

## **The Influence of Domestic Firms on Foreign Direct Investment 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 direct investment despite evidence that such investment can increase economic growth. Why do governments postpone or fail to liberalize capital flows that can benefit the economy? Recent evidence suggests that incumbent firms oppose financial market reforms that threaten their favored status (Kroszner and Strahan, 1999; Feijen and Perotti, 2005).<sup>1</sup> Rajan and Zingales (2003a,b) and Stulz (2005) argue that entrenched incumbent firms have an incentive to oppose the liberalization of international capital flows as liberalization limits their ability to extract monopoly rents. In this paper we provide the first test of the hypothesis that incumbent firms influence the policy 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, much like the rest of the world, is characterized by the concentrated control of assets by state-owned and family-owned firms (La Porta, Lopez de Silanes, Shliefer and Vishny, 1999; Bertrand, Johnson, Samphantharak, and Schoar, 2004). In this study we 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 types of firms were most successful and under what conditions?

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. A major advantage of this data is that the ownership information permits an investigation of whether certain types of incumbent firms in an industry influence the decision to liberalize.

From a public interest perspective, the government ought to liberalize industries according to efficiency and social welfare criteria, without a role for political influence. For instance, the government

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<sup>1</sup> 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).

should liberalize foreign entry into concentrated industries since deadweight losses are likely to be higher (Pigou, 1938). In contrast, the private interest view of economic regulation characterizes the policy process as one of interest group competition where policies reflect the incentives of interest groups and their ability to successfully organize. From this perspective the liberalization of concentrated industries is less likely since incumbent firms in such industries have an incentive to protect their profits (Stigler, 1971) and since concentrated industries are better able to overcome the free-rider problem and successfully organize to lobby the government (Olson, 1965; Stigler, 1971; Peltzman, 1976; Becker, 1983; and Grossman and Helpman, 2001).

Politicians may also be more receptive to the private interests of some 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 they can 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). If allowing foreign direct investment in an industry contributes to the decline of state-owned firms, the state may have an incentive to protect the industry from foreign competition.

Moreover, in many countries, business groups or family-owned firms also tend to be large and politically influential incumbents (Morck, et al., 2005). Indian business groups are controlled by members of the same family, and are typically the largest non-state-owned firms in an industry. However, since business groups are typically diversified across different sectors, and are more efficient than their state-owned counterparts, they may have favored an easing of restrictions on foreign direct investment. Indeed in the years immediately following liberalization foreign direct investment in India occurred primarily through joint ventures with group-owned firms.

The results suggest that the likelihood of barriers to foreign entry being reduced in an industry is inversely related to its concentration. For example, the least concentrated industry in the sample with a Herfindahl index of 0.025 faces on average an 80% chance of being opened to foreign entry. In contrast, for a monopoly the probability of foreign entry liberalization is on average just 9.6%. Consistent with the

private interest hypothesis that firms in concentrated industries seek 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 may also 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 significant 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. The results also suggest 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 has the advantage that before 1991, restrictions on foreign entry were uniformly applied across industries. By focusing on a discrete policy change rather than changes to a continuous 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.<sup>2</sup> In other words, industry and firm characteristics are not a direct outcome of cross-industry differences in barriers to foreign direct investment.<sup>3</sup>

Our results identify concentrated industries and state-owned firms as politically influential incumbents who affect the pattern of foreign direct investment liberalization. However, another potential source of endogeneity is that these industry and firm characteristics may be the result of past protection

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<sup>2</sup>Another issue is whether foreign direct investment is a proxy for contemporaneous reforms such as trade liberalization. However, trade liberalization occurred in a much larger group of industries. Import restrictions were removed in all industries except consumer products, and tariffs were reduced for almost all capital goods (Ahluwalia, 1995). In contrast, foreign direct investment was liberalized in just 46 of 97 three digit industrial categories.

<sup>3</sup> 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).

from domestic competition extended to politically effective firms. In this case, is the state continuing to protect industries that were protected in the past, or does current industry concentration and state-ownership contribute to the ability of these firms to keep out foreign competition? While concentration and ownership may have evolved in response to past protection, our results suggest that consistent with Rajan and Zingales (2003a,b) entrenched incumbent firms also use their current market power to oppose foreign entry.

To capture influence arising out of underlying political effectiveness, we use “excess concentration”, the difference between Indian concentration and U.S. concentration in the same industries. This variable measures market power over and above the “natural” level of concentration in a well-developed financial market such as the U.S. We find that the likelihood of liberalization is negatively correlated with excess industry concentration, suggesting that underlying political effectiveness is a factor in the decision to allow foreign entry. However, the results also show that profitable, concentrated industries and profitable state-owned firms are more likely to oppose foreign entry. Since firms with market power are more likely to earn monopoly profits, these firms have an incentive to oppose foreign entry. This suggests that the decision to selectively retain barriers in some industries is not simply a function of past protection, but that existing market power and connections to the state contribute to the influence of incumbents on financial market reforms.

An alternative explanation for the above pattern of selective liberalization is that industry concentration proxies for natural monopolies or industries of strategic importance. We find that industry concentration continues to be significantly negatively correlated with the probability of liberalization after excluding industries that can be classified as natural monopolies and industries on the government’s strategic list. Another interpretation of our results is that the state protects profitable industries that are engines of future growth or “winners” associated with positive spillovers. The results show that industry concentration is not significantly correlated with future sales growth in industries that retained barriers.

The finding suggests that profitable industries that are protected owe their profitability to the lack of competition rather than their growth potential.<sup>4</sup>

The paper also contributes to the literature that documents the relationship between financial constraints and product market competition (Chevalier and Scharfstein, 1995, 1996; Bertrand, Schoar, and Thesmar, 2004; and 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 inefficiency of state-owned enterprises (Li, 1997; Gupta, 2005; and 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, harder 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.

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<sup>4</sup> Moreover, high growth sectors such as information technology and biotechnology were opened up to foreign direct investment in 1991.

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. Lastly, 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 state-led 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 was also 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. 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 also 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.

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, measured by the Herfindahl Index, in the U.S. was significantly lower at about 24%,

compared to 40% in the same 3-digit SIC level industries located in India.<sup>5</sup> 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 better able to overcome the free-rider problem and successfully organize to lobby the government (Olson, 1965; Stigler, 1971; and Peltzman, 1976). Hence, under the private interest hypothesis entry barriers are more

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<sup>5</sup> Effective concentration in local markets is likely to be even higher in India due to an underdeveloped transportation infrastructure.

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 are also 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. The pattern of liberalization will therefore depend on the relative lobbying strength of incumbent firms in growing industries versus incumbent firms in declining industries.

According to the public interest hypothesis a welfare-maximizing government should liberalize entry in uncompetitive industries. Therefore, a potential avenue of distinguishing between the private and public interest hypotheses is to investigate whether profitability is positively correlated with industry concentration. Under the private interest hypothesis, profitable and concentrated industries are likely to oppose liberalization in order to protect their monopoly profits. However, the public interest hypothesis suggests that industries where firms earn high profits due to a lack of competition are the ones that should be liberalized. We test the hypotheses using data about growth in future sales (a proxy for growth expectations) and 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 usually 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 the policy. Politicians enjoy rents from controlling state-owned firms (Boycko, Shleifer and Vishny, 1998; Shleifer and Vishny, 1998). For example, 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 this hypothesis 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 are also reasons why group-owned firms may have

been in favor of this policy. First, under the state-led industrialization efforts following 1947, 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.<sup>6</sup> 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.)

Ex ante, business groups may have favored foreign entry 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.<sup>7</sup> Third, business groups were well diversified and may not have opposed entry liberalization if they had a minor presence in any given industry. The private interest hypothesis therefore does not yield a clear prediction about the influence of business groups on the likelihood of entry liberalization.

#### **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 range of variables such as sales, profitability, employment, and assets for about 2,187 firms.<sup>8</sup> The companies covered account for more than 70 percent 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.

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<sup>6</sup> 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.

<sup>7</sup> While many business groups entered into joint ventures with foreign firms, few state-owned enterprises did.

<sup>8</sup> 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.

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 3-digit industrial categories used in the empirical analysis into 2-digit industrial categories. The regression analysis employs the 3-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 business groups varies across the different industrial categories. In five of the eight 2-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:

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

where  $\Phi$  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 3-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. This result is robust to a wide range of industry characteristics including size, profitability, productivity, and employment measures. From the specification reported in column (1) we estimate that 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 4-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 could 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 is also 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 then 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:

$$E[\text{Entry Liberalization}_j \mid \text{Herf}_j, \pi_j] = F(\alpha_0 + \alpha_1 \text{Herf}_j + \alpha_2 \pi_j + \alpha_{12} \pi_j \times \text{Herf}_j) \\ = F(u) \quad (2)$$

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,  $\pi_j$ ,

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

where  $f(u) = F'(u)$ . Note that even if the coefficient of the interaction term,  $\alpha_{12}$ , 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. The ownership analysis below further explores the role of profitability by ownership category on the likelihood of entry liberalization.

### ***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 the 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 arise from 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:

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

where  $F$  represents the standard normal cumulative distribution,  $j$  represents the industry with a total of  $i=1 \dots I$  firms, a subset of which are state-owned firms. Note that we estimate the impact of state-owned firms and group-owned firms separately as 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 3-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. 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:

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

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.

The ownership analysis suggests that family-owned firms did not oppose foreign entry. These firms may have sought to reduce the influence of the state, or to gain access to capital and technology from foreign entrants.

### 6C. *Does Geographic Concentration Explain the Pattern of Liberalization?*

One 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:

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

where  $\Phi$  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 3-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. Lastly,  $X_{jk}$  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 state.

## **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) so as 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. This 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 Robustness Checks**

Thus far, our results identify concentrated industries and state-owned firms as politically influential incumbents who affect the pattern of financial market reforms. Given the history of state-led industrialization, do our results simply reflect the fact that the state is protecting industries that were protected in the past, or does the ability of these firms to keep out foreign competition also depend on their market power and ownership?

To capture influence arising out of market power rather than underlying political effectiveness, 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.

Another 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. This variable may capture the underlying political effectiveness of these industries. Columns (1) and (2) of Table 9 examine whether excess concentration has explanatory power in determining the pattern of liberalization in India. The results confirm that the greater the excess concentration in India, the less likely that an industry will be liberalized, suggesting that underlying political effectiveness is a factor in the decision to allow foreign entry.

However, note that the results in Sections 5A and 6A suggest that profitable, concentrated industries and profitable state-owned firms are more likely to oppose foreign entry. Taken together the evidence suggests that the decision to selectively retain barriers in some industries is not simply a function of past protection, but that the market power and ownership of incumbent firms contribute to their influence on the decision to liberalize foreign investment.

Table 9 also uses the 4-firm sales concentration ratio and the 4-firm asset concentration ratio as alternative measures of industry concentration. The results are very similar to the ones described above: The coefficients on the 4-firm sales and the 4-firm asset concentration ratios are negative and statistically significant in all the specifications.

Finally, it may also 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.

## **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. Our results suggest that both the concentrated control of industrial assets and output by a few firms as well as the identity of incumbent firms has a significant influence on the pattern of entry liberalization. Specifically, the state is significantly more likely to retain foreign entry barriers in concentrated industries and in industries with

significant 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 A - Description of Variables

Variables	Definition
<i>State-Owned (SOE)</i>	Firms majority-owned by the Federal and State Governments.
<i>Group Owned</i>	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.
<i>Unaffiliated Private</i>	Privately owned firm not affiliated to a Business Group.
<i>Sales</i>	Sales generated by a firm from its main business activity measured by charges to customers for goods supplied and services rendered. Excludes income from activities not related to main business, such as dividends, interest, and rents in the case of industrial firms, as well as non-recurring income.
<i>Industry Sales</i>	The sum of <i>Sales</i> across all firms in that industry.
<i>Assets</i>	Gross fixed assets of an firm, which includes movable and immovable assets as well as assets which are in the process of being installed.
<i>Industry Assets</i>	Sum of <i>Assets</i> across all firms in that industry.
<i>Employment</i>	Number of employees in a firm.
<i>Industry Employment</i>	Sum of <i>Employment</i> across all firms in that industry.
<i>Wages</i>	Salaries paid to workers.
<i>Industry Wages</i>	Sum of <i>Wages</i> across all firms in that industry.
<i>Wages per Worker</i>	Ratio of <i>Wages</i> to <i>Employment</i> in each firm averaged across firms in an industry.
<i>Market Share</i>	Ratio of <i>Sales</i> to <i>Industry Sales</i> for a firm.
<i>Average Product</i>	Ratio of <i>Sales</i> to <i>Employment</i> .
<i>Industry Average Product</i>	Ratio of <i>Industry Sales</i> to <i>Industry Employment</i>
<i>EBDITA</i>	Excess of income over all expenditures except tax, depreciation, interest payments, and rents in a firm.
<i>Firm Profits</i>	Ratio of <i>EBDITA</i> to <i>Sales</i> in a firm, averaged across firms in an industry.
<i>Profit of 4 Largest Firms</i>	Ratio of <i>EBDITA</i> to <i>Sales</i> of the four largest (in terms of sales) firms in an industry.
<i>Sales Growth</i>	$(\text{Industry Sales} - \text{Lagged Industry Sales}) / \text{Lagged Industry Sales}$ .
<i>Future Sales Growth</i>	<i>Sales Growth</i> for the period 1992-1994.
<i>Capital Intensity</i>	Ratio of <i>Industry Assets</i> to <i>Industry Employment</i> .
<i>NIC Code</i>	Three-digit industry code includes manufacturing, financial, and service sectors
<i>Herfindahl Index</i>	Sum of the squares of the market shares of all firms in an industry in each 3-digit industrial category.
<i>Concentration Ratio</i>	Ratio of the sum of <i>Sales</i> of the 4 firms with highest sale revenues in each industry to <i>Industry Sales</i> in each 3-digit industrial category.
<i>Asset Concentration</i>	Ratio of the sum of <i>Assets</i> of the 4 firms with largest asset size in each industry to <i>Industry Assets</i> in each 3-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 I 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 I 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 I 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 3-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 description. Column 3 presents the number of firms in each 3-digit NIC category.

NIC Code	Industry Description	Number of Firms
151	Production, processing and preservation of meat, fish, fruits, vegetables, oil	39
152	Manufacture of dairy products	4
153	Manufacture of grain mill, starches & starch products, animals feeds	8
154	Manufacture of other food products	89
155	Manufacture of beverages	23
202	Manufacture of products of wood, cork, straw and plaiting materials	7
210	Manufacture of paper and paper 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 & apparatus for line telephony & telegraphy	11
323	Mfg of TV & 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 & 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 3-digit industry categories for India and the US. 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	
<i>Herfindahl Index</i>	<b>0.399</b>	0.236	4.338***	
	(.034)	(.024)		
Minimum	0.025	0.010		
Maximum	1	1		
<i>Number of Industries</i>	75	75		

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

	Correlation Between Industry Concentration and Profitability			
	Profitability		Future Sales Growth	
	Correlation coefficient	p-value	Correlation coefficient	p-value
Full Sample	<b>0.061</b>	0.553	<b>0.223</b>	0.029**
Protected Industries	<b>0.589</b>	0.000***	0.149	0.299
Liberalized Industries	<b>-0.687</b>	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 2-digit industrial categories, whereas in the regression analysis we use 3-digit categories. The 4-firm *Concentration Ratio* is the ratio of the sum of sale revenues of the 4 firms with highest sale revenues in each industry to aggregate sales in each 3-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 4 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 (.237)	0.489 (.296)	0.878 (.223)	0.316 (.409)	0.373 (.527)	1.162 (4.332)	0.105 (.304)	22	46	203
200-299	0.668 (.237)	0.264 (.273)	0.696 (.221)	0.250 (.326)	0.599 (.289)	0.071 (.138)	0.139 (.049)	21	85	469
300-399	0.874 (.152)	0.385 (.266)	0.876 (.152)	0.275 (.397)	0.579 (.395)	-0.260 (1.095)	0.100 (.086)	21	35	148
400-499	0.766 (.162)	0.236 (.062)	0.847 (.159)	0.446 (.186)	0.539 (.176)	0.126 (.314)	0.025 (.157)	3	21	31
500-599	0.865 (.154)	0.462 (.357)	0.888 (.125)	0.261 (.343)	0.429 (.412)	0.052 (.087)	0.112 (.063)	9	30	60
600-699	0.934 (.103)	0.541 (.282)	0.938 (.089)	0.600 (.400)	0.382 (.402)	0.365 (.282)	0.571 (.439)	9	51	65
700-799	0.988 (.027)	0.785 (.295)	0.980 (.043)	0.578 (.494)	0.409 (.478)	-0.021 (.183)	0.225 (.329)	8	10	18
800-999	1.000 (.000)	0.919 (.140)	1.000 (.000)	0.598 (.528)	0.333 (.577)	0.234 (.133)	0.250	3	2	1

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

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 3-digit industrial category. *Firm Profits* is the ratio of EBDITA to sales in a firm, averaged across all firms in an industry. *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. *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)
<i>Herfindahl Index</i>	-0.880*** (0.213)	-0.988*** (0.300)	-0.981*** (0.288)	-1.554*** (0.568)	-0.951*** (0.300)	-1.270*** (0.356)	-1.453*** (0.556)	-1.596*** (0.547)	-1.280** (0.525)
<i>Profit of 4 Largest Firms</i>		-0.931*** (0.350)		-0.932** (0.381)	-1.419*** (0.543)	-0.885** (0.367)	-0.913** (0.355)	-0.660* (0.339)	-0.824** (0.356)
<i>Firm Profits</i>			-0.616* (0.377)						
<i>Industry Average Product</i>				-0.151** (0.067)					
<i>Sales Growth</i>					-0.186** (0.086)				
<i>Future Sales Growth</i>						-1.030*** (0.296)			
<i>Industry Employment</i>							0.048 (0.060)		
<i>Capital Intensity</i>								-0.186** (0.083)	
<i>Wages per Worker</i>									-0.562 (8.730)
<i>Industry Sales</i>		-0.025 (0.084)	-0.034 (0.077)	-0.038 (0.110)	-0.045 (0.094)	-0.051 (0.095)	-0.078 (0.108)	-0.03 (0.114)	-0.072 (0.106)
<i>Industry Wages</i>		0.022 (0.083)	0.012 (0.078)	0.007 (0.118)	0.034 (0.088)	-0.019 (0.092)	0.007 (0.129)	-0.01 (0.124)	0.068 (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 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. *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						
<i>Sales Share</i>	-0.414**							0.247						
	(0.211)							(0.175)						
<i>Asset Share</i>		-0.554***							0.380**					
		(0.187)							(0.170)					
<i>Firm Profits</i>			-0.428**							-0.231				
			(0.204)							(0.354)				
<i>Average Product</i>				-0.526**							4.819			
				(0.253)							(3.824)			
<i>Wage Share</i>					-0.940***							0.638**		
					(0.325)							(0.299)		
<i>Labor Share</i>						-0.463**							0.460**	
						(0.216)							(0.217)	
<i>Wages per Worker</i>							-0.624**							6.187
							(0.288)							(4.799)
<i>Herfindahl Index</i>	-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)
<i>Industry Sales</i>		-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)
<i>Industry Assets</i>	-0.095			-0.188**				-0.121*			-0.185			
	(0.071)			(0.089)				(0.065)			(0.125)			
<i>Industry Wages</i>	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)	
<i>Industry Employment</i>					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 Per Capita Income* is the log of per capita GDP of each state. *Industry 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)	(4)
<i>Industry Share in State Output</i>	-0.567** (0.290)			
<i>SOE Sales Share</i>	-0.355*** (0.067)			
<i>Industry Share in State Assets</i>		-0.429* (0.267)		
<i>SOE Asset Share</i>		-0.334*** (0.066)		
<i>Industry Share in State Employment</i>			-0.597** (0.282)	
<i>SOE Labor Share</i>			-0.442*** (0.125)	
<i>Industry Share in State Wages</i>				-0.669** (0.300)
<i>SOE Wage Share</i>				-0.356*** (0.066)
<i>Herfindahl Index</i>	-0.240** (0.107)	-0.246** (0.106)	-0.085 (0.185)	-0.248** (0.106)
<i>State Industrial Output</i>	-0.098*** (0.023)	-0.092*** (0.022)	-0.159** (0.074)	-0.105*** (0.024)
<i>Profit of 4 Largest Firms</i>	-0.476*** (0.127)	-0.435*** (0.132)	-0.802*** (0.305)	-0.479*** (0.129)
<i>Future Sales Growth</i>	-0.039** (0.020)	-0.039** (0.020)	-0.342* (0.200)	-0.039** (0.020)
<i>State Per Capita Income</i>	0.049 (0.078)	0.038 (0.078)	0.034 (0.189)	0.053 (0.079)
<i>Industry Wages</i>	0.047*** (0.017)	0.044** (0.017)	0.046 (0.040)	0.055*** (0.018)
Number of Industry-States	474	474	141	474
Pseudo R-squared	0.16	0.16	0.25	0.16
Prob > chi-squared	0.000	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 3-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		
<i>Market Share</i>	<b>0.039</b> (.003)	0.033 (.002)	6.911***
Number of Firms	1231	1231	
<i>Firm Profits</i>	0.115 (.010)	0.094 (.019)	1.359
Number of Firms	1231	1231	
<i>Herfindahl Index</i>	<b>0.281</b> (.037)	0.236 (.036)	6.296***
Number of Industries	46	46	
State-Owned Firms			
<i>Market Share</i>	<b>0.084</b> -0.015	0.072 -0.013	3.806***
Number of Firms	115	115	
<i>Firm Profits</i>	<b>-0.072</b> (.085)	-0.218 (.137)	1.706*
Number of Firms	115	115	
<i>SOE Sales/Industry Sales</i>	<b>0.206</b> (.046)	0.185 (.043)	4.247***
Number of Industries	46	46	
Group-Owned Firms			
<i>Market Share</i>	<b>0.043</b> (.004)	0.038 (.003)	4.071***
Number of Firms	700	700	
<i>Firm Profits</i>	0.143 (.007)	0.127 (.024)	0.71
Number of Firms	700	700	
<i>Group Sales/Industry Sales</i>	0.622 (.049)	0.639 (.044)	-1.3302
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	
<i>Herfindahl Index</i>	-1.185*** (0.344)	-1.382** (0.551)	-1.314*** (0.358)	-1.546*** (0.570)
<i>Industry Sales</i>	-0.055 (0.093)	-0.014 (0.119)	-0.136 (0.106)	-0.053 (0.146)
<i>Industry Wages</i>	-0.004 (0.094)	0.008 (0.134)	0.045 (0.100)	0.027 (0.149)
<i>Future Sales Growth</i>	-0.868*** (0.301)		-1.185*** (0.296)	
<i>Capital Intensity</i>		-0.170** (0.080)		-0.200*** (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 3-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 3-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 3-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 sales 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)
<i>Excess Industry Concentration</i> (India - US)	-1.105*** (0.308)		
<i>Concentration Ratio</i>		-1.192** (0.482)	
<i>Asset Concentration</i>			-1.775*** (0.574)
<i>Profit of 4 Largest Firms</i>	-1.059** (0.477)	-0.708** (0.332)	-0.693** (0.320)
<i>Future Sales Growth</i>	-0.864* (0.486)	-0.632** (0.265)	-0.651** (0.260)
<i>Industry Sales</i>	0.12 (0.113)	0.03 (0.086)	0.015 (0.085)
<i>Industry Wages</i>	-0.12 (0.113)	-0.036 (0.084)	-0.035 (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,  $\alpha_2$  in the specification below estimated using Norton, Wang, Ai (2004):

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

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

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

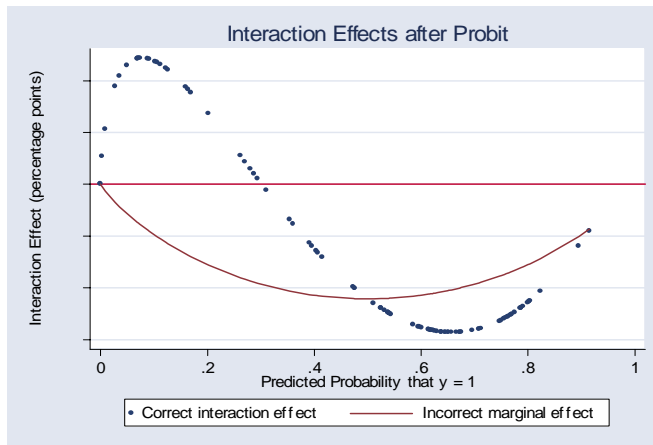


Figure 1a.

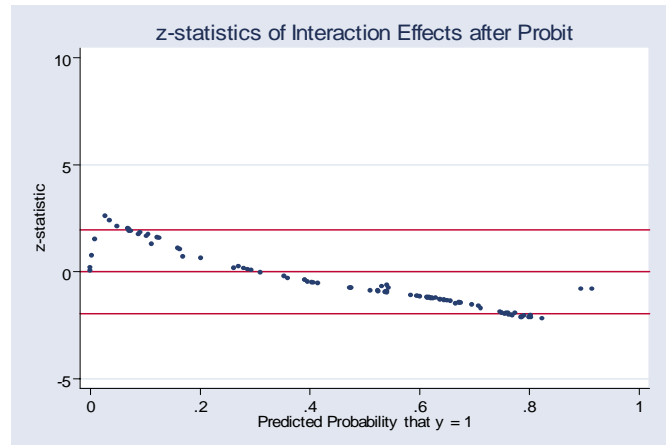


Figure 1b.

- 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)

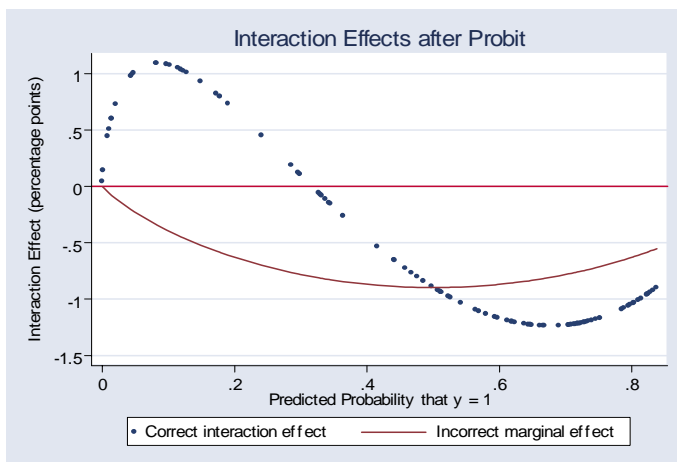


Figure 2a.

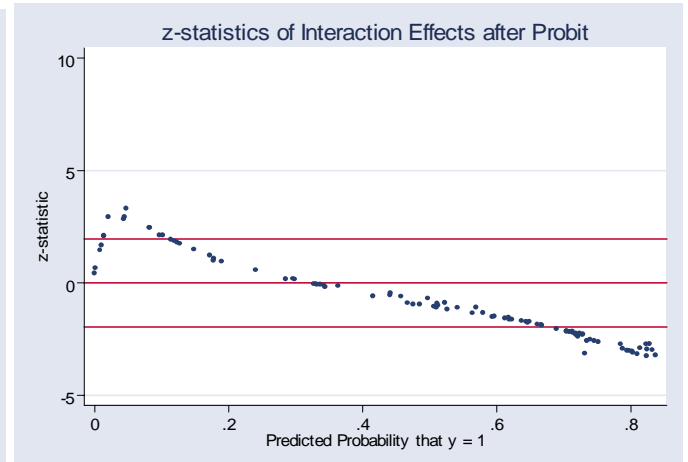


Figure 2b.