this policy. Using data on 26 states and 96 industries we estimate the following specification:

$$\Pr(\textit{Entry Liberalization}_j = 1) = \Phi(\alpha_0 + \alpha_1 \textit{Industry Share}_{j,k} + \alpha_2 \textit{Concentration}_{j,k} + \alpha_3 \textit{SOE Share}_{j,k} + \alpha_4 X_{j,k} + \varepsilon_{j,k}) \quad (6)$$

where Φ represents the standard normal cumulative distribution, *j* indicates the industry, and *k* the state. 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 enterprises in each state by industry. Finally, X_{jk} represents a matrix of industry and state-level characteristics in each state, including industry profitability and size, and state per capita income.

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 share of assets, wages, and employment. We also find that the coefficients of the Herfindahl Index, industry profitability, and the stake of state-owned enterprises in each state by industry, are negative and highly significant. 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. One interpretation of these results is that politicians seeking reelection may have a greater incentive to cater to the interests of incumbent firms and to preserve private benefits from state-owned firms, such as securing employment for supporters, in their home states.

7. How Does Foreign Entry Affect Incumbent Firms?

Thus far the results suggest that particular incumbent firms and industries have more influence on the pattern of foreign direct investment liberalization. However, we do not observe direct evidence of incumbent influence such as corporate lobbying contributions, which are illegal in India. Another approach is to investigate whether incumbent firms have an incentive to oppose foreign entry by considering the impact of this reform on the market share and profitability of firms in industries in which barriers to foreign investment are removed.

Since our results suggest that the decision to relax foreign entry barriers in some industries may depend on incumbent firm characteristics, this rules out a "difference-in-difference" regression analysis with a control group of industries which retain barriers to foreign entry. Instead, we consider the "before-after" impact of foreign entry liberalization on incumbent firms in industries in which barriers to foreign entry were removed. We restrict our sample to two years of pre-liberalization performance (1989 and 1990) and two years of post-liberalization performance (1992 and 1993) in order to reduce the confounding impact of other economic reforms undertaken in subsequent years.

From the results described in Table 7 it appears that firms have an incentive to oppose foreign entry liberalization because the market share of incumbent firms and industry concentration decline

significantly following the policy change. However, closer examination reveals that while the market share of all firms falls following foreign entry liberalization, firm profits fall significantly only for state-owned firms in liberalized industries. Firm profits for family owned firms remain unaffected by foreign entry liberalization. The finding is consistent with the hypothesis that group-owned firms may not have opposed foreign entry.

We do not claim that the decline in market share and profitability is entirely due to foreign entry liberalization. To establish a causal impact of liberalization on the market share and profitability of firms we would need to address the potential endogenous timing of this reform, and the impact of contemporaneous economic reforms.

8. Additional Tests and Robustness Checks

Our results identify concentrated industries and state-owned firms as politically influential incumbents that affect the pattern of financial market reforms. Our data have the advantage that restrictions on foreign entry were uniformly applied across all industries before 1991, hence we avoid the endogeneity problem that industry characteristics have evolved in response to existing differences in barriers to foreign entry across industries. Another issue is whether our results reflect the fact that the state is simply protecting industries that were protected in the past, or whether the ability of these firms to keep out foreign competition also depends on their current market power and ownership. To capture influence arising out of market power we use industry concentration in the U.S. as an instrumental variable for industry concentration in India. The results (not reported) suggest that industry concentration in the U.S. cannot explain foreign direct investment liberalization in India. However, U.S. and Indian industry concentration are not significantly correlated, suggesting that the former is not an effective instrument for the latter.

An alternative approach is to use "excess concentration," the difference between Indian concentration and U.S. concentration in the same industries, which measures market power over and above the "natural" level of concentration in a well-developed financial market, such as the U.S. Columns

(1) and (2) of Table 9 examine 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 that an industry will be liberalized. Consistent with Rajan and Zingales (2003 a, b), this result suggests that the state-led industrial policies of the past have created powerful incumbent firms that use their current market power and connections to the state to oppose liberalization of foreign entry.

Table 9 also uses the four-firm sales concentration ratio and the four-firm asset concentration ratio as alternative measures of industry concentration. The results are very similar to the ones described above: The coefficients on the four-firm sales and the four-firm asset concentration ratios are negative and statistically significant in all the specifications.

Finally, it also may be the case that the state 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 in two ways. First, we exclude 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 Table 8 show that industry concentration continues to have a significant and negative impact on the probability of entry liberalization when natural monopolies and strategic industries are excluded. Second, the inverse relationship between entry liberalization and industry concentration continues to hold when we include a strategic industry and natural monopoly dummy for the full sample of industries.[8]

9. Concluding Remarks

In this paper we investigate the influence of incumbent firms on the selective removal of barriers to foreign direct investment in a subset of industries in India. The liberalization of foreign direct investment is likely to invoke considerable opposition from domestic firms and presents an ideal opportunity to examine the impact of domestic incumbents on the policy process. Our results suggest that

[8] To save space we do not report this result.

both 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 state 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.

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Appendix - Description of Variables

Variables	Definition
State-Owned (SOE)	Firms majority owned by the state or federal governments
Group Owned	Firms majority-owned by a business 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.
Unaffiliated Private	Privately owned firm not affiliated to a Business Group.
Sales	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.
Industry Sales	The sum of *Sales* across all firms in that industry
Assets	Gross fixed assets of an firm, which includes movable and immovable assets as well as assets which are in the process of being installed
Industry Assets	Sum of *Assets* across all firms in that industry
Employment	Number of employees in a firm
Industry Employment	Sum of *Employment* across all firms in that industry
Wages	Salaries paid to workers
Industry Wages	Sum of Wages across all firms in that industry
Wages per Worker	Ratio of *Wages* to *Employment* in each firm averaged across firms in an industry
Market Share	Ratio of *Sales* to *Industry Sales* for a firm
Average Product	Ratio of *Sales* to *Employment*
Industry Average Product	Ratio of *Industry Sales* to *Industry Employment*
EBDITA	Excess of income over all expenditures except tax, depreciation, interest payments, and rents in a firm
Firm Profits	Ratio of *EBDITA* to *Sales* in a firm, averaged across firms in an industry
Profit of 4 Largest Firms	Ratio of *EBDITA* to *Sales* of the four largest (in terms of sales) firms in an industry
Sales Growth	(*Industry Sales* -Lagged *Industry Sales*)/Lagged *Industry Sales*
Future Sales Growth	*Sales Growth* for the period 1992-1994
Capital Intensity	Ratio of *Industry Assets* to *Industry Employment*
NIC Code	Three-digit industry code includes manufacturing, financial, and service sectors
Herfindahl Index	Sum of the squares of the market shares of all firms in an industry in each three-digit industrial category
Concentration Ratio	Ratio of the sum of *Sales* of the four firms with highest sale revenues in each industry to *Industry Sales* in each three-digit industrial category
Asset Concentration	Ratio of the sum of *Assets* of the four firms with largest asset size in each industry to *Industry Assets* in each three-digit industrial category

Table A1: Key Changes in India's Industrial Policy Regime: Evolution of Industrial Concentration and State-Ownership

Industries (Development Regulation) Act of 1951	Specified the Schedule I industries where licenses were required for firms with fixed investment above a certain level of investment or import content of investment above a certain level.
Companies Act, 1951	Restrictions on the operation of managing agencies, which affected the operation of many British companies in India.
Industrial Policy Resolution, 1956	Articulated the role of public investment in planned development and specified: Schedule A: industries reserved exclusively for state enterprises. Schedule B: industries where further expansion would be by state enterprises.
Corporate Tax policies, 1957-1991	Specified rates of corporate tax on companies incorporated outside India. These were usually between 15-20% higher than the rates applied to large Indian companies during this period.
Monopolies and Restrictive Trade Practices Act, 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 irrespective of size.
Industrial Policy Statement, 1973	Specified the criteria and list of Appendix I of 'core' industries to which large business houses and foreign firms were to be confined. Main criteria for being an Appendix 1 industry were that of local non-availability or domination of a sector by a single foreign firm. Schedule A industries from IPR, 1956 could not figure in the Appendix 1 list.
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 (as defined in IPS, 1973). (ii) The company was using sophisticated technology or met certain export commitments.
Policy Statements, 1985	Business houses were not restricted to Appendix 1 industries as long as they moved to industrially backward regions. Minimum asset limit defining business houses was raised from Rs. 200 million to Rs. 1 billion
New Industrial Policy, 1991	Abolished licensing for all except 18 industries. Large companies no longer needed MRTP approval for capacity expansions. Number of industries reserved for the public sector in Schedule A (IPR1951), cut down from 17 to 8; Schedule B was abolished altogether. Limits on foreign equity holdings were raised from 40 to 51% in a wide range of industries.

Sources: Adapted from Sivadasan, 2004.

Table A2: 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 dataset into industries. Column 1 presents the NIC code. Column 2 presents the industry descriprion. Column 3 presents the number of firms in each three-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 product	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 & 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
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, and apparatus for line telephony and 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 & semi-trailers	1
343	Manufacture of parts and accessories for motor vehicles and their engines	74
351	Building and repair of ships and 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 1

Comparing Concentration Ratios in India and the U.S. Before Foreign Direct Investment Liberalization

This table compares Herfindahl Indices in India with Herfindahl Indices of the same industries in the U.S. in 1990. The first panel shows within-country summary statistics across the same three-digit industry categories for India and the U.S. 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 U.S. Standard deviations are in parentheses. The third panel describes the correlation between *Firm Profits* and the *Concentration Ratio* across industrial categories.

	India	US	Equality of Means t-test
Herfindahl Index	**0.399**	0.236	4.338***
	(.034)	(.024)	
Minimum	0.025	0.010	
Maximum	1	1	
Number of Industries	75	75	

	Herfindahl Index			
	India	US	Equality of Means t-test	*Number of Industries*
Protected Industries	**0.539**	0.216	6.047***	38
	(.047)	(.035)		
Liberalized Industries	0.255	0.257	-0.041	37
	(.034)	(.031)		

	Correlation Between Industry Concentration and			
	Profitability		**Future Sales Growth**	
	Correlation coefficient	p-value	Correlation coefficient	p-value
Full Sample	**0.061**	0.553	**0.223**	0.029**
Protected Industries	**0.589**	0.000***	0.149	0.299
Liberalized Industries	**-0.687**	0.000***	0.095	0.531

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%

Table 2

Industry Concentration and Ownership Composition Varies Across Industries

This table reports mean values of variables measuring industry concentration and the composition of ownership categories across industries from 1988-1990. 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. The *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 *Group* refers to firms owned by Indian Business Groups. *SOE Sales Share* is the sum of sale revenues of SOEs in each industrial category divided by total sale revenues in that industry, and *Group Sales Share* is the sum of sale revenues of business group owned firms in each industrial category divided by total sale revenues in that industry. *Profits* is the average ratio of *EBITDA* to *Sales* averaged across firms in each industry. Standard deviations are reported in parentheses.

Industry Code	Concentration Ratio	Herfindahl Index	Asset Concentration	SOE Sales Share	Group Sales Share	SOE Profitability	Group Profitability	Number of 3-digit Industries	Number of SOEs	Number of Group Firms
100-199	0.878	0.489	0.878	0.316	0.373	1.162	0.105	22	46	203
	(.237)	(.296)	(.223)	(.409)	(.527)	(4.332)	(.304)			
200-299	0.668	0.264	0.696	0.250	0.599	0.071	0.139	21	85	469
	(.237)	(.273)	(.221)	(.326)	(.289)	(.138)	(.049)			
300-399	0.874	0.385	0.876	0.275	0.579	-0.260	0.100	21	35	148
	(.152)	(.266)	(.152)	(.397)	(.395)	(1.095)	(.086)			
400-499	0.766	0.236	0.847	0.446	0.539	0.126	0.025	3	21	31
	(.162)	(.062)	(.159)	(.186)	(.176)	(.314)	(.157)			
500-599	0.865	0.462	0.888	0.261	0.429	0.052	0.112	9	30	60
	(.154)	(.357)	(.125)	(.343)	(.412)	(.087)	(.063)			
600-699	0.934	0.541	0.938	0.600	0.382	0.365	0.571	9	51	65
	(.103)	(.282)	(.089)	(.400)	(.402)	(.282)	(.439)			
700-799	0.988	0.785	0.980	0.578	0.409	-0.021	0.225	8	10	18
	(.027)	(.295)	(.043)	(.494)	(.478)	(.183)	(.329)			
800-999	1.000	0.919	1.000	0.598	0.333	0.234	0.250	3	2	1
	(.000)	(.140)	(.000)	(.528)	(.577)	(.133)				

Table 3

Industry and Firm Characteristics Before Liberalization of Foreign Direct Investment

This table reports mean values of industry and firm characteristics in protected and liberalized industries for the period 1988-1990. *Market Share* is defined as the ratio of the sum of sales of a particular ownership group in each industrial category divided by aggregate sales in that industry. *Firm Profits* is the ratio of *EBDITA* (excess of income over all expenditures except tax, depreciation, interest payments, and rents) to sales, averaged across firms in each industrial category. *Asset Size* is gross fixed assets averaged across firms in each industrial category. *Sales* is average revenues from main activity at the firm level. Standard deviations of means are in parentheses.

Ownership Category	**Protected Industries**	**Liberalized Industries**	**Equality of means t-test (p-value)**
		Market Share	
State-Owned Enterprise	**0.481**	0.205	3.609 ***
	(.060)	(.046)	
Group Owned	0.414	**0.627**	-2.896 ***
	(.056)	(.047)	
Unaffiliated Private	0.106	0.168	-1.369
	(.031)	(.033)	
		Firm Profits	
Full Sample	-0.005	0.112	-0.801
	(.226)	(.006)	
State-Owned Enterprise	**0.287**	-0.043	2.850 ***
	(.097)	(.050)	
Group Owned	-0.267	0.139	-1.476
	(.478)	(.003)	
Unaffiliated Private	**0.156**	0.109	2.127 **
	(.023)	(.010)	
		Asset Size	
Full Sample	**512.496**	112.225	7.764 ***
	(76.589)	(9.132)	
State-Owned Enterprise	**1650.841**	495.839	3.876 ***
	(262.198)	(83.703)	
Group Owned	93.428	94.934	-0.118
	(14.954)	(5.399)	
Unaffiliated Private	17.234	24.546	-1.222
	(2.467)	(3.364)	

*Notes:***significant at the 1% level, ** significant at the 5% level, * significant at the 10% level*

Table 4

Does Industry Concentration Affect the Probability of Foreign Entry Liberalization?

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. The *Herfindahl Index* is the sum of the squares of the market shares of all firms in an industry in each three-digit industrial category. *Firm Profits* is the ratio of EBDITA to sales in a firm, averaged across all firms in an industry. *Profit of four Largest Firms* is the average ratio of *EBDITA* to sales of the four largest (in terms of sales) firms in an industry. *Industry Average Product* is the ratio of aggregate sales to aggregate employment in each industry. *Sales Growth* is equal to the contemporaneous growth rate of aggregate sales in an industry. *Future Sales Growth* is *Sales Growth* for the post-deregulation period 1992-1994. *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 aggregate fixed assets to aggregate employment in an industry *Wages per Worker* is the ratio of salaries to 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. Standard errors are in parentheses. Regressions are corrected for heteroskedasticity and for clustering at the industry level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Herfindahl Index	-0.880***	-0.988***	-0.981***	-1.554***	-0.951***	-1.270***	-1.453***	-1.596***	-1.280**
	(0.213)	(0.300)	(0.288)	(0.568)	(0.300)	(0.356)	(0.556)	(0.547)	(0.525)
Profit of 4 Largest Firms		-0.931***		-0.932**	-1.419***	-0.885**	-0.913**	-0.660*	-0.824**
		(0.350)		(0.381)	(0.543)	(0.367)	(0.355)	(0.339)	(0.356)
Firm Profits			-0.616*						
			(0.377)						
Industry Average Product				-0.151**					
				(0.067)					
Sales Growth					-0.186**				
					(0.086)				
Future Sales Growth						-1.030***			
						(0.296)			
Industry Employment							0.048		
							(0.060)		
Capital Intensity								-0.186**	
								(0.083)	
Wages per Worker									-0.562
									(8.730)
Industry Sales		-0.025	-0.034	-0.038	-0.045	-0.051	-0.078	-0.03	-0.072
		(0.084)	(0.077)	(0.110)	(0.094)	(0.095)	(0.108)	(0.114)	(0.106)
Industry Wages		0.022	0.012	0.007	0.034	-0.019	0.007	-0.01	0.068
		(0.083)	(0.078)	(0.118)	(0.088)	(0.092)	(0.129)	(0.124)	(0.112)
Number of Industries	96	94	96	59	93	94	59	59	59
Pseudo R-squared	0.180	0.230	0.230	0.290	0.260	0.310	0.260	0.300	0.250
Prob > chi-squared	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

*Notes: * significant at 10%; ** significant at 5%; *** significant at 1%*

Table 5

Which Firms Are More Likely to Oppose Foreign Direct Investment Liberalization?

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. *Sales Share* is the sum of sales across firms in each ownership category in an industry divided by aggregate sales in that industry. *Asset Share* is the sum of assets across firms in each ownership category in an industry divided by aggregate assets in that industry. *Firm Profits* is the ratio of *EBDITA* to sales averaged across firms by ownership category and industry. *Average Product* is the ratio of sales to employment averaged across firms by ownership category and industry. *Wage Share* is the sum of salaries across firms in each ownership category in an industry divided by aggregate salaries in that industry. *Labor Share* is the sum of employment across firms in each ownership category in an industry divided by aggregate employment in that industry. *Wages per Worker* is the ratio of wages to employment averaged across firms by ownership category and industry. The *Herfindahl Index* is the sum of the squares of the market shares of all firms in an industry in each three-di industrial category. *Industry Sales* is the log of the sum of sales across all firms in an industry. *Industry Assets* is the log of the sum of fixed assets across all firms in an industry. *Industry Wages* is the log of the sum of wages across all firms in an industry. *Industry Employment* is the log of the sum of the number of workers across all firms in that industry. Standard errors are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	State-Owned Firms							Group-Owned Firms						
Sales Share	-0.414**							0.247						
	(0.211)							(0.175)						
Asset Share		-0.554***							0.380**					
		(0.187)							(0.170)					
Firm Profits			-0.428**							-0.231				
			(0.204)							(0.354)				
Average Product				-.526**							4.819			
				(0.253)							(3.824)			
Wage Share					-0.940***							0.638**		
					(0.325)							(0.299)		
Labor Share						-0.463**							0.460**	
						(0.216)							(0.217)	
Wages per Worker							-.624**							6.187
							(0.288)							(4.799)
Herfindahl Index	-0.684**	-0.662**	-1.004***	-1.571***	-1.185**	-1.324***	-1.752***	-0.882***	-0.868***	-0.950***	-0.341	-1.342**	-1.327***	-0.503
	(0.309)	(0.292)	(0.340)	(0.503)	(0.577)	(0.488)	(0.557)	(0.295)	(0.294)	(0.348)	(0.520)	(0.555)	(0.488)	(0.688)
Industry Sales		-0.079	-0.056		-0.146*	-0.128	-0.061		-0.079	-0.032		-0.126*	-0.126	0.031
		(0.073)	(0.079)		(0.082)	(0.098)	(0.080)		(0.075)	(0.083)		(0.074)	(0.098)	(0.146)
Industry Assets	-0.095			-0.188**				-0.121*			-0.185			
	(0.071)			(0.089)				(0.065)			(0.125)			
Industry Wages	0.134*	0.127	0.069	0.19		0.127		0.125	0.082	0.023	0.204		0.126	
	(0.078)	(0.081)	(0.089)	(0.121)		(0.106)		(0.076)	(0.078)	(0.086)	(0.159)		(0.106)	
Industry Employment					0.177**		0.023					0.121*		-0.036
					(0.073)		(0.055)					(0.064)		(0.087)
Number of Industries	96	96	66	49	59	59	49	96	96	80	28	59	59	28
Pseudo R-squared	0.250	0.260	0.290	0.370	0.340	0.280	0.320	0.230	0.230	0.170	0.130	0.280	0.280	0.080
Prob > chi-squared	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

*Notes: * significant at 10%; ** significant at 5%; *** significant at 1%*

Table 6

Does Geographic Concentration Matter?

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. The *Industry Share* variables are the ratio of aggregate sales, assets, employment, and wages in each industry in a state to aggregate sales, assets, employment, and wages across all industries in that state. The *SOE Share* variables are the ratio of aggregate sales, assets, employment, and wages of state-owned enterprises in each industry by state to aggregate sales, assets, employment, and wages in that 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 4 Largest Firms* is the average ratio of *EBDITA* to sales of the four largest (in terms of sales) firms in each industry by state. *Future Sales Growth* is the growth rate of sales in each industry by state for the post-deregulation years 1992-1994. *State I -ry Wages* is the log of aggregate salaries in each industry by state. Standard errors are in parentheses. Regressions are corrected for heteroskedasticity and for clustering at the industry level.

	(1)	(2)	(3)
Industry Share in State Output	-0.567**		
	(0.290)		
SOE Sales Share	-0.355***		
	(0.067)		
Industry Share in State Assets		-0.429*	
		(0.267)	
SOE Asset Share		-0.334***	
		(0.066)	
Industry Share in State Employment			-0.597**
			(0.282)
SOE Labor Share			-0.442***
			(0.125)
Industry Share in State Wages			
SOE Wage Share			
Herfindahl Index	-0.240**	-0.246**	-0.085
	(0.107)	(0.106)	(0.185)
State Industrial Output	-0.098***	-0.092***	-0.159**
	(0.023)	(0.022)	(0.074)
Profit of 4 Largest Firms	-0.476***	-0.435***	-0.802***
	(0.127)	(0.132)	(0.305)
Future Sales Growth	-0.039**	-0.039**	-0.342*
	(0.020)	(0.020)	(0.200)
State Per Capita Income	0.049	0.038	0.034
	(0.078)	(0.078)	(0.189)
Industry Wages	0.047***	0.044**	0.046
	(0.017)	(0.017)	(0.040)
Number of Industry-States	474	474	141
Pseudo R-squared	0.16	0.16	0.25
Prob > chi-squared	0.000	0.000	0.000

*Notes: * significant at 10%; ** significant at 5%; *** significant at 1%*

Table 7

Effect of Foreign Entry Liberalization on Market Share and Profit Margins

This table provides descriptive statistics of the "before-after" effect of foreign direct investment liberalization on the market share and profitability of firms and concentration ratios in liberalized industries. The sample is restricted to industries that deregulated foreign investment and to two years before (1989-1990) and two years after (1992-1993) the policy was implemented in 1991. *Market Share* is defined as the ratio of firm sales divided by aggregate sales in that industry. *Firm Profits* is the ratio of *EBDITA* (excess of income over all expenditures except tax, depreciation, interest payments, and rents) to sales, averaged across firms in each industrial category. The *Herfindahl Index* is the sum of squares of the market shares of all firms in each three-digit industrial category. *SOE Sales/Industry Sales or* the market share of state-owned firms in an industry is measured as the ratio of the sum of sales across state-owned firms in an industry to aggregate industry sales. *Group Sales/Industry Sales* or the market share of group-owned firms in an industry is measured as the ratio of the sum of sales across group-owned firms in an industry to industry sales.

	Before Entry Deregulation	After Entry Deregulation	Before-After Difference of Means (t-test)
		Full Sample	
Market Share	**0.039**	0.033	6.911***
	(.003)	(.002)	
Number of Firms	1231	1231	
Firm Profits	0.115	0.094	1.359
	(.010)	(.019)	
Number of Firms	1231	1231	
Herfindahl Index	**0.281**	0.236	6.296***
	(.037)	(.036)	
Number of Industries	46	46	
		State-Owned Firms	
Market Share	**0.084**	0.072	3.806***
	-0.015	-0.013	
Number of Firms	115	115	
Firm Profits	**-0.072**	-0.218	1.706*
	(.085)	(.137)	
Number of Firms	115	115	
SOE Sales/Industry Sales	**0.206**	0.185	4.247***
	(.046)	(.043)	
Number of Industries	46	46	
		Group-Owned Firms	
Market Share	**0.043**	0.038	4.071***
	(.004)	(.003)	
Number of Firms	700	700	
Firm Profits	0.143	0.127	0.71
	(.007)	(.024)	
Number of Firms	700	700	
Group Sales/Industry Sales	0.622	0.639	-1.3302
	(.049)	(.044)	
Number of Industries	46	46	

*Notes: * significant at 10%; ** significant at 5%; *** significant at 1%*

Table 8

Excluding Natural Monopolies and Strategic Industries
Does Industry Concentration Affect the Probability of Foreign Entry Liberalization?

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 an industry in each 3-digit industrial category. *Industry Sales* is the log of the sum of sales across all firms in an industry. *Industry Assets* is the log of the sum of fixed assets across all firms in an industry. *Industry Wages* is the log of the sum of wages across all firms in an industry. *Future Sales Growth* is the growth rate of sales in each industry for the post-deregulation years 1992-1994. *Capital Intensity* is the ratio of aggregate fixed assets to aggregate employment in an industry. Standard errors are in parentheses. Regressions are corrected for heteroskedasticity and for clustering at the industry level.

	(1)	(2)	(3)	(4)
	Excluding Natural Monopolies and Financial Services		Excluding Strategic Industries	
Herfindahl Index	-1.185***	-1.382**	-1.314***	-1.546***
	(0.344)	(0.551)	(0.358)	(0.570)
Industry Sales	-0.055	-0.014	-0.136	-0.053
	(0.093)	(0.119)	(0.106)	(0.146)
Industry Wages	-0.004	0.008	0.045	0.027
	(0.094)	(0.134)	(0.100)	(0.149)
Future Sales Growth	-0.868***		-1.185***	
	(0.301)		(0.296)	
Capital Intensity		-0.170**		-0.200***
		(0.080)		(0.075)
Number of Industries	87	53	86	52
Pseudo R-squared	0.26	0.27	0.28	0.28
Prob > chi-squared	0.000	0.000	0.000	0.000

*Notes: * significant at 10%; ** significant at 5%; *** significant at 1%*

Table 9

Using Alternative Measures of Industry Concentration

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. *Excess Industry Concentration* is the difference between the *Herfindahl Index* in India and the *Herfindahl index* in the U.S. for the same industry, where the *Herfindahl Index* is the sum of squares of the market shares of all firms in each three-digit industrial category. The *Concentration Ratio* is the ratio of the sum of sales of the four largest firms in an industry to aggregate industry sales in each three-digit industrial category. *Asset Concentration* is the ratio of the sum of assets of the four largest (in asset size) firms in an industry to total industry assets in each three-digit industrial category. *Profit of 4 Largest Firms* is the average ratio of *EBDITA* to sales of the four largest (in terms of sales) firms in an industry. *Future Sales Growth* is the growth rate of sales in each industry for the post-deregulation years 1992-1994. *Industry Sales* is the log of the sum of sa across all firms in an industry. *Industry Wages* is the log of the sum of wages across all firms in an industry. Regressions are corrected for heteroskedasticity and for clustering at the industry level. Standard errors are in parentheses.

	(1)	(2)	(3)
Excess Industry Concentration (India - US)	-1.105***		
	(0.308)		
Concentration Ratio		-1.192**	
		(0.482)	
Asset Concentration			-1.775***
			(0.574)
Profit of 4 Largest Firms	-1.059**	-0.708**	-0.693**
	(0.477)	(0.332)	(0.320)
Future Sales Growth	-0.864*	-0.632**	-0.651**
	(0.486)	(0.265)	(0.260)
Industry Sales	0.12	0.03	0.015
	(0.113)	(0.086)	(0.085)
Industry Wages	-0.12	-0.036	-0.035
	(0.113)	(0.084)	(0.086)
Number of Industries	75	94	94
Pseudo R-squared	0.3	0.23	0.28
Prob > chi-squared	0.000	0.000	0.000

*Notes: * significant at 10%; ** significant at 5%; *** significant at 1%*

Measuring the Interaction Effect of Industry Concentration and Profitability on the Probability of Foreign Entry Liberalization

The following are graphs of the coefficient and z-statistic for the interaction term, α_2 in the specification below estimated using Norton, Wang, Ai (2004):

$$\Pr(\textit{Entry Deregulation}_j = 1) = \Phi(\alpha_0 + \alpha_1 \textit{Herfindahl}_j + \alpha_2 \textit{Herfindahl}_j \times \prod_j + \alpha_3 \prod_j + \mathbf{X}_j\boldsymbol{\beta} + \varepsilon_{i,j})$$

1. Interaction between *Herfindahl Index* and *Firm Profits* (*EBITDA/Sales*)

   Mean interaction effect (standard error) = -0.604 (0.936)

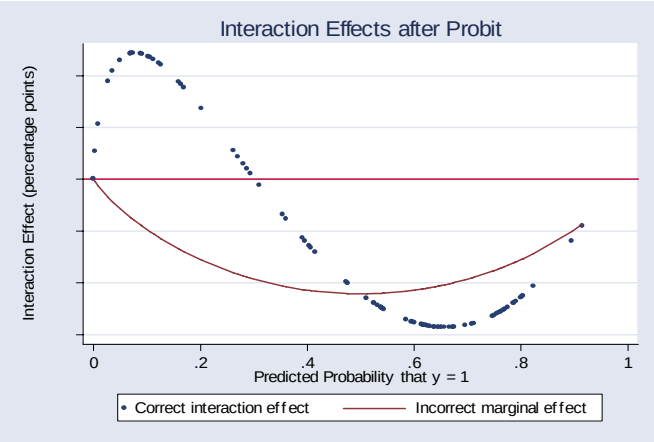

Figure 1a.

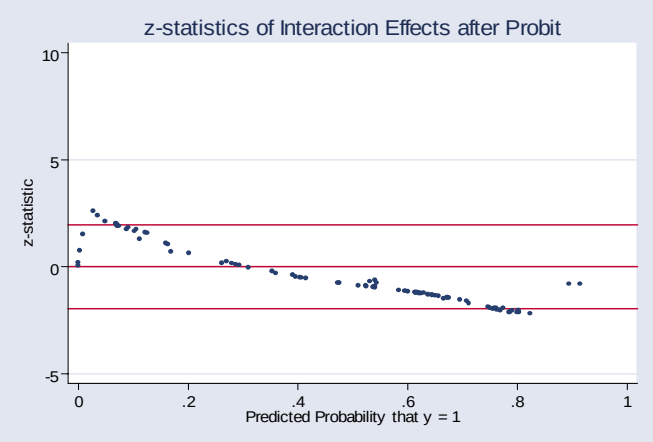

Figure 1b.

2. Interaction between the *Herfindahl Index* and *Future Sales Growth* (Sales – Lagged Sales/Lagged Sales) for the post-deregulation years 1992-1994.

   Mean interaction effect (standard error) = -0.498 (0.645)

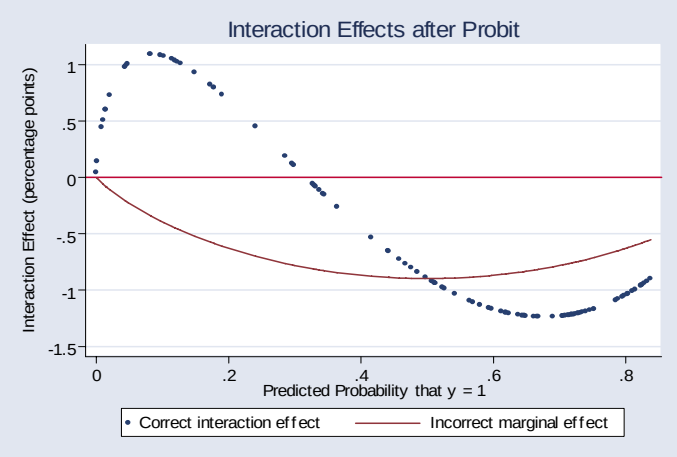

Figure 2a.

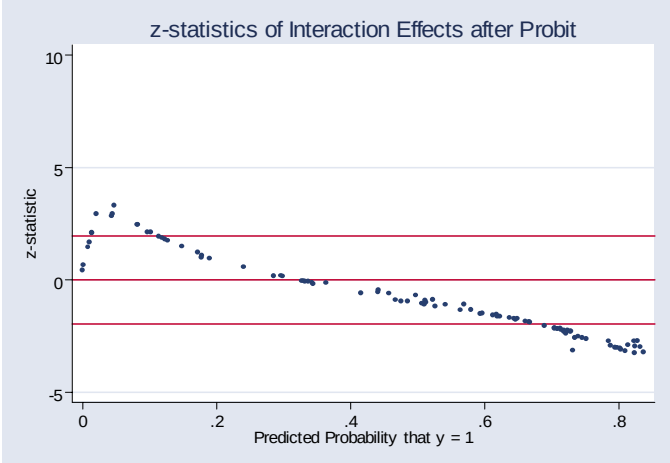

Figure 2b.