The Political Economy of Foreign Entry Deregulation*

Anusha Chari
University of Michigan

Nandini Gupta
Indiana University

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Abstract

This paper investigates the influence of incumbent firms on the policy decision to allow foreign direct investment. Using firm-level data from India, we find that the likelihood of barriers to foreign entry being reduced in an industry is inversely related to its concentration. The least concentrated industry in the sample faces a 80% probability of being opened to foreign entry in comparison to a 10% probability for a monopoly. The results also suggest that politicians are more receptive to the interests of some incumbent firms over others. Industries that are state-owned monopolies face a 13% probability of being opened to foreign entry in comparison to a 52% probability for industries with no state-owned firms. When foreign entry is allowed in an industry, incumbent firms experience a significant decline in market share and profits. The results are consistent with the hypothesis that incumbent firms oppose foreign entry to protect monopoly profits.

* Contact Information: * Anusha Chari, Assistant Professor of Finance, Ross School of Business at the University of Michigan, 701 Tappan Street, Ann Arbor, MI 48109. Internet: achari@umich.edu. ** Nandini Gupta, Assistant Professor of Finance, Kelley School of Business Indiana University 1309 East 10th Street Bloomington, IN 47405. Internet: nagupta@indiana.edu. We thank Utpal Bhattacharya, Mara Faccio, Peter Henry, Simon Johnson, Randy Kroszner, and Enrico Perotti for helpful comments. This paper also benefited from the comments of participants at the Indiana and Michigan finance department workshops, and the 6th International Conference on Financial Market Development in Emerging and Transition Economies, Moscow 2005. Chari thanks the Mitsui Life Financial Research Center for financial support.

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

Stigler (1971), page 5

I. Introduction

Corporate assets around the world tend to be controlled by a few, politically-connected incumbents (Berglof and Perotti, 1994; Johnson and Mitton, 2003; and Claessens, Djankov, Fan, and Lang, 2002). New evidence suggests that incumbent firms receive preferential benefits from the state such as concessionary loans and corporate bailouts (Khwaja and Mian, 2005; and Sapienza, 2004). It has also been shown that incumbents will oppose institutional change, such as financial market development, if it threatens their favored status (Kroszner and Strahan, 1999; Pagano and Volpin, 2001; Rajan and Zingales, 2003a; Perotti and Volpin, 2005; and, Feijen and Perotti, 2005).[1] However, the ability of incumbent firms to extract rents becomes limited when barriers to international capital flows are removed, suggesting that incumbent firms have an incentive to oppose such policy changes (Rajan and Zingales, 2003a; and, Stulz, 2005).

In recent years a number of developing countries have opened up their economies to foreign direct investment. The evidence suggests that the removal of barriers to entry varies across industries (Chari and Henry, 2004), and that foreign entry deregulation has an unequal impact across industries and geographic regions (Aghion, Burgess, Redding, and Zilibotti, 2003). These findings raise the following question: Is the decision to allow foreign investment random across industries?

Although foreign investment can be beneficial for economic growth, it is conceivable that the decision to deregulate foreign investment is likely to face opposition from domestic incumbents who have enjoyed decades of protection in many developing countries. To that end, selectively retaining barriers to

[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) Post 1500, Western European countries with absolutist monarchies opposed property rights protection and free entry in profitable industries (Acemoglu, Johnson, and Robinson, 2005a); (iii) incumbent firms lobby to restrict investor protection laws that would help new entrants raise capital (Perotti and Volpin, 2005); (iv) entrenched firms may lobby to restrict access to credit after a crisis, forcing poorer entrepreneurs to exit (Feijen and Perotti, 2005). For an excellent survey of the literature on the political economy of finance see Pagano and Volpin (2001).

foreign entry can be politically convenient for the state as it can cater to powerful incumbents under the patriotic guise of protecting domestic firms.

In response to a balance of payments crisis in 1991, the Indian government undertook reforms to open up its markets and selectively removed barriers to foreign direct investment in a subset of its industries. The Indian corporate sector, much like the rest of the world, is characterized by the concentrated control of assets by state-owned firms and politically-connected business groups. In this study we ask the following question: Did incumbent firms influence the state's decision to reduce foreign entry barriers in some industries and not others? [2] Using a rich firm-level dataset from India we adopt a political economy approach to answer this question.

The private interest view of economic regulation characterizes the regulatory process as one of interest group competition in which compact, well organized groups are able to use the coercive power of the state to capture rents for those groups at the expense of more dispersed groups (Olson (1965), Stigler (1971), Peltzman (1976), (1989), and Becker (1983)). Since winners and losers emerge from the process, the decision to deregulate may be subject to the political influences of these different groups. It follows that incumbent groups that have the most to lose from deregulation are likely to lobby against it. An alternative hypothesis is the public interest view. According to this view the government is likely to deregulate industries according to efficiency and social welfare criteria, rather than according to the preferences of organized interest groups.

Theory suggests that incumbent firms in concentrated industries have an incentive to oppose entry if they stand to lose monopoly profits (Tirole, 1988). Firms in concentrated industries also have the power to organize and influence the state by resolving the free rider problem prevalent in industries with more disperse ownership (Olson, 1965; Peltzman, 1976; and Stigler, 1971). However, since deadweight

[2] While evidence suggests that reducing barriers to entry will increase the level of investment (Chari and Henry, 2005), the main advantage of looking at a policy change and not actual entry is that the latter is likely to depend on many other factors.

losses are likely to be higher in concentrated industries (Pigou, 1938), the alternative public interest view would suggest that the government should deregulate entry in these industries.

Politicians may also be more receptive to the interests of some incumbent firms over others. For example, in the case of state-owned firms the state is itself an incumbent (Shleifer and Vishny, 1998). State-owned firms can be influential because their earnings accrue directly to the government and also because politicians obtain private benefits from controlling these firms (Shleifer and Vishny, 1998; Dinc and Gupta, 2005; and Megginson, 2005). 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 tend to be large and politically influential incumbents (Morck, Wolfenzon, and Yeung, 2005). Indian business groups are similar in organizational structure to Korean *chaebols* and the Japanese *keiretsu.* These groups of companies tend to be controlled by the same shareholders, usually all members of the same family, and are typically the largest non-state-owned firms in an industry.[3] However, since Indian business groups are more efficient than their state-owned counterparts they may not have opposed foreign investment. In fact, in the years immediately following deregulation, the majority of foreign investment in India occurred through joint ventures with group-owned firms.

We find 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[4] of 0.025 faces on average a 80% chance of being opened to foreign entry. In contrast, for a monopoly the probability of foreign entry deregulation is just 9.6% on average. The results also suggest that the likelihood of foreign entry deregulation is significantly lower for concentrated industries that are

[3] In 1991, 22 out of the top 50 companies in India by stock market capitalization were controlled by business groups.
[4] In the main analysis we use the four-firm concentration ratio, a standard measure of industry concentration that is defined as the ratio of the sum of sales of the four largest firms in an industry to total industry sales. However, as a robustness check we also use the Herfindahl Index (sum of the squares of the market shares of all firms) and the four-firm asset concentration ratio (the ratio of the sum of assets of the four largest firms in an industry to total industry assets).

profitable. These results are consistent with the private interest hypothesis that firms in concentrated industries oppose foreign entry in order to protect monopoly profits.

An alternative explanation for the above pattern of selective deregulation is that industry concentration proxies for natural monopolies or industries of strategic importance. If this is the case, the selective removal of barriers to foreign direct investment is perhaps not driven by the anti-competitive agenda of industry incumbents. Excluding industries that can be classified as natural monopolies and industries on the government's strategic list from the estimations, we find that industry concentration continues to be significantly negatively correlated with the probability of foreign entry deregulation.

Our results suggest 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, industries with state-owned monopolies face a 12.9% chance of being deregulated, while industries with no state-owned firms face a 52% probability of deregulation. The results also suggest that the state is more likely to protect profitable rather than declining state-owned firms.

Our paper contributes to the growing literature on the economic impact of the concentrated control of assets by entrenched incumbents (Rajan and Zingales, 2003a; Cetorelli and Strahan, 2005; and Morck, Wolfenzon, and Yeung, 2005).[5] It is also related to the large literature on institutions and economic growth. For example, Acemoglu and Johnson (2005) show that countries with poor property rights institutions, which include regulations that favor large and politically-connected firms, experience lower long-run economic growth. Selective entry deregulation to protect concentrated industries can inhibit economic growth by reducing competition. From a welfare-maximization perspective, the result that entry barriers are retained in more concentrated industries also implies greater deadweight loss (Pigou, 1938).

[5] For example, Cetorelli and Strahan (2005) show that the concentrated control of banking assets can impede access to credit.

Using data on India offers several advantages. In studies that examine the political economy of reform in the U.S. there is a concern that industry characteristics are an endogenous outcome of past protection (Gawande and Krishna, 2004). An advantage of our data is that before 1991, restrictions on foreign entry were uniformly applied across industries. By focusing on a discrete policy change rather than a continuous measure of protection, we avoid the problem that industry characteristics have evolved endogenously in response to existing differences in barriers to foreign entry across industries. A related concern is that protection from foreign entry and the industrial structure have both evolved as outcomes of a common, omitted variable. Once again, since foreign entry barriers were uniformly applied before 1991, this potential source of endogeneity will not affect our results.

We do not, however, observe voting records in parliament or lobbying contributions which may provide a more direct measure of the political activity of incumbent firms. Detailed parliamentary records for the deregulation measure studied in this paper are not available, and corporate lobbying contributions are illegal in India. A disadvantage of using data on lobbying contributions, if available, is that the political activities of incumbents and the policy positions of politicians are likely to be simultaneously determined. It is harder to make a similar claim for the ex-ante stake of incumbent firms.

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

In Section 2 we provide testable hypotheses and describe our methodology. In Section 3 we discuss the economic reforms and industrial structure in India. Section 4 describes the data. Section 5 discusses the relationship between industry characteristics and the likelihood of foreign direct investment deregulation. Section 6 describes the relationship between the likelihood of deregulation and the ownership of incumbent firms in that industry. Section 7 provides summary statistics describing the effects of foreign entry deregulation on incumbent firms. In Section 8 we provide additional robustness checks and Section 9 concludes.

2. Hypotheses and Methodology

The private interest view of deregulation holds that incumbent groups 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 public interest and private interest views to generate testable hypotheses about industry characteristics that are likely to influence the decision to remove barriers to foreign investment in an industry.

2A. Concentrated Industries

Firms in concentrated industries are more likely to earn monopoly profits (Tirole, 1988) and therefore have an incentive to oppose entry deregulation 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). The private interest perspective yields the following prediction:

> ***Prediction #1a****: 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 deregulation and the ability to successfully influence the government.*

However, concentrated industries are also associated with greater deadweight losses (Pigou, 1938; Becker, 1983). Therefore, from a public interest perspective the government should enact policies to promote competition by removing entry barriers in more concentrated industries: [6]

[6] The empirical estimations control for other government objectives, such as protecting strategic industries or natural monopolies, which may also be highly concentrated.

***Prediction #1b**: 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.

2B. Profitable and Declining Industries

Incumbent firms have an incentive to oppose deregulation if entry causes a decline in profits (Stigler, 1971), or if a changing economic environment threatens income and employment (Olson, 1983). However, while firms and workers in industries with declining growth rates and profitability may have an incentive to oppose entry deregulation, 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.

***Prediction #2a:** Under the private interest hypothesis both profitable, high growth industries and unprofitable, declining industries have an incentive to oppose foreign entry deregulation. The pattern of deregulation will 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 deregulate entry in uncompetitive industries. Therefore, if profitable industries are uncompetitive then the government ought to remove entry barriers in these industries. However, the government also has an incentive to deregulate entry in industries with declining growth and profitability if introducing competition can increase efficiency in these industries (Kroszner and Strahan, 1998).

***Prediction 2b:** Under the public interest hypothesis entry deregulation in both profitable and unprofitable industries may be efficiency enhancing.*

One way of distinguishing between the private and public interest hypotheses is to investigate whether profitability is positively correlated with concentration. Under the private interest hypothesis

profitable, concentrated industries are less likely to be deregulated, while the public interest hypothesis predicts the opposite. We use growth in future sales (a proxy for growth expectations) and several measures of profitability such as return on sales and revenues per worker to test this hypothesis.

2C. High Employment Industries

If entry deregulation adversely affects the workers of incumbent firms, the private interest hypothesis predicts that industries that employ more workers have an incentive to oppose entry deregulation. Also, labor unions in India are well organized groups that are closely affiliated with political parties and have the ability to influence the government. Moreover, Caves (1976) emphasizes the positive relationship between the voting strength of an industry and the extent of trade protection it receives. Extending this idea to entry deregulation yields the following prediction:

> ***Prediction 3a:*** *Under the private interest hypothesis the likelihood of entry deregulation should be negatively related to the number of employees in an industry.*

From a public interest perspective, governments have an incentive to reduce income inequality by protecting the living standards of the lowest income groups (Ball, 1967, Constantopoulos, 1974, and Fieleke, 1976). Hence, the likelihood of entry deregulation will be lower in industries that employ low-income, unskilled workers. Since the proportion of unskilled workers is likely to be proportionate to the total number of workers in an industry, the public interest hypothesis yields a similar prediction as the private interest hypothesis. A potential avenue for distinguishing between the two hypotheses is by considering averages wages. Since wages per worker are likely to be lower in industries that employ a large number of unskilled workers we obtain the following prediction:

> ***Prediction 3b:*** *The public interest theory predicts that the likelihood of entry deregulation should be negatively related to the number of employees and positively related to wages per worker in that industry.*

To investigate the potential influence of labor groups we use data on aggregate employment, wages, and wages per worker. We also use the capital-labor ratio as a measure of labor intensity since the more labor intensive an industry, the less likely it is to be deregulated.

2D. 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. This could be as a result of the status associated with being in charge of the largest petroleum company in the country for example, or the power to secure employment for one's supporters, or in the case of corrupt politicians, getting pecuniary benefits 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, government revenues are adversely affected. Since private benefits or rents to politicians such as employment and profits are likely to be 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.

> ***Prediction 4a:*** *Under the private interest hypothesis, the likelihood of entry deregulation should be inversely related to the presence of state-owned enterprises in that industry.*

From a public interest perspective, it is not obvious why the presence of these firms should have any influence on policy. One argument is that if state-owned firms employ more unskilled workers then the government may choose to protect workers in these firms, which yields the following prediction:

> ***Prediction 4b:*** *Under the public interest hypothesis, controlling for employment, the likelihood of entry deregulation 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.

2E. Role of Business Groups

While, family-owned firms, or business groups in India have historically enjoyed a close relationship with the government (Khanna and Palepu, 2004), group-owned firms may have been in favor of entry deregulation for several reasons. 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.[7] Ex ante, business groups may have favored deregulation 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.[8] Also, business groups are well diversified and may not have opposed entry deregulation 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 deregulation.

[7] 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.

[8] In India foreign direct investment in the years immediately following deregulation was through joint ventures with domestic firms. While many business groups entered into joint ventures with foreign firms, no state-owned enterprises did.

3. Reforms and Industrial Structure

In this section we discuss the economic reforms undertaken by the Indian government in 1991 and the foreign direct investment deregulation 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, prior to the removal of barriers to foreign direct investment, with concentration ratios of the same industries in the U.S. as a benchmark.

3A. Deregulating Foreign Entry in India

In a deregulated economy, 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. For example, the Industrial Policy Resolution of 1956 reserved certain industries for state-owned firms, prohibiting the entry of all private firms. In addition, a draconian regulatory framework, popularly known as the "License Raj," required government approval for the entry of new firms as well as 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. These reforms were part of the conditions imposed by a bailout package from the IMF.[9] A key feature 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,

[9] The IMF bailout packages to Thailand, Korea, and Indonesia following the East Asian crisis also imposed conditions to allow foreign competition in the market for corporate control (Chari, Ouimet, Tesar, 2005).

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 level of investment.

The deregulation 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).[10]

3B. How Do Concentration Ratios Compare 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 concentration ratios in the same industries between 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).

From Table 1 we see that in 1990, a year prior to the reforms in India, average industry concentration ratios in the U.S. were significantly lower at 67.9%, compared to an average concentration ratio of 79.7% in the same 3-digit SIC level industries located in India.[11] Note that the average concentration ratio in Indian industries that retained barriers to foreign direct investment was significantly higher at 89.9% compared to an average concentration ratio of 63.7% for the same industries in the United States. A paired-equality-of-means test shows that this difference is statistically significant at the 1% level.

[10] In China, foreign direct investment inflows accounted for ten percent of gross capital formation in 2001 (World Development Indicators, The World Bank, 2001).
[11] Effective concentration in local markets is likely to be even higher in India due to an underdeveloped transportation infrastructure.

Given that average industry concentration ratios are 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. Since Indian industries that retained barriers to foreign direct investment were 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.

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 2187 firms.[12] The companies covered account for more than 70 percent of industrial output (Topolova, 2004). For all the variables used in the estimations we construct averages for the three fiscal years, 1988-1990, preceding the deregulation 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 deregulation. 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) 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 deregulated 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

[12] 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.

Prowess dataset into industries. 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.[13] The formal 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 takes into account the market share of all firms in an industry. 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 observation is useful for the empirical analysis as it suggests that there is cross-sectional variation in market share across ownership categories, which can help 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 produce a bigger share of output and control a larger share of fixed assets in industries which retain entry barriers, compared to state-owned firms in deregulated 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 deregulated and protected industries. The market share of group-owned firms is significantly smaller 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 entry were removed relative to the industries that were kept off-

[13] All the variables at the industry level are averaged across the 3-digit industries. The firm specific measures are averaged across firms in each 3-digit industry, and then averaged across the 3-digit industries for the 2-digit summary statistics.

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 deregulation.

5. Do Concentrated Industries Influence the Pattern of Foreign Direct Investment Deregulation?

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:

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

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 estimations use three alternative measures of industry concentration: the Herfindahl index, the 4-firm sales concentration ratio, and the 4-firm asset concentration ratio. 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 entry barriers in concentrated industries. This result is robust to a wide range of industry characteristics including size, profitability, productivity, and employment measures. From column 1 we note that while the probability of entry deregulation is 9.6% in the case of a monopoly, the least concentrated industry in the sample with a Herfindahl index of 0.025 faces a 80.3% chance of being deregulated.

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 deregulation 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 Deregulation?

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 deregulation. 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 by returns on sales for all firms, returns on sales for the largest four firms in an industry, and output per worker, respectively. The results reported in columns (5) and (6) suggest that entry barriers are significantly less likely to be removed in industries that face better contemporaneous and future growth opportunities, the latter variable measured by 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).

That the government is more likely to protect 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 the profitable industries are also more concentrated then from a public interest perspective, the state should deregulate 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 average firm profits (*ROS*, ratio of *EBDITA* to *Sales*) in equation (1). The estimation is also conducted using the average profitability of the four firms with the highest sales in the industry, average product or ratio of industry sales to employment, and future sales growth.

Distinct from a linear regression specification, the coefficient of the interaction term in a probit specification may not give the correct interaction effect. Consider the probit specification in equation (1). The conditional mean of the dependent variable is given by the following equation:

$$E[Entry\ Deregulation_{i,j} \mid Herf_j, \pi_j] = F(\alpha_0 + \alpha_1 Herf_j + \alpha_2 \pi_j + \alpha_{12} Herf_j \pi_j) = F(u) \quad (3)$$

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 Deregulation* = 1 for a change in both the Herfindahl index and the industry-level profitability measure, π_j,

$$\frac{\Delta^2 \left(\frac{\partial F(u)}{\partial x_{i,j}} \right)}{\Delta Herf_j \Delta \pi_j} = \frac{\Delta[f(\alpha_0 + \alpha_1 Herf_j + \alpha_2 \pi_j + \alpha_{12} Herf_j \pi_j)(\alpha_1 + \alpha_{12} \pi_j)]}{\Delta Herf_j} = f(\alpha_0 + \alpha_1 Herf_j + \alpha_2 \pi_j + \alpha_{12} Herf_j \pi_j)\alpha_{12} + (\alpha_1 + \alpha_{12} \pi_j)(\alpha_1 + \alpha_{12} \pi_j) f'(\alpha_0 + \alpha_1 Herf_j + \alpha_2 \pi_j + \alpha_{12} Herf_j \pi_j) \quad (3)$$

where $f(u) = F'(u)$. Note that even if the coefficient of the interaction term is $\alpha_{12} = 0$, 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).

Given the non-linear nature of the probit estimation procedure, interaction effects may vary over the distribution. The results reported graphically in Figures 1- 4 show that the coefficients of the interaction terms between industry concentration and the profitability measures are negative and highly statistically significant over a considerable range of the distribution. Put another way, in industries with similar levels of concentration, higher profitability reduces the likelihood of entry deregulation.

The industry level results appear to support a private interest story: Barriers to foreign entry are more likely to be retained in industries with a few, profitable firms, which seek to protect their monopoly profits. The ownership analysis below further explores the role of profitability by ownership category on the likelihood of entry deregulation.

5B. Does Labor Influence Deregulation?

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, workers do not appear to have had significant influence on the policy process. Neither industry employment nor wages per worker have a significant impact, and from column (8) it appears 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, it may be the case that part of the influence of the largest firms stems from the fact that they are also the largest employers in an industry. Moreover, below we show that the influence of labor may depend on the ownership of the incumbent firms.

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 report results from the specifications using alternative measures of industry concentration including the 4-firm concentration ratio and asset concentration.

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

6A. State-Owned Firms

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

$$\Pr(Entry\ Deregulation_j = 1) = \Phi(\alpha_0 + \alpha_1 SOE\ Stake_j + \alpha_2 X_j + \varepsilon_j), \quad (4)$$

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. The *SOE Stake* variables capture the presence of state-owned firms in an industry. These include the ratios of *SOE* sales, assets, employment and wages, to total industry sales, assets, employment, and wages, respectively. We also include the profitability of state-owned firms in an industry. The $\mathbf{X}_j$ vector includes the Herfindahl index and several controls for

industry characteristics. A heteroskedasticity adjustment is done using the Huber-White estimator for variance. 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 deregulation. 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 deregulation is also economically significant. The probability of foreign entry deregulation evaluated at the mean values of all the variables in column (1) of Table 5 is 48.2%, where the sample average share of output produced by state-owned enterprises is 34.9%. An industry with no state-owned firms on average faces a 51.7% chance of being deregulated. In contrast, the likelihood of foreign entry deregulation declines nearly 40 percentage points to 12.9% if the industry is a state-owned monopoly.

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) suggest the former - industries with profitable state-owned enterprises are more likely to be protected.

The results also suggest that workers of state-owned firms may have more influence on the policy process. The probability of deregulation 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, contrary to the public interest hypothesis, industries with higher average wages per worker are significantly less likely to be deregulated. It does not appear that the government retains entry barriers to reduce income inequality by protecting the living standards of the lowest income groups.

Nest we investigate whether family-owned firms had similar influence over foreign entry deregulation, or whether state-owned firms are treated differently from other incumbents.

6B. Family-Owned Firms

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

$$\Pr(Entry\ Deregulation_j = 1) = \Phi(\alpha_0 + \alpha_1 Group\ Stake_j + \alpha_2 X_j + \varepsilon_j) \qquad (5)$$

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 $Groupstake_j$ variables are positive and statistically significant for the shares of assets, wages and labor while the effect of the sales share of family-owned firms in column (8) is positive and but not statistically significant. Compared to state-owned firms, either family-owned firms were in favor of foreign entry deregulation, or were unsuccessful in lobbying the state to prevent it.

The results may be capturing the fact that the state is more likely to protect industries with state-owned firms, rather than the absence of business group influence. To test this hypothesis equation (5) is estimated with the sample restricted to industries without any state-owned firms. From the results reported in column (15) it appears that when there are no state-owned incumbent firms in an industry, the presence of family-owned firms does not have a significant impact on the probability of foreign entry deregulation.

Some interesting issues arise as far as the relative influence of incumbent firms is concerned. The ownership analysis suggests that in comparison to state-owned firms, family-owned firms may have been in favor of allowing foreign entry, either to reduce the influence of the state or to gain access to capital and technology.

6C. Does Geographic Concentration Explain the Pattern of Deregulation?

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 deregulate 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:

$$\Pr(Entry\ Deregulation_{jk} = 1) = \Phi(\alpha_0 + \alpha_1 IndustryShare_{j,k} + \alpha_2 Concentration_{j,k} + \alpha_3 SOEShare_{j,k} + \alpha_4 X_{j,k} + \varepsilon_{jk})$$

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 3-digit industrial category in each state as a share of total state industrial output (workers, assets, and wages). 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 deregulation 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 geographic concentration, measured by the Herfindahl Index, and the stake of state-owned enterprises 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 deregulated. Moreover, the results also suggest that geographic concentration has a significant effect on the probability of deregulation and that the effect of industry concentration may vary across states.

7. How Does Foreign Entry Impact Incumbent Firms?

Thus far the results suggest that particular incumbent firms and industries have more influence on the pattern of foreign direct investment deregulation. 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 entry were removed.

Since our results suggest that the decision to relax foreign entry barriers in some industries may depend on incumbent 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 deregulation on incumbent firms in industries in which barriers to foreign entry were removed in 1991. We restrict our sample to two years of pre-deregulation performance (1989 and 1990) and two years of post-deregulation performance (1992 and 1993) so as to avoid 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 deregulation 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 deregulation, firm profits fall significantly only for state-owned firms in deregulated industries. Firm profits for family-owned firms remain unaffected by foreign entry deregulation. This is consistent with the hypothesis that group-owned firms may not have been opposed to foreign investment.

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

8. Additional Robustness Checks

It 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 deregulation after excluding industries that belong to these categories. 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 deregulation when natural monopolies and strategic industries are excluded.

Columns 1 and 2 of Table 9 examine whether excess concentration in India relative to the U.S. has explanatory power in determining the pattern of deregulation in India. The results confirm that the greater the excess concentration in India, the less likely that an industry will be deregulated. 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.

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. We use firm-level data to identify influential incumbent firms and industries that have the incentive and ability to successfully oppose foreign entry. We find that both the concentrated control of corporate assets as well as the identity of incumbents has a significant influence on the pattern of entry deregulation. 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 their

monopoly profits because the likelihood of foreign entry deregulation is significantly lower in concentrated industries that are profitable, and in industries with profitable state-owned firms.

Protecting concentrated industries from foreign competition may have an adverse impact on economic growth (Acemoglu and Johnson, 2005), and generate greater deadweight losses (Pigou, 1938). Similarly, the state-owned firms the government seeks to protect may be profitable because they are monopolistic. The inefficiency of state-owned firms has been widely documented in the literature (Megginson and Netter, 2001; Gupta, 2005; and Megginson, 2005). Since competition has been shown to improve the efficiency of state-owned firms (Megginson, 2005), protection from foreign entry is likely to perpetuate the misallocation of scarce public resources to these firms.

It is argued that in a state-controlled economy undertaking reforms, entry deregulation should precede privatization (Roland, 2000; and Megginson, 2005). If there is a state-owned monopoly in an industry, then privatizing this firm before allowing entry in this industry risks creating a privately-owned monopoly that will lobby the state to prevent entry deregulation. This has occurred in Russia for example (Roland, 2000). However, the evidence in this paper suggests that state capture is not restricted to privately-owned firms – state-owned firms significantly reduce the likelihood of foreign entry deregulation. In other words, without privatization there may also be no entry deregulation.

Although we find that the state is likely to protect profitable state-owned firms, it is not clear that these firms would continue to be profitable in the absence of a shield from foreign competition. Given the prevalence of state-ownership and the widely documented inefficiencies of these firms, (Megginson and Netter, 2001; Gupta, 2005; Megginson, 2005), our results suggest that the influence of state-owned incumbents on policy is likely to perpetuate the misallocation of capital and scarce public resources.

In the last decade, many economies have implemented sweeping economic and financial sector reforms, including stock market liberalization, privatization, and the deregulation of foreign direct investment. There is now a large literature evaluating the effect of these reforms on firm performance and economic growth. Recent evidence suggests however that the removal of barriers to investment was unequally applied across industries — while some industries were opened to foreign investment, others

remained off-limits (Chari and Henry, 2004). Thus, the question arises whether these reforms are random, as assumed by much of the literature, or whether they are unequally applied. Our results suggest that incumbent firms are likely to influence the pattern of financial market reforms.

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Appendix - Description of Variables

Variables	
SOE	Firms majority-owned by the Federal and State Governments
Group Firm	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. They are similar in organizational structure to Korean chaebols and the Japanese keiretsu.
Unaffiliated Private	Privately owned firm not affiliated to a Business Group
Sales	Annual sales generated by an enterprise 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	Log of aggregate sales generated by all enterprises in that industry.
Assets	Annual gross fixed assets which include movable and immovable assets as well as assets which are in the process of being installed.
Industry Assets	Log of aggregate fixed assets across all enterprises in that industry.
Employment	Annual number of Employees
Industry Employment	Log of aggregate employment across all enterprises in that industry.
Wages	Annual salaries paid to workers
Industry Wages	Log of aggregate salaries across all enterprises in that industry.
Wages per Worker	Annual ratio of salaries to employment.
Market Share	Annual ratio of firm sales to industry sales
Average Product	Annual ratio of sales to employment
EBDITA	Annual excess of income over all expenditures except tax, depreciation, interest payments, and rents.
Firm Profits	Annual ratio of EBDITA to sales
Profit of 4 Largest Firn	Annual ratio of EBDITA to sales for the four largest (in terms of sales) firms in the industry
Industry Profits	Aggregate EBITDA to Sales ratio across all enterprises in an industry.
Sales Growth	(Sales-Lagged Sales)/Lagged Sales
Future Sales Growth	Sales growth for the period 1992-1994
Capital Intensity	Annual Ratio of Assets to Employment
NIC Code	Three-digit industry code includes manufacturing, financial, and service sectors
Concentration Ratio	Ratio of the sum of sales of the four largest firms in an industry to total industry sales in each 3-digit industrial category. This variable is used in the main analysis
Herfindahl Index	Sum of the squares of the market shares of all companies in an industry
Asset Concentration	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

Table 1

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

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 deregulated 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 Industry Profits and the Concentration Ratio for each industry.

	India	US	Equality of Means t-test
Herfindahl Index	**.399**	.236	4.338***
	(.034)	(.024)	
Minimum	.025	.010	
Maximum	1	1	
Number of Industries	75	75	

	Herfindahl Index			
	India	US	Equality of Means t-test	*Number of Industries*
Protected Industries	**.539**	.216	6.047***	38
	(.047)	(.035)		
Deregulated Industries	.255	.257	-.041	37
	(.034)	(.031)		

Correlation Between Industry Concentration and Profitability

	Correlation coefficient	p-value
Full Sample	0.061	0.553
Protected Industries	**0.589**	0.000***
Deregulated Industries	**-0.687**	0.000***

*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 analysis we use 3-digit categories. All the variables are calculated and averaged across the 3-digit industrial categories for the 2-digit industries. The 4-firm concentration ratio is the sum of sales of the 4 firms with highest sale revenues in each industry divided by total sales in that industry. The herfindahl index is the sum of the squares of the market share of all firms in each 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 enterprises and Group refers to business group owned firms. 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. ROS is the average ratio of EBITDA to Sales 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	ROS in SOEs	ROS in Group Firms	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	61	438
	(.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	115	852
	(.237)	(.273)	(.221)	(.326)	(.289)	(.138)	(.049)			
300-399	0.874	0.385	0.876	0.275	0.579	-0.260	0.100	21	45	291
	(.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	31	102
	(.162)	(.062)	(.159)	(.186)	(.176)	(.314)	(.157)			
500-599	0.865	0.462	0.888	0.261	0.429	0.052	0.112	9	39	200
	(.154)	(.357)	(.125)	(.343)	(.412)	(.087)	(.063)			
600-699	0.934	0.541	0.938	0.600	0.382	0.365	0.571	9	118	461
	(.103)	(.282)	(.089)	(.400)	(.402)	(.282)	(.439)			
700-799	0.988	0.785	0.980	0.578	0.409	-0.021	0.225	8	19	115
	(.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	26
	(.000)	(.140)	(.000)	(.528)	(.577)	(.133)				

Table 3

Industry and Firm Characteristics Before Deregulation of Foreign Direct Investment

This table reports mean values of industry and firm characteristics of regulated and deregulated industries for the period 1988-1990. Market share are defined as the sum of Sales of a particular ownership group in each industrial category divided by total 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. Assets is the average gross fixed assets at the firm level. Sales is average revenues from main activity at the firm level. Standard deviations of means are in parentheses.

Ownership Category	Protected Industries	Deregulated 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	-1.2216
	(2.467)	(3.364)	

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

Table 4

Does Industry Concentration Affect the Probability of Entry Deregulation?

This table reports the marginal probit coefficients where the dependent variable is equal to 1 if the industry deregulated foreign entry in 1991, and equal to 0 otherwise. The sample period is 1988-1990.The Herfindahl Index sum of squares of the market shares of all firms in each industry. Firm Profits is the annual ratio of EBDITA (excess of income over all expenditures except tax, depreciation, interest payments, and rents) to sales. Profit of 4 largest firms is average Firm Profits of the largest 4 firms in terms of sales within each industry. Average Product is the annual ratio of sales to employment. Sales Growth is (Sales-Lagged Sales)/Lagged Sales. Future Sales Growth is Sales Growth for the post-deregulation years 1992-1994. Industry Employment is the Log of aggregate employment. Industry Wages is the log of aggregate salaries. Capital Intensity is the ratio of assets to sales. Wages per Worker is the ratio of wages to employment. Industry Sales is the log of aggregate sales. Industry Assets are defined as the log of aggregate fixed assets. 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***	-0.981***	-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)						
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

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

Table 5

Which firms are more likely to oppose Foreign Direct Investment deregulation?

This table reports the marginal probit coefficients where the dependent variable is equal to 1 if the industry deregulated foreign entry in 1991, and equal to 0 otherwise. The sample period is 1988-1990. All the industry variables are averaged across firm years for each industry. The firm specific variables are averaged across years for the firms and then averaged across firms for each industry. Sales Share is aggregate sales for each ownership category in an industry divided by aggregate sales in the industry. Asset Share is aggregate fixed assets for each ownership category divided by aggregate assets in each industry. Firm profits is the ratio of EBITDA to Sales. Average Product is the ratio of Sales to Employment. Wage Share is aggregate salaries for each ownership category divided by aggregate wages within each industry. Labor Share is aggregate employment for each ownership category in an industry divided by aggregate industry employment. Wages per worker is the ratio of wages to employment. Industry Sales is the log of aggregate sales. Industry Assets are defined as the log of aggregate fixed assets. Industry Wages is the log of aggregate salaries. Industry Employment is the Log of aggregate employment. 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)	(10)	(11)	(12)	(13)	(14)	(15)
	State-Owned Firms							Group-Owned Firms							
															No SOE in Industry
Sales Share	-0.414**							0.247							
	(0.211)							(0.175)							
Asset Share		-0.554***							0.380**						-0.202
		(0.187)							(0.170)						(0.342)
Firm Profits			-0.428**							-0.231					
			(0.204)							(0.354)					
Average Product				-.526**							4.819				
				(.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	-0.607
	(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)	(0.477)
Industry Sales		-0.079	-0.056		-0.146*	-0.128	-0.061		-0.079	-0.032		-0.126*	-0.126	0.031	-0.03
		(0.073)	(0.079)		(0.082)	(0.098)	(0.080)		(0.075)	(0.083)		(0.074)	(0.098)	(0.146)	(0.170)
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		0.121
	(0.078)	(0.081)	(0.089)	(0.121)		(0.106)		(0.076)	(0.078)	(0.086)	(0.159)		(0.106)		(0.173)
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	30
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	0.220
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	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 deregulated foreign entry in 1991, and equal to 0 otherwise. The sample period is 1988-1990. All variables are calculated for each industry-state observation. The Industry Share variables are the ratio of the sales, assets, employment, and wages for each industry in each state to total state industrial sales, assets, employment, and wages. The SOE Share variables are the ratio of aggregate sales, assets, employment, and wages in state-owned enterprises in each industry in each state divided by aggregate sales for each industry in each state. The Herfindahl Index sum of squares of the market shares of all firms in each industry in each state. Profit of 4 largest firms is average Firm Profits of the largest 4 firms in terms of sales within each industry and each state. Future Sales Growth is Sales Growth 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. Standard errors are in parentheses. Regressions are corrected for heteroskedasticity and for clustering at the industry level.

	(1)	(2)	(3)	(4)
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
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 Deregulation on Market Share and Profit Margins

This table provides descriptive statistics looking at the before after effect of foreign entry deregulation on the market share and profitability of firms and concentration ratios in deregulated 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 firm sales divided by total industry sales; Firm Profits is the ratio of EBITDA (the excess of income over all expenditures except tax, depreciation, interest payments, and rents) to sales; and the Herfindahl Index sum of squares of the market shares of all firms in each 3-digit industrial category.

	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 Entry Deregulation?

This table reports the marginal probit coefficients where the dependent variable is equal to 1 if the industry deregulated 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 sum of squares of the market shares of all firms in each industry. Industry Sales is the log of aggregate sales. Industry Assets are defined as the log of aggregate fixed assets. Industry Wages is the log of aggregate salaries. Future Sales Growth is Sales Growth for the post-deregulation years 1992-1994. Capital Intensity is the ratio of assets to sales. 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)
	Excluding Natural Monopolies and Financial Services				Excluding Strategic Industries			
Herfindahl Index	-1.185***	-1.172***	-1.382**	-1.329**	-1.314***	-1.256***	-1.546***	-1.357**
	(0.344)	(0.326)	(0.551)	(0.533)	(0.358)	(0.331)	(0.570)	(0.531)
Industry Sales	-0.055		-0.014		-0.136		-0.053	
	(0.093)		(0.119)		(0.106)		(0.146)	
Industry Assets		-0.109		-0.052		-0.165**		-0.158
		(0.092)		(0.124)		(0.077)		(0.123)
Industry Wages	-0.004	0.057	0.008	0.051	0.045	0.1	0.027	0.161
	(0.094)	(0.107)	(0.134)	(0.153)	(0.100)	(0.094)	(0.149)	(0.160)
Future Sales Growth	-0.868***	-0.876***			-1.185***	-1.174***		
	(0.301)	(0.302)			(0.296)	(0.311)		
Capital Intensity			-0.170**	-0.166**			-0.200***	-0.181**
			(0.080)	(0.080)			(0.075)	(0.086)
Number of Industries	87	87	53	53	86	86	52	52
Pseudo R-squared	0.26	0.27	0.27	0.27	0.28	0.31	0.28	0.31
Prob > chi-squared	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 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 deregulated 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. The Concentration Ratio is the ratio of the sum of sales of the four largest firms in an industry to total 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 average ratio of EBITDA to Sales of the largest 4 firms in terms of sales within each industry. Future Sales Growth is Sales Growth for the post-deregulation years 1992-1994. Industry Sales is the log of aggregate sales. Industry Wages is the log of aggregate salaries. Regressions are corrected for heteroskedasticity and for clustering at the industry level. Standard errors are in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)
Excess Industry Concentration						
(India - US)	-1.030***	-1.105***				
	(0.280)	(0.308)				
Concentration Ratio			-1.229***	-1.192**		
			(0.404)	(0.482)		
Asset Concentration					-1.698***	-1.775***
					(0.481)	(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	75	96	94	96	94
Pseudo R-squared	0.21	0.3	0.15	0.23	0.19	0.28
Prob > chi-squared	0.000	0.000	0.000	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 Deregulation

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

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

1. Interaction between Herfindahl index and Firm Profits (EBITDA/Sales)
   Mean interaction effect (standard deviation)= -.604 (.936)

I.

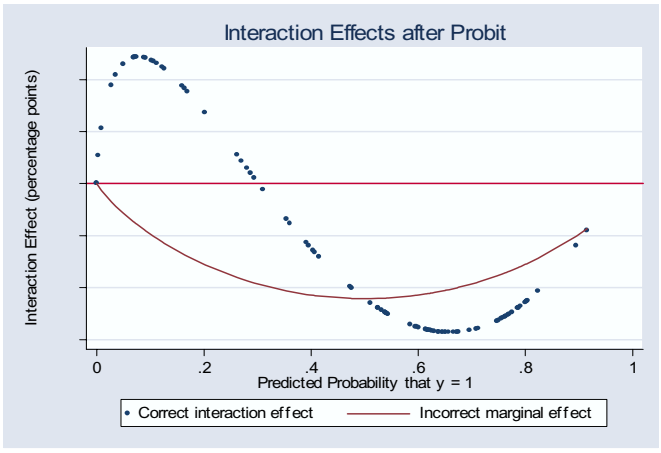

Figure 1a.

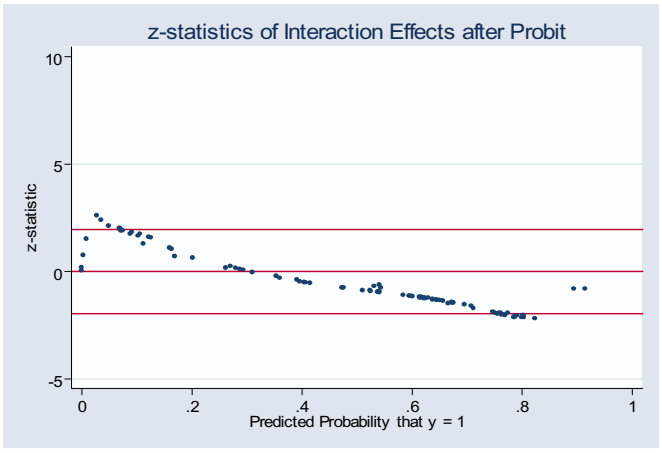

Figure 1b.

II. Interaction between Herfindahl index and Firm Profits (EBITDA/Sales) for 4 largest firms in industry:
Mean interaction effect (standard deviation)= -.236(.908)

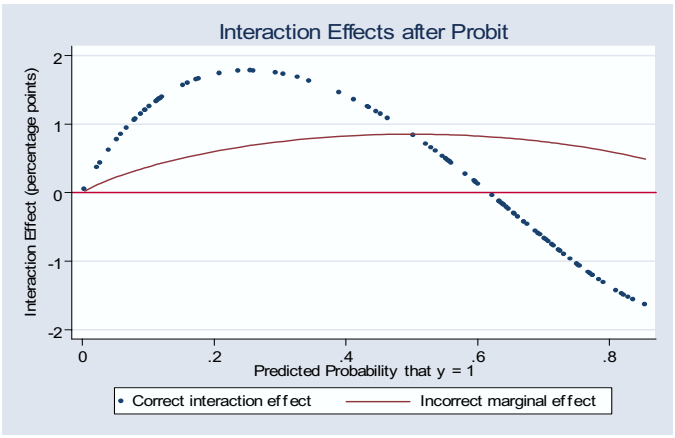

Figure 2a.

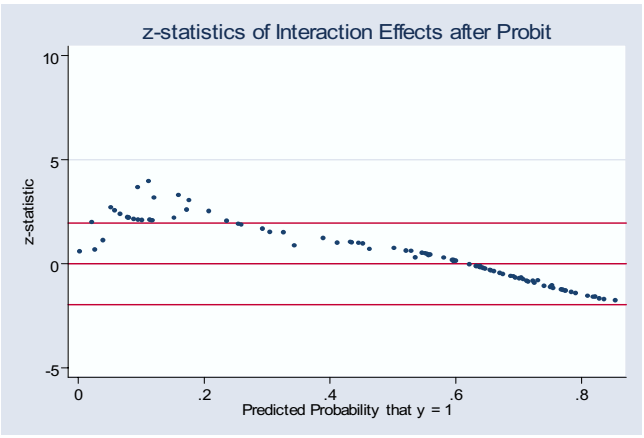

Figure 2b.

III. Interaction between Herfindahl index and Future Sales Growth (Sales – Lagged Sales/Lagged Sales from 1992-1994).

Mean interaction effect (standard deviation)= -.498 (.645)

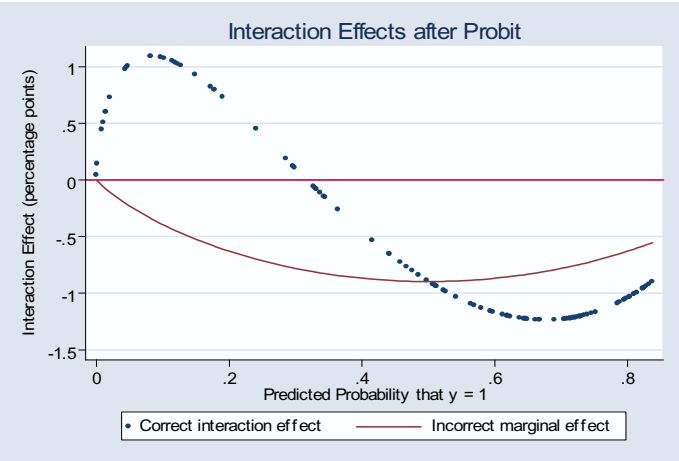

Figure 3a.

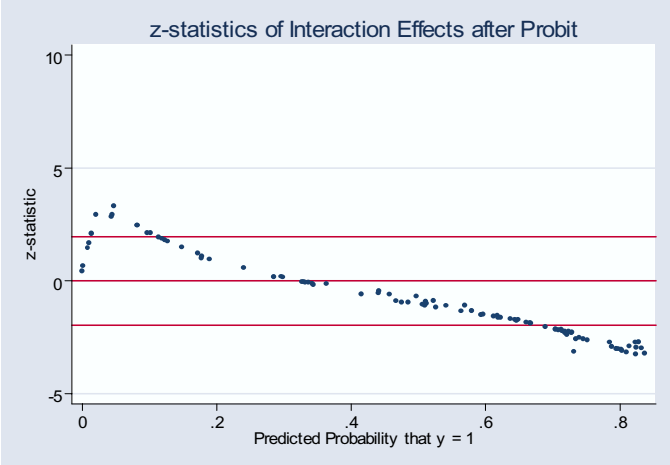

Figure 3b.

IV. Interaction between Herfindahl index and Average Product (Sales/Labor):
Mean interaction effect (standard deviation)= -.941 (1.291)

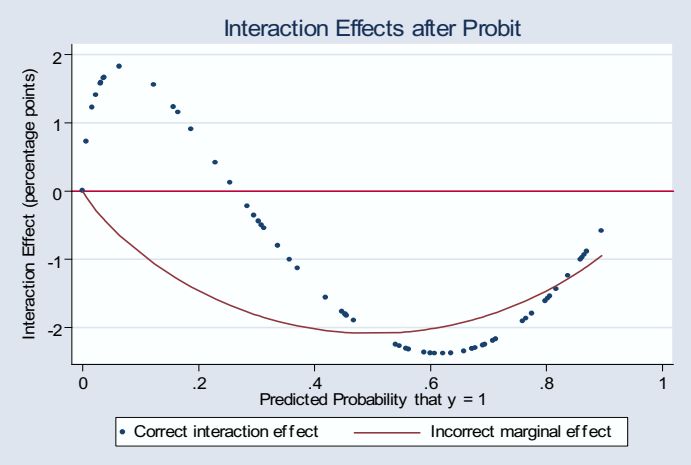

Figure 4a.

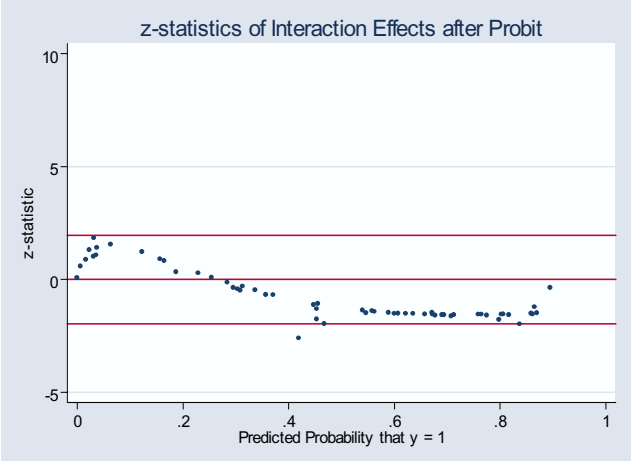

Figure 4b.