

# IMF Working Paper

---

## Sources of Corporate Profits in India—Business Dynamism or Advantages of Entrenchment?

*Ashoka Mody, Anusha Nath, and Michael Walton*

## IMF Working Paper

### Sources of Corporate Profits in India—Business Dynamism or Advantages of Entrenchment?

Prepared by Ashoka Mody, Anusha Nath, and Michael Walton<sup>1</sup>

Authorized for distribution by the European Department

January 2011

#### Abstract

Some see India's corporate sector as the fundamental driver of recent and future prosperity. Others see it as a source of excessive market power, personal enrichment, and influence over the State, with an ultimately distorting influence. To inform this debate, this paper analyses the correlates of profitability of firms listed on the Bombay Stock Exchange, covering a dynamic period—in terms of firm entry and growth—from the early 1990s to the late 2000s. Overall, the results do not provide support for the systematic exercise of market power via the product market. At least for this period, the story is more consistent with a competitive and dynamic business sector, despite the continued dominance of business houses and public sector firms in terms of sales and assets. Those with opposing views can, with justification, argue that our analysis does not cover influences, such as corporate governance and state-corporate relations, which may paint a less flattering picture of the corporate sector's role. Those broader themes deserve further attention.

JEL Classification Numbers:H0, K2, L16, O4

Keywords: Corporate sector, India, profitability, market power, growth.

Author's E-Mail Address:amody@imf.org; nathanusha@gmail.com; Michael\_Walton@harvard.edu

**This Working Paper should not be reported as representing the views of the IMF.**

The views expressed in this Working Paper are those of the author(s) and do not necessarily represent those of the IMF or IMF policy. Working Papers describe research in progress by the author(s) and are published to elicit comments and to further debate.

<sup>1</sup> The authors' affiliations are as follows. Mody: International Monetary Fund, Nath: Boston University and Walton: Kennedy School of Government, Harvard University, and the Centre for Policy Research, Delhi. An earlier version of this paper was presented at the India Policy Forum, July 13–14, 2010, New Delhi. For their generous comments, we thank Abhijit Banerjee, Rajnish Mehra, Rakesh Mohan, Dilip Mookherjee, **Error! Bookmark not defined.**Ila Patnaik, Partha Ray, Ajay Shah, S.L. Shetty, and Rohini Somanathan. From the many comments received, Arvind Panagariya, as editor, helped us sort through the priorities for sharpening and enhancing the paper. The views expressed in this paper should not be attributed to the International Monetary Fund, its management, or its Executive Board.

| <b>Contents</b>   | <b>Page</b> |
|---|-------------|
| Abstract.....   | 2           |
| I. Introduction.....  | 5           |
| II. Data.....   | 9           |
| III. Corporate Profitability Trends: Change or Continuity?..... | 11          |
| IV. Empirical Strategy.....                                     | 20          |
| A. Principal Findings.....                                      | 23          |
| B. The Persistence of Persistence?.....                         | 25          |
| C. Differentiating the Firms.....                               | 27          |
| V. Conclusion.....  | 32          |
| References.....   | 34          |

### **Tables**

|  |    |
|--|----|
| 1. The Share of Sales Across Ownership Type of BSE Firms, 1989–2008.....                                   | 15 |
| 2. Patterns of Entry, Profitability and Concentration for Fast and Slow-Growing Industries, 2003–2007..... | 16 |
| 3. Correlates of Corporate Profitability: Base Regressions, Annual Data, 1993–2007.....                    | 23 |
| 4. Profitability Correlates: Changes over Time, Annual Data.....   | 26 |
| 5. Longer-Run Profitability Dynamics.....  | 27 |
| 6. Business Houses, Kiviet Estimation with Three-Year Data.....  | 29 |
| 7. Structural Differentiation, Kiviet Estimation with Three-Year Data.....                                 | 30 |
| 8. Sectoral Differentiation, Kiviet Estimation with Three-Year Data.....                                   | 31 |

### **Figures**

|   |    |
|---|----|
| 1. The Number of Firms and Median Gross Sales for Sample Firms.....   | 11 |
| 2. The Median Profit Rate for BSE Firms for all Firms with Data and for a Balanced Panel, 1989–2010.....      | 12 |
| 3. The Ratio of Profits to GDP for all BSE Firms and the Balanced Panel, 1989–2010.....                       | 12 |
| 4. The Profitability of Tradeable and Nontradeable Industries, 1989–2009.....                                 | 13 |
| 5. The Rate of Corporate Profits and Growth Rate of GDP, 1993–2007.....                                       | 14 |
| 6. The Changing Distribution of Profitability Across Firms, 2003–2007.....                                    | 14 |
| 7. Firm Entry and Profitability for the Steel and Drugs Industries.....                                       | 16 |
| 8. The Distribution of Market Shares in the BSE Sample of Firms, 1993–2007.....                               | 17 |
| 9. The Distribution of Sectoral Concentration in the BSE Sample of Firms, 1993–2007.....                      | 18 |
| 10. Patterns of Concentration for the Steel, Drugs, Computer Programming and Hotel Industries, 1993–2007..... | 19 |

## Appendix Figures

|   |    |
|---|----|
| Appendix Figure 1. The Evolution of Profitability Across the Distribution ..... | 36 |
| Appendix Figure 2. The Evolution of Profitability by Firm Size .....            | 36 |

## Appendix Tables

|   |    |
|---|----|
| Appendix Table 1. Descriptive Data from the Prowess Data Base .....   | 37 |
| Appendix Table 2. Selected Characteristics of Firms in the BSE Sample, by Ownership<br>Category .....                             | 37 |
| Appendix Table 3. Sectoral Distribution of Firms in the BSE Sample .....  | 38 |
| Appendix Table 4. Principal Components Analysis: Correlation of First Two Principal<br>Components with Underlying Variables ..... | 39 |
| Appendix Table 5. Cross-Sectional Relationships.....  | 40 |

## I. INTRODUCTION

It is widely agreed that economic liberalization in the second half of the 1980s and the early 1990s was associated with a more competitive environment for Indian firms and was a source of dynamism in the business sector. Liberalization worked in large part through changing the incentives of the corporate sector, unleashing new forces. But the behavior and achievements of Indian companies remain controversial. This paper offers a closer examination of the corporate sector's post-liberalization performance to help explore the controversies and sharpen our understanding of India's economic change as well as its political economy.

The analysis is motivated by two competing views. The first holds that liberalization fostered business dynamism through removal of entry barriers and competitive pressures. According to this view, competitive capitalism has been the source of India's structural change and growth. The other view, while recognizing the gains, sees the forces of capitalism as generating incentives to accumulate excessive market power accompanied by economic entrenchment of the winning firms. This in turn led to deepening inequality and concentration of personal wealth. Such entrenchment, which is reinforced by corporate influence over the state, creates a new rent-seeking environment and potentially saps business energy, with adverse consequences for growth in the medium to long term.

Much of the literature on the firm performance leans towards the second view. Thus, Alfaro and Chari (2009, p. 4) concede that liberalization has led to significant new entry but conclude that: "...from closer examination, what emerges is not a story of dramatic transformation in India's micro-economic structure following liberalization. Rather, the data suggest an economy still dominated by the incumbents (state-owned firms and business groups)." Bertrand, Mehta and Mullainathan (2002) focus on evidence for "tunneling," or the transfer of profits between firms within corporate groups. Such diversion of resources between firms presumably distracts management from more productive activities while damaging the interests of minority shareholders. By contrast, Aghion et al. (2005, p. 1) postulate that: "Technologically advanced firms and those located in regions with pro-business institutions are more likely to respond to the threat of entry by investing in new technologies and production processes." Using three-digit state-industry data from 1980–1997, they conclude that "...delicensing led to an increase in within-industry inequality in industrial performance."

These questions are also related to the broader debate on whether the policy changes and growth accelerations of the past twenty five years are best interpreted as a move toward a "pro-business" orientation or a "pro-market" position (see for example, Rodrik and Subramanian, 2004; and Kohli, 2006, on the "pro-business" interpretation, and Panagariya, 2008, for an example of the "pro-market" interpretation). Under the pro-business view, the government shifted its stance toward modern-sector productive activity through removing restrictions—and implicitly increasing assurances—on the large-scale private sector. This

unleashed investment and growth, but essentially “oligarchic” capitalism. By contrast, the pro-market views the mix of reduced restrictions and external liberalization as the main drivers of changes in economic performance, working via heightened competitive pressures on firm behavior. A related view could be characterized as a Schumpeterian process of creative destruction, in which corporate firms, and especially those connected to the business houses (conglomerates that are typically still controlled by founding families and their allies), have sufficient market power or economies of scale to protect profits, but also face sufficient incentives from home or abroad to induce investment and innovation.

To inform this debate, this paper analyses the correlates of profitability of firms listed on the Bombay Stock Exchange, covering a dynamic period—in terms of firm entry and growth—from the early 1990s to the late 2000s. The focus on profits is deliberate. Profits are intimately related to the issues at stake. Profits can be a reward and spur to creative change that, in turn, creates wealth, trade and jobs for society. Or they can be a product of the exercise of market power and influence. The sources of profitability then guide the production, investment, innovation, market and lobbying strategies of firms.

The core econometric analysis relates a firm’s profit rate to its profit rate in the preceding year, other firm characteristics, key features of the industry in which the firm operates, and macroeconomic conditions. Earlier contributions using the Prowess database and motivated by similar interests include those by Khanna and Palepu (2000) and Bertrand et al. (2002).<sup>2</sup> Khanna and Palepu (2000) undertake a cross-sectional analysis on one year, 1993. Bertrand et al. cover the period from 1989 to 1999, and control for unobserved firm-level heterogeneity, which biases cross-sectional analysis. They, however, do not allow for the persistence of profits, which we find is significant, and requires special econometric treatment. Moreover, their focus is on testing a specific hypothesis regarding tunneling of profits and not on the broader correlates of corporate profitability.

Our approach is more akin to that used for the analysis of European and U.S. firms’ profitability, which allow for persistence in profit rates and deploy econometric techniques appropriate for that setting (Goddard, Tavakoli, and Wilson, 2005 and Tregenna, 2009). In similar spirit, we undertake both a descriptive and econometric analysis of the patterns of change over time. While this does not constitute a rigorous test of the three hypotheses, we are able to explore the consistency of the patterns in the data with the alternative interpretations.

Extensive firm entry would provide *prima facie* support for competitive pressures, but is not decisive, since new entry could be of small, or follower firms, who do not threaten the power

---

<sup>2</sup> Alfaro and Chari (2009) review the evolution of the corporate sector, but do not analyze the determinants of profitability.

of incumbents. Similarly, while business houses may have greater capacity to exert influence of markets and government than stand-alone firms, they can also be a source of dynamism—it is a mistake to identify the business house form as being intrinsically anti-competitive, with stand-alone firms as intrinsically competitive. This is why we focus on actual profit behavior of all firms. We examine in particular the persistence of firm-specific profits—a potential indicator of the capacity of firms to resist competitive pressures from firms in the same industry—and the influence of firm-level market shares and industry-level measures of concentration. However, while these relations carry additional information, they are also not decisive with respect to assessing the hypotheses: persistence of profits can also be an indicator of unobservable firm-specific advantages (of management, labor force, quality, etc.); an association between profits and market shares may reflect rewards to growth, especially in a dynamic formulation; and measures of both domestic market share and concentration are incomplete proxies for competitive pressures for import-competing industries.

For these reasons we also undertake a series of further explorations of how profit behavior varies across different groupings of the firms, dividing them with respect to industry size, tradable and nontradables, firm-level efficiency and corporate structure (especially between business houses and others). In each of these areas, the hypothesis to explore is that the exercise, or abuse, of entrenched market power is more marked amongst larger firms, nontradables, and business houses, and not a product of greater efficiency. Conversely, the absence of such a pattern supports the view of more competitive behavior.

The results do not, in general, provide support for the systematic exercise of market power, but are rather consistent with a dynamic business sector with significant competitive pressures. However, there is also features of the corporate sector that could provide the basis for a changes in the dynamic, away from getting ahead through competitive ability to one where market power and government-business relationships once again acquire increased importance. In particular we find:

- A marked overall profit cycle over the past two decades. Profitability was high just before the liberalization, stayed high for a few years afterwards, and then fell significantly till the early 2000s. There was then a significant recovery in profitability in the mid to late 2000s. This cycle affected almost all industries, with a similar pattern for firms in tradeable and nontradeable sectors, suggesting the primary drivers were domestic.
- We indeed find a significant link between profitability and macroeconomic conditions, in both the descriptive and econometric analysis. There in particular are influences of measures that proxy both “overheating” and underlying economic growth. However, the association with overheating seems to be confined to the earlier part of the period.

- There was substantial entry across virtually all industries in the early to mid-1990s. However, this virtually stopped after the late 1990s, with little new firm entry in the 2000s, despite the recovery in profits in this period. This pattern was associated with a fall in measures of market concentration for most industries in the 1990s. While the bulk of entry, in terms of numbers, was in the form of Indian stand-alone firms, business houses and publicly owned firms remain dominant throughout the period in terms of shares of sales and assets; firms linked to business houses actually slightly increased their share of total sales in the sample from 41 percent in 1989 to 42 percent in 2008.
- A firm's profitability tends to persist strongly from year to year. But the persistence declines when profitability is averaged over longer periods (up to four years), suggesting some "super normal" profits are whittled away over time. More efficient firms tend to have more persistent profits. Thus, some part of the persistence reflects greater efficiency, although because of the overlap between efficient and large firms, market power may also have a role in maintaining the profit rate over time.
- There was some re-concentration in the 2000s, affecting about a third of firms for which we have a long time series, indicating a process of consolidation. There is, however, no consistent evidence of a general influence of market concentration on profitability: if anything, firms in less concentrated sectors have higher profit rates. Moreover, firms in re-concentrating sectors have similar overall profit dynamics as other firms, again supporting the view that the exercise of market power is not a general phenomenon for this group.
- Firms with growing market shares do enjoy higher profitability, but the pattern of results is more consistent with causation flowing in the opposite direction, that is in success of dynamism. In particular, we find that this association is equally or more true of small firms and less concentrated industries.

Overall we interpret this as presenting a picture of a corporate sector that, in this period of major change, was characterized to extensive competitive pressures, inducing dynamism, as opposed to being typified by market power and entrenchment. More speculatively, the combination of support for competitive dynamics with structural continuity (especially of business houses), and of some profit persistence, could be indicative of a Schumpeterian dynamic of creative-destruction of activities, with firms induced to discover rents through processes of innovation. However, exploring this would require substantial further work on patterns of innovation and change that we leave to future research.

Moreover, while the overall assessment is supportive of a dynamic business sector, the results do caution that this process also shows signs that could change the direction of Indian corporate dynamics, especially with respect to the lack of entry in the 2000s and a reversal in

the trend of declining concentration for some sectors. Further accentuation of these tendencies could create greater incentives for investment in entrenchment and a less dynamic corporate sector. Furthermore, those with opposing views can, with justification, argue that the analysis in this paper does not cover broader influences, such as corporate governance and state-corporate relations, which may paint a less flattering picture of the corporate sector's role. Recent years have seen a number of specific cases of malfeasance, corruption, or the apparent exercise of influence over the state. Our paper clears the ground for that further analysis.

The rest of the paper is organized as follows. The next section describes the data. There then follows an account of the descriptive patterns, focusing on trends in profitability, entry, market share and concentration. The principal econometric findings are reported thereafter. A concluding section reflects on the findings, the broader political economy context, and further avenues for research.

## II. DATA

The analysis for this paper is based on the Prowess data, that is maintained by the Centre for the Monitoring of the Indian Economy (CMIE), and is the most comprehensive source of financial information on individual firms in India. A firm is included in the Prowess database if either of two criteria are satisfied, (1) the firm has a turnover of more than Rupees 2.5 crores, or (2) if its annual reports are available for at least the two latest years prior to the year of updating. In practice Prowess is dominated by publicly listed companies. Once a firm is in the data base, an effort is made to include historical data, and in particular, includes information of the year of a firm's incorporation, that is an indicator of its birth as a formal firm. There is also information on ownership structure, between foreign, domestic private and public, and whether a firm is part of a business group. If new firm formed by a business group, is treated as firm entry affiliated to that business group.

The data includes firms listed on the Bombay Stock Exchange (BSE), the largest exchange in India, as well as the variety of other exchanges in India. We confine our analysis in this paper to the BSE firms: because of more comprehensive and better quality data for this group, most researchers focus on them. (Careful exploration of the whole data base remains an important task for future research.) By 2007, BSE firms accounted about a third of all firms in the Prowess data base, but some 70 percent of total sales and assets. Median sales and assets are much larger amongst firms listed on the BSE (see Appendix Table 1).

Reasonably comprehensive financial data is available from the 1989 financial year until the 2010 financial year, but with still incomplete reporting for the last couple years. About 20 percent of the BSE firms do not have data on the profit rate—for which we use the ratio of profits before interest and tax to the reported value of assets—and these are excluded from our analysis. For some of the descriptive information on patterns we present data for all BSE

firms with profit data the whole 1989–2010 period. This was a period of large expansion in the number of firms in the data base, even for the BSE alone. For most of the analysis we use the full unbalanced panel of BSE firms with data on the required variables. There is data from the 1989 to 2010 financial years for just under 160 firms: these had an average age of incorporation of 1957, with two as early as 1897. This constitutes a balanced panel, and we also present information on its profit rate in the next section.

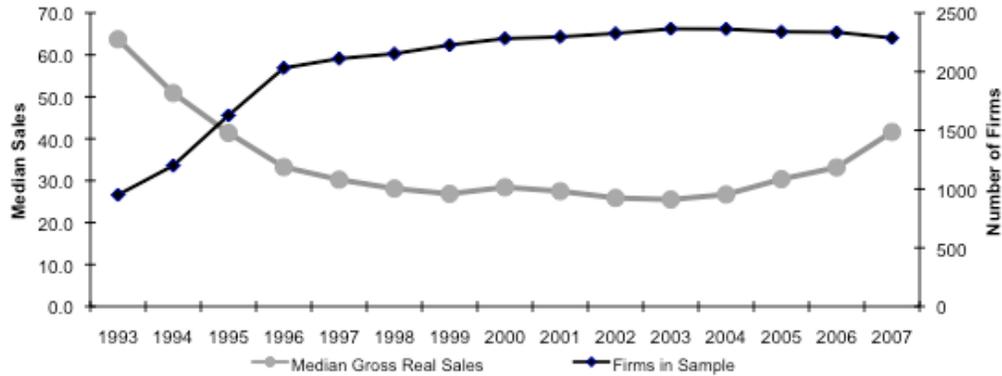
The sample used for the econometric analysis involved two other adjustments. First, we dropped a further 20 percent of the firms that do not report the right-hand side variables needed (see Appendix Table 1). Second, we also confined the analysis for the period from 1993 to 2007: the period between 1989 and 1993 involved both a very large expansion and significant shifts in the economic environment. As noted, there is still significant under-reporting after 2007, that could have distorted the results. We also dropped firms in the financial sector, whose assets (loans) and sales have completely different interpretations relative to the other firms. Our sample is thus likely to reflect the more established and better-run parts of the Indian corporate sector, a group that is in particular unlikely to face credit constraints. While not representative of the whole corporate sector, it is a particularly important and interesting group.

Between 1993 and 2007 the number of firms in our core sample more than doubled in number, rising from less than 1,000 to some 2,300 firms (Figure 1). This mirrored the overall growth in numbers of BSE firms, as well as all firms in the Prowess data base. The dramatic increase in new listings in the early to mid-1990s appears largely to have been “greenfield” listing, implying genuine new entry rather than just a reclassification of a firm as listed on the BSE.<sup>3</sup> In terms of numbers, the bulk of new entry was from stand-alone Indian firms, though there was also significant formation of new firms by business houses and some new business houses. From 1997 the number of firms in the sample is quite stable. With new entry, median real sales fell significantly, since new firms were much smaller (the sales of established firms continued to rise). Median sales then stabilized and started to rise after 2003. The median firm is of course changing in this period, owing to entry, exit, and shifts in rankings, but we believe that this captures an interesting pattern in the data.

---

<sup>3</sup> We are grateful to Ajay Shah for clarifying this for us. On entry, see also Alfaro and Chari (2009).

Figure 1. The Number of Firms and Median Gross Sales for Sample Firms



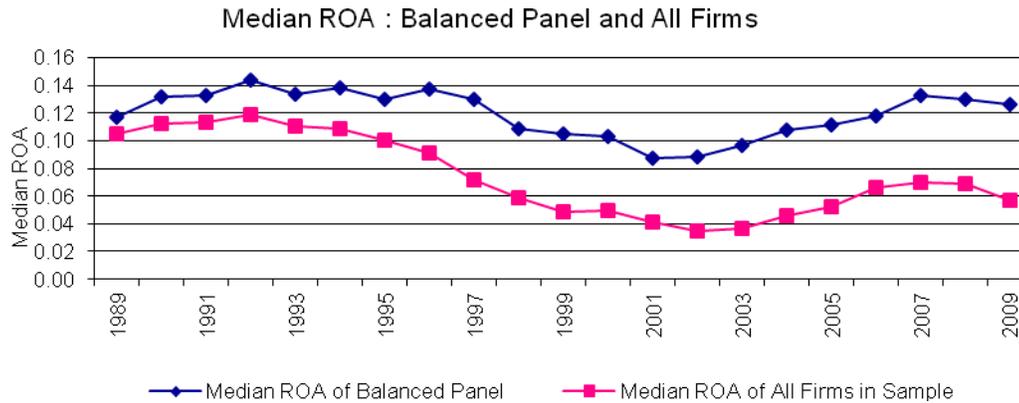
Source: CMIE

While our focus on a subset of the BSE firms is guided by data availability and the intrinsic interest in these relatively large firms, the levels and trends across the different samples are very similar in at least one key respect. The overall pattern of a fall in the return on assets from the early 1990s to the early 2000s, that is analyzed in the next section, is a common feature of the core sample of firms used in the econometric analysis, the sample of all BSE firms with profit data, and of all firms with profits data in the Prowess data base.

### III. CORPORATE PROFITABILITY TRENDS: CHANGE OR CONTINUITY?

The overall evolution of the profitability of BSE firms between 1989 and 2010 is shown in Figure 2. The median profit rate (the ratio of profits before interest and taxes to assets) rose between 1989 and 1992, then experienced a steady and substantial decline until 2002, followed by a significant recovery, albeit to a profit rate that was less than the early 1990s level. 2009 then saw a fall—in the context of the global financial crisis and domestic slowdown. Initial reporting for 2010 suggest a recovery is under way. This long cycle of a fall and rise profitability was experienced throughout the distribution of firms: to both more and less profitable firms and to both larger and smaller firms (see Appendix Figures 1 and 2). Similarly, the balanced panel of firms already established in 1989 experienced a cycle with a very similar rhythm, but with a less pronounced fall in profitability in the late 1990s. Both the balanced panel and large firms (with some overlap between these categories) were typically more profitable than other firms throughout the period.

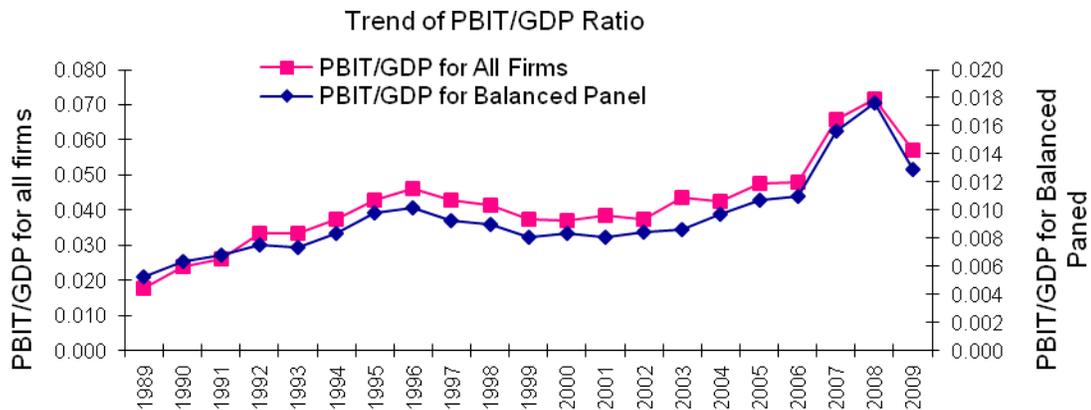
Figure 2. The Median Profit Rate for BSE Firms for all Firms with Data and for a Balanced Panel, 1989–2010



Note: ROA refers to the ratio of profits before interest and taxes to assets for the sample of firms in the Bombay Stock Exchange.  
Source: CMIE

In contrast to the firm-level profit rates, the share of profits in national income of this part of the corporate sector rose substantially in both the early to mid-1990s and from the early 2000s, with a (probably temporary) fall in 2009 in the recession. While this is not the focus of this paper, it is a noteworthy phenomenon of the overall structure of the Indian economy.

Figure 3. The Ratio of Profits to GDP for all BSE Firms and the Balanced Panel, 1989–2010

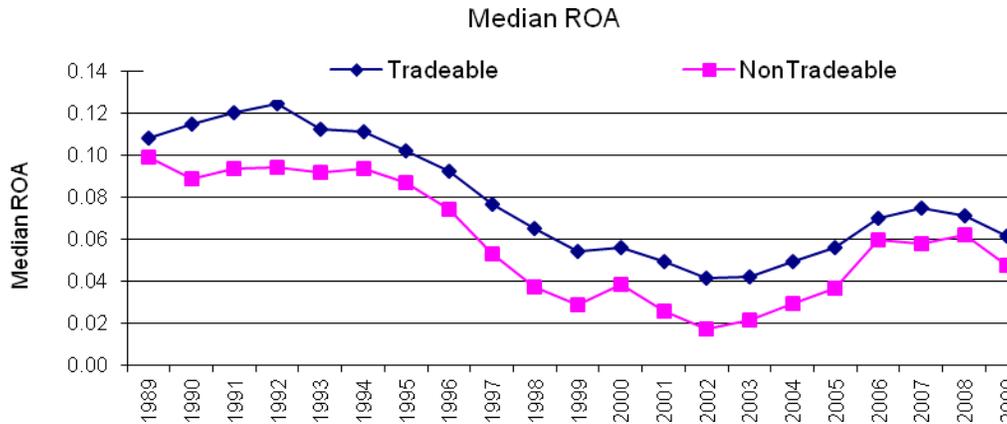


Note: PBIT refers to profits before interest and taxes.  
Source: CMIE, Central Statistical Organisation.

The two most important parts of the reforms involved de-licensing, with major liberalization of entry in the late 1980s and 1991 (with a further liberalization in the late 1990s), and external trade liberalization, with a major initial opening in 1991. As Topalova (2007) argues, the 1991 opening was a significant, and probably largely unanticipated, shock. De-licensing was an industry-by-industry affair that affected tradeable and nontradeable activities. External trade liberalization of course only affected tradeables. Figure 4 presents

the median profit rate for these two groups: this provides a striking additional result—the profit cycle looks very similar for both groups over the whole period, though the median tradeable firm actually rose in profitability through 1992 (a similar pattern is found if we take averages). This suggests common, and so primarily domestic, drivers of overall change between tradeable and nontradeable industries.

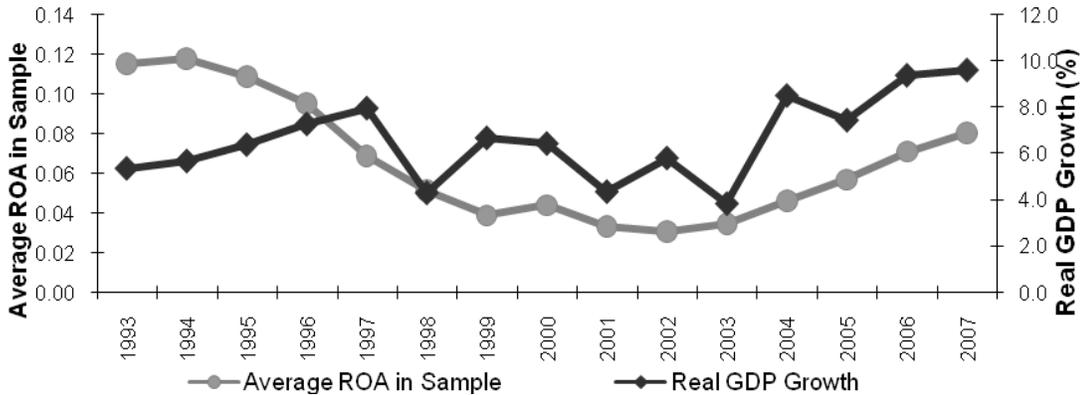
Figure 4. The Profitability of Tradeable and Nontradeable Industries, 1989–2009



Source: CMIE, Central Statistical Organisation.

There were two developments that affected all, or most, industries: domestic macroeconomic activity and the experience of opening to firm entry. With respect to macroeconomic activity, apart from the early years, the profit rate indeed moved rather closely with the Indian GDP growth rate (Figure 5: how hard is to update this through 2009?). In the early years of our sample, firms may have been able to exploit the relatively high inflationary environment to raise prices faster than costs. But, thereafter, the link to short-run demand pressures diminishes and to GDP growth strengthens. Thus, through 2002, slow GDP growth and substantial entry of domestic firms and opening to foreign competition appears to have depressed profitability. By about 2001, market shares stabilized and GDP growth started increasing, which was reflected in the rise in the profit rate. The timing of the turnaround in profit rates is also consistent with Virmani's (2009) analysis of a new acceleration in Indian GDP growth through private investment. Thus, growth, investment, and profitability appear to have reinforced each other.

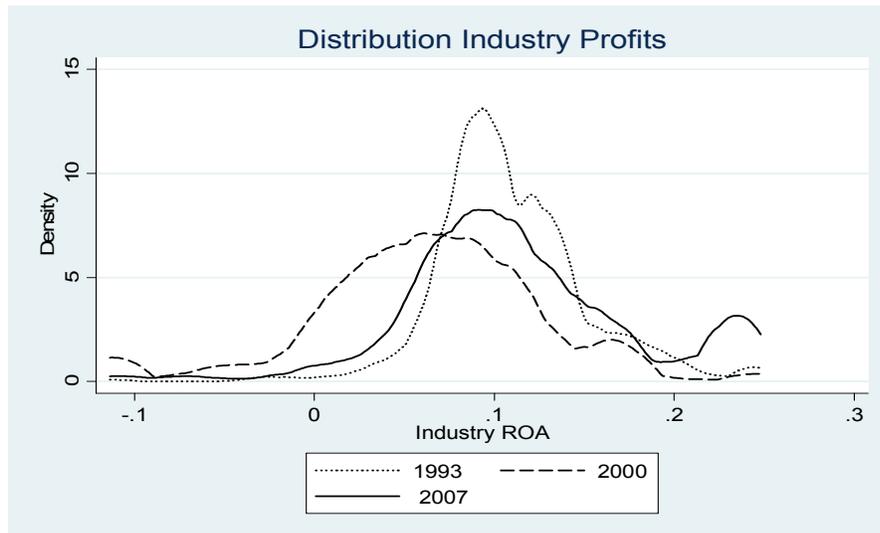
Figure 5. The Rate of Corporate Profits and Growth Rate of GDP, 1993–2007



Source: CMIE

Before turning to patterns of entry, we highlight a further feature of the data. The changes in median, or average, rates of return hides large differences across firms. This is illustrated in Figure 6. The high profit rate in 1993 was also relatively narrowly distributed: most firms’ profit rates were closely clustered. The declining profitability between 1993 and 2000 was accompanied by an increased dispersion of profit rates. This may have been because the competitive pressures on profits from the liberalization were felt more acutely by some firms than others, or because of rising heterogeneity associated with the substantial firm entry. As profit rates increased, the distribution of profit rates shifted once again to the right. There was also some narrowing of the dispersion, but the distribution remained wider than in 1993, with a suggestion of a rise in the proportion of highly profitable firms (and this is after taking out outliers in the distribution).

Figure 6. The Changing Distribution of Profitability Across Firms, 2003–2007



Source: CMIE

So what did entry do in terms of market structure? This is determined by the number of new entrants, their size, and the subsequent expansion paths across firms. We look at three features of the structure: the composition of firms by ownership type; market shares; and measures of industry-level concentration.

The overall picture of substantial new firm entry in the early and mid-1990s reflects a surge in the numbers of Indian “stand-alone” companies. In our core sample stand-alones accounted for a 35 percent of total firms by 1993, but over 60 percent by 2007. However, this occurred within the context of the continued dominance of central government commercial companies and firms affiliated with business houses: in terms of the share of sales in BSE firms, there was some decline in the share of government companies, but a modest *rise* in the share of Indian business houses (see Table 1; also Alfaro and Chari, 2009). Within business houses, the top fifty houses saw a more modest increase in numbers of firms, but maintained their share of sales—at just over a quarter. Whether the entrance of new stand-alone firms created a more competitive environment or whether the Indian business sector is essentially still dominated by government-owned firms and conglomerates with influence over market conditions (and government policies and regulation), is clearly an issue. We take this up in the econometric analysis.

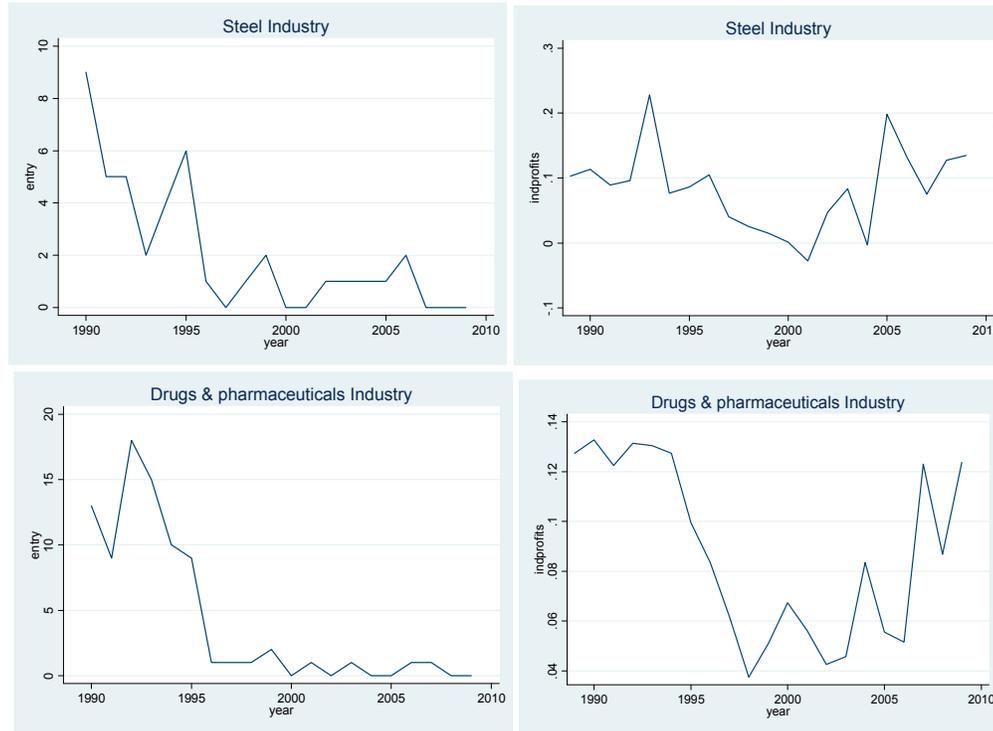
Table 1. The Share of Sales Across Ownership Type of BSE Firms, 1989–2008

| Ownership Type                    | 1989 | 2000 | 2008 |
|-----------------------------------|------|------|------|
| Government Commercial Enterprises | 44.6 | 39.4 | 36.9 |
| Indian Business Houses            | 40.8 | 40.1 | 42.4 |
| Indian Private Stand-Alones       | 3.6  | 9.4  | 11.9 |
| Foreign Firms                     | 9.3  | 9.5  | 7.4  |
| NRI Business Houses               | 0.8  | 1.0  | 1.0  |

Source: CMIE.

For the assessment of entry, market share and concentration we turn to a sectoral analysis. The first striking result in the data is the consistency across the vast majority of industries of the pattern of substantial entry in the early to mid 1990s, followed by stability thereafter. We illustrate with two very different sectors: steel, a traditional industry with significant public presence, indeed central to Nehruvian industrial strategy, compared with pharmaceuticals, an iconic dynamic industry of the post-liberalization period. Yet, as Figure 7 shows, the dynamics of entry and the profit cycle is qualitatively very similar for both. Pharmaceuticals experienced a bigger fall in profitability than steel, but *also* had almost no entry into the BSE group after the mid-1990s, despite a major recovery in profit rates after the mid-2000s. This pattern is broadly repeated.

Figure 7. Firm Entry and Profitability for the Steel and Drugs Industries



Source: CMIE

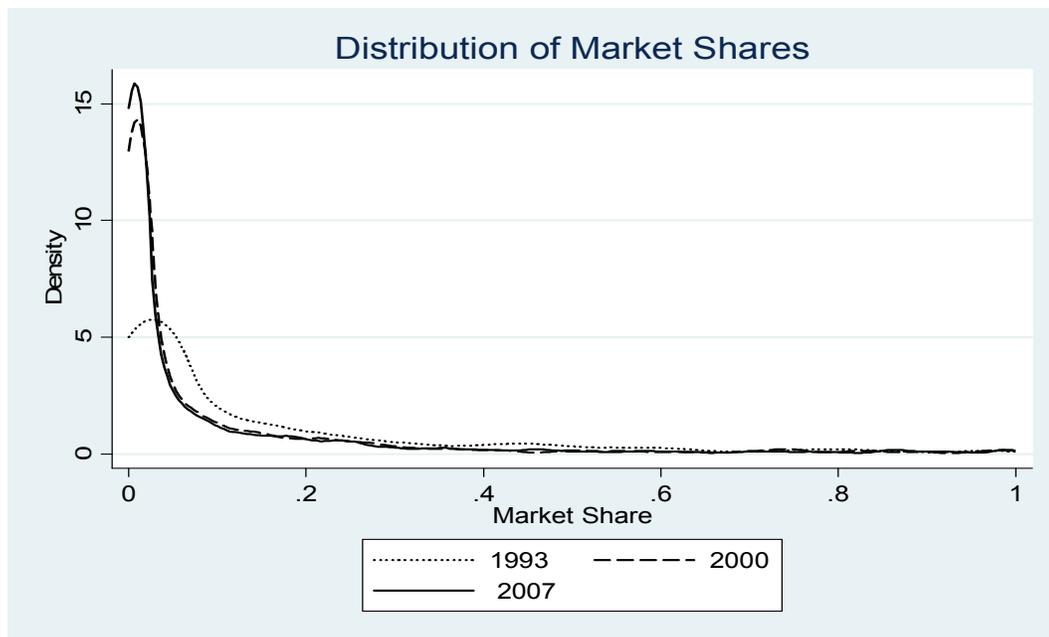
From an industry-level market structure perspective, we are interested in the consequences of entry for firm-level market shares and sectoral concentration. These are closely related, but can have different interpretations. An individual firm with a larger market share may earn higher profits because of greater market power or because of superior capabilities, often unobservable in the data. High sector-wide concentration can allow individual firms with large market shares to influence the market but can also support generalized excess profits in a sector. The extent of competition is also influenced by exposure to competition from imports, and it is an empirical question whether high market share and or levels of concentration provide the market power for anti-competitive behavior. In the econometric analysis we explore whether there are differences in results for manufacturing (essentially open to import competition) and services (that are not).

The quantitative analysis was undertaken for the core sample of firms with good data (as used for the econometric analysis). Market shares are calculated in terms of a firm's share of sales in its particular (five-digit) sector. This is an overestimate of true market share to the extent that firms outside the sample are also in the same sector, but is likely to be a good indicator of competition from the larger and more established firms. Sectoral concentration is proxied by the Herfindahl-Hirschman Index (HHI) for the five-digit sector in which the firm

is recorded as operating. This again is calculated for firms in the data base, so is an upper bound on the extent of concentration in the market.<sup>4</sup>

Firm-level market shares are bunched at low levels, with a noticeable leftward shift in the density in the 2000s, compared with 1993, implying a larger proportion of individual firms have low shares (Figure 8). This is consistent with the entry of large numbers of stand-alone Indian firms noted above. Some firms do have high market shares, especially government-owned firms and those associated with larger business houses. However, these firms lost market shares over time: the median market share of central government-owned firms was 26 percent in 1993, falling to 17 percent by 2007. For firms affiliated to the top fifty business houses, the median market share fell from 13 to 8 percent in the same period, implying half the firms in this category had higher shares. These are not insignificant numbers. Overall, the picture is of a large number of firms with low market shares, but with a significant group with potentially influential market positions.

Figure 8. The Distribution of Market Shares in the BSE Sample of Firms, 1993–2007



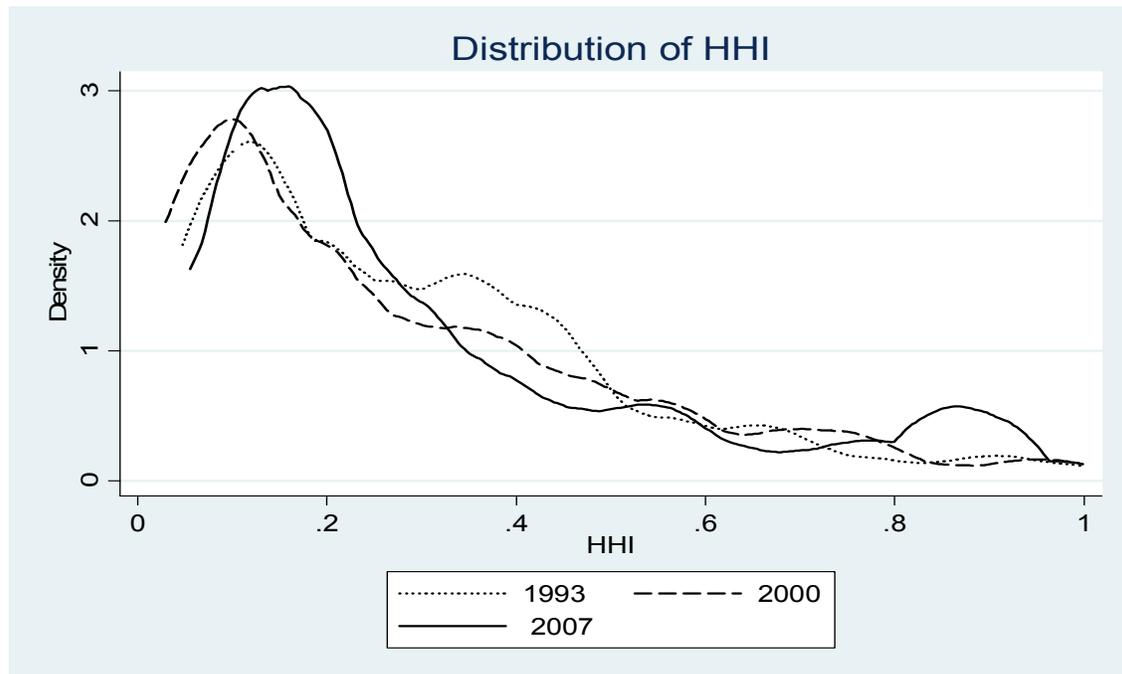
Source: CMIE

The measure of sectoral concentration also shows interesting shifts over time. The distribution is again skewed to lower levels of concentration, as would be expected from the

<sup>4</sup> The Herfindahl-Hirschman index is given by the sum of the square of market shares, where the market shares are expressed as fractions, and ranges for close to zero (for a very large number of small firms) to one (for one monopolist producer); the index is often expressed in terms of the sum of percentage squares, in which case the range is from close to zero to 10,000.

market share data, and there was a leftward shift between 1993 and 2000, indicating a rising proportion of firms in sectors with lower levels of concentration. However, this was followed by a significant shift to higher levels of concentration by 2007. About a third of firms for which we have long time-series were in sectors that experienced significant re-concentration in the 2000s; the remainder were in sectors that had either stable or falling levels of concentration. Note also that many firms are in sectors in which the measured concentration is quite significant: there is substantial density above 0.2. By way of comparison, the US Justice Department uses a cutoff of 0.1 (1,000 if the index is calculated in terms of the square of percentages, that goes from zero to a maximum of 10,000) as a critical cutoff for investigation of merger proposals. Measured levels may be distorted by the upward bias in the measured values noted above, but the changes over time are indicative of some action: this could be benign—if there is some efficient consolidation—or a potential source of market power.

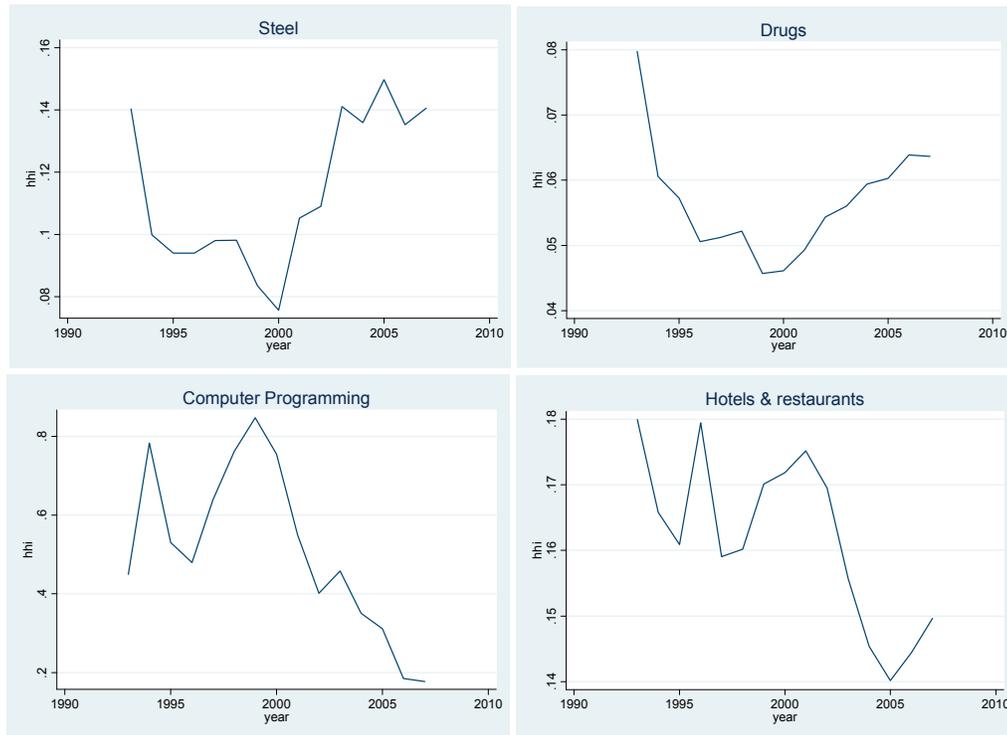
Figure 9. The Distribution of Sectoral Concentration in the BSE Sample of Firms, 1993–2007



Source: CMIE

The pattern of increases in concentration in the 2000s is by no means uniform across sectors: some industries experience a marked reconcentration, while others undergo further reduction in the degree of concentration. Figure 10 illustrates for four industries: both steel and drugs/pharmaceuticals are cases of substantial reconcentration, while computer programming and hotels/restaurants became less concentrated in the 2000s.

Figure 10. Patterns of Concentration for the Steel, Drugs, Computer Programming and Hotel Industries, 1993–2007



Source: CMIE

Are there systematically different patterns between fast and slow-growing firms? Table 2 provides summary measures for a partition of firms into three categories, by their average pace of real sales growth for the 1993–2007 period. Since there was extensive new entry, the period over which the averaging is undertaken varies across firms. This shows much greater firm entry amongst fast-growing firms, and an actual decline in numbers between 2000 and 2007 amongst slow-growing firms. This is aligned with patterns of profitability: fast-growing, experienced a smaller decline in profitability between 1993 and 2000, from 12 percent to 8 percent, and then recovered to a 11 percent by 2007. Medium-growing firms experienced a similar pattern, but with somewhat lower profit rates in 2000 and 2007. By contrast, slow-growing firms had a negative profit rate in 2000 and a meager 3 percent in 2007. The mean size of fast-growing firms was half that of medium-sized firms in 1993, but only slightly below in 2007. Slow-growers were much smaller. Finally, there is little difference in terms of sectoral concentration indices; though slow growers were in sectors with a larger increase between 2000 and 2007. This is overall a picture of substantial shifts reflecting the overall structure of profitability.

Table 2. Patterns of Entry, Profitability and Concentration for Fast and Slow-Growing Industries, 1993–2007

| Category by Growth Rate | Real sales (Rp....) |      |      | Number of firm-observations |      |      | Average ROA (%) |      |      | Average HHI |      |      |
|-------------------------|---------------------|------|------|-----------------------------|------|------|-----------------|------|------|-------------|------|------|
|                         | 1993                | 2000 | 2007 | 1993                        | 2000 | 2007 | 1993            | 2000 | 2007 | 1993        | 2000 | 2007 |
| Fast                    | 1.2                 | 1.0  | 2.8  | 190                         | 748  | 926  | 12.3            | 8.2  | 10.6 | 0.28        | 0.27 | 0.30 |
| Medium                  | 2.2                 | 2.1  | 3.5  | 393                         | 752  | 757  | 12.5            | 6.2  | 9.2  | 0.28        | 0.27 | 0.28 |
| Slow                    | 0.7                 | 0.4  | 0.2  | 367                         | 782  | 604  | 10.0            | -0.9 | 2.7  | 0.30        | 0.29 | 0.35 |

Source: CMIE

In sum, the Indian corporate sector represented in the BSE has experienced a marked long-term cycle in profitability over the past 20 years—with a substantial fall in profitability in the 1990s, but one that started a couple of years after the major liberalization of 1991, followed by a significant recovery from the early 2000s. This was broadly aligned with aggregate growth outcomes, but also with a pattern of substantial firm entry in the 1990s followed by quite notable stability in firm numbers in the 2000s. Structural patterns and shifts within the corporate sector can be read as evidence of change and dynamism or, alternatively, of continuity with potentially high levels of market power and entrenchment. Industry concentration fell in the late 1990s, but has shown some tendency to rise in the 2000s, albeit with highly varying experiences across sectors. Throughout, the traditionally-dominant public sector firms and those from business houses maintained their visible presence, with the overall share of business houses actually rising slightly in the overall period, despite the surge in numbers of Indian stand-alone firms.

#### IV. EMPIRICAL STRATEGY

To probe beneath the patterns presented in the previous section, and explore the further the dynamics of this important phase of corporate development, we turn to an econometric analysis of the data on variation in profitability across firms.

For the core analysis we regress a firm's profit rate ( $\pi$ ) on:

- its lagged profit rate;
- firm characteristics—the contemporaneous growth of the firm's real sales ( $g$ ), the share of the firm's sales in a five-digit industrial classification category ( $s$ ), and lagged assets ( $a$ );
- industry characteristics—industry concentration measured by the Herfindal-Hirschman index ( $H$ ) and the average profit rate of all other firms in that industry, following Bertrand et al, 2002, ( $\pi_{ind}$ ); and

- macro characteristics—these are drawn from a principal components analysis of a number of macro and financial variables in which the first two principal components have a naturally-appealing interpretation in terms of “overheating” ( $OH$ ), that mainly reflects high inflation and interest rates, and an appreciated real exchange rate, and “sustained economic growth” ( $G$ ), that mainly reflecting GDP growth and a benign global financial environment—see Appendix Table 4.

The estimating equation is thus as follows, for firm  $i$  in industry  $j$  in time period  $t$ :

$$\pi_{ijt} = \alpha + \beta_1 \pi_{ijt(-1)} + \beta_2 S_{ijt} + \beta_3 g_{ijt} + \beta_4 a_{ijt(-1)} + \beta_5 H_{jt} + \beta_6 \pi ind_{jt} + \beta_7 OH_t + \beta_8 G_t + \varepsilon_{ijt}$$

This is a fairly standard specification, though an integrated analysis of structural and macroeconomic influences is not common. However, drawing inferences on the competitive process is not straightforward. For example, strong persistence of profitability may be read as evidence of weak competitive pressures to bid down above-normal profits—or weed out firms with relatively low profits. But it may also be indicative of underlying differences in efficiency across firms, associated with managerial or other sources of intra-firm performance, leading to sustained differences in profit rates. Similarly, a significant influence of market share could be an indicator of the role of market power, but the direction of causation could go the other way, with higher market share (and especially increases in market share) may also reflect superior firm-level performance.

Firm growth and lagged assets have more natural interpretations. While they do not directly speak to the issue of the competitiveness of the corporate sector, they are interesting in themselves and are introduced as control variables. Firm growth is a measure of performance, and we saw above that there is some link between dynamism and profits, while lagged assets capture scale effects.

Amongst industry characteristics, we are particularly interested in any evidence of the influence of sectoral concentration, proxied by the Herfindahl-Hirschman index. While market share data may capture the market power of individual firms (with the interpretative caveats just noted), overall concentration could proxy the influence of sector-wide oligopolistic conditions—for example Tregenna (2009) finds such sector-wide oligopoly, rather than firm-specific market shares, to be the characteristic feature of the US financial industry.

The industry-wide profitability variable controls for specific supply and demand. However, a strong association with industry-wide profitability could either be due to competitive influences moving profits together, or to all benefiting from oligopolistic conditions (perhaps supplemented by strategic interactions between firms when numbers are low.)

Finally, the descriptive patterns were suggestive of a relationship with macroeconomic conditions, but there could be different profit responses to overheating pressures (where there can be short-run opportunities to raise prices and increase profits) and long-term growth.

As the above indicates, the main interpretative questions depend on whether any observed relationships with lagged profits, market share, industry-wide concentration and industry-wide profitability are consequences of a market power or dynamic efficiency interpretation. We explore this through a strategy of analyzing the core profit equation over different horizons and, especially, through partitioning the firms into groups—small versus large, business house versus stand alone, more versus less efficient, manufacturing versus services—and examining comparative results across the partitions.

In addition to substantive issues of interpretation, there are important econometric questions that need to be handled. Control for firm-level heterogeneity can, in principle, be achieved through the use of firm fixed effects. However, where the lagged dependent variable is part of the specification, the fixed effects results are biased. There are two concerns. First, the coefficient on the lagged dependent variable will tend to be lower than the “actual”, mis-measuring the degree of persistence. Second, as a consequence, the coefficients on the other variables will also be biased in a less well-specified manner. To deal with this concern, GMM techniques may be used. However, recent analysis by Flannery and Hankins (2009) cautions that when there is second-order serial correlation of errors, as is the case in our data, GMM techniques can be seriously biased. Moreover, where there are gaps in the time series of an individual firm, as is common in firm-level data, and is the case in the Prowess data, GMM techniques are also inappropriate. Flannery and Hankins (2009) find that the so-called “Kiviet” correction, while also not perfect, performs much more consistently. Unlike the GMM approach, which uses instruments to deal with the fixed effects’ bias, the Kiviet methodology directly measures the bias in the fixed effects’ estimates and corrects for that bias. Our approach is to present the standard fixed effects results to motivate the discussion, but to rely primarily on the Kiviet-correction for our findings.

Finally, as is customary in panel analysis of firm-level data, we “winsorize” the variables, in other words, we remove extreme values of variables to minimize the effects of outliers. For the rate of profit itself, we drop the top and bottom 2½ percent of observations, given the pattern of extreme values at the two ends of the distribution. For all other variables we drop the top and bottom 1 percent of observations.

It is important to be clear what this analysis does and does not achieve. While we use a specification and econometric approach regarded as appropriate in the context and are, therefore, able to overcome a number of potential biases, we are unable to deal with issues of reverse causality. Thus, a firm’s sales growth and market share could well be influenced by its profitability rather than the other way around, as is suggested by the way we present our results. Because it is not clear how the endogeneity problems can be resolved, the results we

present should be treated as a refined descriptive analysis through partial correlations and associations.

### A. Principal Findings

Table 3 reports the basic set of regressions on annual data for our full sample of BSE firms, covering the whole fifteen-year period. Fixed effect regressions are reported in columns (1) to (4), which sequentially add more variables, starting with a parsimonious specification and ending with all the variables used. Column (5) reports the OLS results. The core equation, utilizing the Kiviet correction is reported in column (6), with the full set of variables.

Note that the overall equation, including a blend of structural firm and industry-level factors and macroeconomic conditions, performs well, despite uncertainties over the quality of the underlying data, and the substantial rise in the number of firms in the period. Importantly, econometric theory says that the coefficient on the lagged dependent variable is overstated in the OLS specification, understated in the fixed-effects specification, and, hence, the coefficient in a valid Kiviet specification should fall between the two limits. It is reassuring that this is indeed the case.

Table 3. Correlates of Corporate Profitability: Base Regressions, Annual Data, 1993–2007

| Variables               | (1)                     | (2)                        | (3)                            | (4)                  | (5)                | (6)                  |
|-------------------------|-------------------------|----------------------------|--------------------------------|----------------------|--------------------|----------------------|
|                         | Firm<br>Characteristics | +Industry<br>Concentration | +Industry<br>Rate of<br>Return | +Macro<br>Factors    | All<br>Variables   | All Variables        |
|                         | FE                      | FE                         | FE                             | FE                   | OLS                | Kiviet               |
| Lagged profit rate      | 0.298***<br>[24.7]      | 0.297***<br>[24.6]         | 0.294***<br>[24.2]             | 0.298***<br>[24.7]   | 0.528***<br>[50.9] | 0.403***<br>[57.4]   |
| Sales growth            | 0.061***<br>[25.8]      | 0.060***<br>[25.6]         | 0.060***<br>[25.5]             | 0.061***<br>[26.0]   | 0.071***<br>[32.0] | 0.060***<br>[33.0]   |
| Market share            | 0.094***<br>[7.06]      | 0.097***<br>[7.07]         | 0.106***<br>[7.61]             | 0.111***<br>[8.01]   | 0.036***<br>[8.31] | 0.096***<br>[8.56]   |
| Lagged assets           | -0.018***<br>[-9.75]    | -0.018***<br>[-9.79]       | -0.019***<br>[-9.85]           | -0.020***<br>[-10.8] | 0.003***<br>[7.25] | -0.015***<br>[-11.7] |
| Sector concentration    |                         | -0.018*<br>[-1.69]         | -0.021*<br>[-1.96]             | -0.018*<br>[-1.71]   | -0.006*<br>[-1.67] | -0.013<br>[-1.51]    |
| Sector-wide profit rate |                         |                            | 0.111***<br>[7.13]             | 0.144***<br>[9.56]   | 0.106***<br>[9.14] | 0.131***<br>[8.76]   |
| “Overheating”           |                         |                            |                                | 0.003***<br>[4.99]   | -0.001<br>[-1.46]  | 0.002***<br>[3.10]   |
| “Economic growth”       |                         |                            |                                | 0.009***<br>[11.7]   | 0.005***<br>[7.89] | 0.007***<br>[9.44]   |
| Constant                | 0.028***<br>[5.09]      | 0.032***<br>[5.49]         | 0.019***<br>[3.18]             | -0.009*<br>[-1.90]   | 0.019***<br>[12.1] |                      |
| Observations            | 26477                   | 26477                      | 26477                          | 26477                | 26477              | 26477                |
| R-squared               | 0.215                   | 0.215                      | 0.217                          | 0.214                | 0.410              |                      |
| Number of firms         | 3096                    | 3096                       | 3096                           | 3096                 | 3096               | 3096                 |

Robust t-statistics in brackets

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Sources: authors calculations from data reported in CMIE.

The results indicated that the profit rate exhibits substantial persistence from year to year. Under the preferred Kiviet regression, after controlling for other factors, some 40 percent of the profit rate carries over to the next year.

The coefficient on the firm-level market share of industry sales is robustly positive and significant (though smaller in size for the OLS specification). It is important to be clear what this result is saying. The fixed-effects and Kiviet regressions imply that an increase in market share relative to the firm's mean market share over the period is associated with an increase in the profit rate. This is, thus, a statement of changes “within” a firm. The fact that the OLS coefficient is lower implies that in the cross-section, a firm with a larger market share does not necessarily have a higher profit rate. Nevertheless, the question remains whether persistent profits and a positive association between *change* in the profit rate and market share reflect market power or differential firm efficiency. We explore this distinction in more detail below.

The coefficient on the sector concentration variable is insignificant in the Kiviet specification, and when (just) significant in other specifications it has a negative sign, implying higher measured concentration is associated with *lower* profitability.

The profit rate is robustly and positively associated with firm-level growth in sales—more dynamic firms are more profitable—whichever way the direction of causation goes. And firm-level profitability is also positively associated with the profitability of other firms in the industry.

A more intriguing finding is the negative relationship between the profit rate and lagged assets in the fixed effects and Kiviet specifications. Note that in the OLS specification, which also gives weight to the cross-sectional dimension, that coefficient is positive. And, indeed, the OLS specification mirrors the purely descriptive data that shows that larger Indian firms are, in general, significantly more profitable than smaller firms. What the results seem to be saying is that while historically larger firms have been more profitable, *increasing* a firm's profitability has not entailed increasing its assets. On the contrary, a more rational use of assets has helped raise the profit rate.<sup>5</sup>

---

<sup>5</sup> This finding is related to the observation that small and medium firms in India have traditionally operated at lower than optimal scales and this outcome was not just a matter of policies that reserved space for small firms (Banerjee and Duflo, 2005). The cross-sectional relationship between larger firms and higher profitability tends to support this view. However, our results caution that some of that observed cross-sectional relationship may have reflected strategic asset accumulation by large firms, who, by virtue of such strategic positioning, enjoyed high profit rates. Thus, large size was not necessarily an indicator of efficient operations in India. With increasing competition, more efficient deployment of assets has helped raise profit rates.

Finally, profitability is positively associated with both the “overheating” and “economic growth” indices of macroeconomic conditions for this period. As we show below, higher profits during periods of relatively high inflation and interest rates was mainly a phenomenon of the early part of our sample. During those years, as Indian firms became less competitive abroad, they were apparently able to exploit domestic shortages associated with the higher inflation. But an increasingly competitive and internationally-open environment offset that effect over time. In contrast, growth and favorable international financial conditions were consistently associated with higher profit rates throughout the period.

### **B. The Persistence of Persistence?**

To get further insights and explore the robustness of these results, we undertake a variety of alternative cuts in analyzing the data. As a next step we look at two time effects—any evidence of parameter changes over time, and the influence of averaging over longer intervals. How far we can go in these directions is limited by the fact that we are working with only 15 years of data. These are nevertheless helpful results that support the overall robustness of the framework reported in the previous section. Where the results differ, they offer interesting insights.

First, are there changes over time, as we roll the sample forward from the 1990s to the 2000s? The descriptive figures presented earlier show that economic growth went through a decline and then a rise. There was also a big change in the entry patterns, with a surge of entry in the 1990s and stability in the 2000s, with associated shifts in market shares and industry concentration. The question is whether the responses to these variables also changed over time. We explore this by estimating the fixed-effects regression for the 1992–2003 period and then moving the sample one year ahead at a time, ending with the period 1996–2007 period (Table 4). Because the Kiviet estimation is computationally more demanding, we report those results only for the first and the last periods.

The results show a notable stability of results over time: in particular, the significance and size of coefficients on lagged profits, sales growth, market shares, industry-wide profitability and concentration all show little change. This reassuring in light of the substantial entry of new firms between 1992 and 1996 period, leading to an effective doubling of the number of firms in the data base. The only result of note relates to the “overheating” variable, which shifts from being highly positive and significant in the 1992–2003 period, to being insignificant in the 1996–2007 period. The mix of indicators on which this is based—especially changes in inflation rates, interest rates, and the real exchange rate—were of falling significance in the shift from the 1990s and 2000s, probably reflecting the increasing importance of the 2000s boom on firm behavior. By contrast the “economic growth” variable—mainly reflecting economic growth and the international financial environment—remains highly significant and slightly rises in value. A speculative interpretation is that firms were doing less “profiteering” over time, in the sense of making use of episodes of overheating to extract more profits. Apart from this, the coefficient on

industry concentration varies in significance level depending on the period, but is consistently negative.

Table 4. Profitability Correlates: Changes over Time, Annual Data

| Variables               | (1)                  | (2)                  | Fixed Effects        |                      |                      | Kiviet               |                      |
|-------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
|                         | 1992-2003            | 1993-2004            | 1994-2005            | 1995-2006            | 1996-2007            | 1992-2003            | 1996-2007            |
| Lagged profit rate      | 0.275***<br>[19.2]   | 0.280***<br>[20.3]   | 0.289***<br>[21.1]   | 0.290***<br>[21.5]   | 0.274***<br>[21.1]   | 0.427***<br>[46.6]   | 0.411***<br>[55.6]   |
| Sales growth            | 0.061***<br>[22.4]   | 0.061***<br>[23.0]   | 0.059***<br>[23.8]   | 0.059***<br>[24.0]   | 0.056***<br>[22.5]   | 0.061***<br>[32.0]   | 0.058***<br>[34.2]   |
| Market share            | 0.128***<br>[8.07]   | 0.129***<br>[8.79]   | 0.130***<br>[8.83]   | 0.123***<br>[7.31]   | 0.117***<br>[6.78]   | 0.105***<br>[6.48]   | 0.095***<br>[8.07]   |
| Lagged assets           | -0.019***<br>[-7.16] | -0.019***<br>[-8.05] | -0.020***<br>[-8.03] | -0.023***<br>[-9.74] | -0.026***<br>[-10.6] | -0.016***<br>[-8.93] | -0.018***<br>[-10.8] |
| Sector concentration    | -0.026*<br>[-1.88]   | -0.031***<br>[-2.61] | -0.041***<br>[-3.43] | -0.028**<br>[-2.36]  | -0.022*<br>[-1.82]   | -0.018<br>[-1.62]    | -0.017*<br>[-1.80]   |
| Sector-wide Profit rate | 0.153***<br>[8.25]   | 0.150***<br>[8.77]   | 0.147***<br>[8.73]   | 0.143***<br>[8.63]   | 0.139***<br>[8.32]   | 0.132***<br>[6.63]   | 0.128***<br>[6.77]   |
| “Overheating”           | 0.005***<br>[5.21]   | 0.005***<br>[7.02]   | 0.004***<br>[5.53]   | 0.002***<br>[3.32]   | 0.002**<br>[2.52]    | 0.003***<br>[3.00]   | 0.001<br>[0.93]      |
| “Economic growth”       | 0.007***<br>[8.40]   | 0.007***<br>[9.69]   | 0.007***<br>[9.67]   | 0.008***<br>[10.6]   | 0.008***<br>[9.93]   | 0.006***<br>[6.80]   | 0.007***<br>[6.96]   |
| Constant                | -0.008<br>[-1.40]    | -0.007<br>[-1.27]    | -0.006<br>[-1.15]    | -0.015***<br>[-2.78] | -0.020***<br>[-3.43] |                      |                      |
| Observations            | 17730                | 19918                | 21203                | 22248                | 22881                | 17730                | 22881                |
| R-squared               | 0.245                | 0.239                | 0.221                | 0.191                | 0.163                |                      |                      |
| Number of firms         | 2850                 | 2941                 | 3013                 | 3049                 | 3057                 | 2850                 | 3057                 |

Robust t-statistics in brackets

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Second, are results affected because they are based on annual data? This is explored by taking three- and four-year averages of the data (Table 5).<sup>6</sup> Here, the first finding of note is the substantial fall in the size of the coefficient on lagged profitability, from around 0.4 in the annual data to close to 0.2 in the four-year data. It remains, however, robustly significant in the Kiviet regression (though not in the fixed effects specification). There continues to be persistence over time, but its strength fades. In other words, while firms are able to maintain about 40 percent of their profit rates from one year to another, over longer periods, their ability to do so diminishes.

The coefficients on variables reflecting firm performance remain highly significant and rise substantially in value—this includes both firm-level sales growth and market share—while the association with profitability of other firms in the same industry also rises. The size of the

<sup>6</sup> Because the annual sample is 15 years long, the three-year averages give us five observations per firm. The four-year estimations have the first observation of three years length and the other two are averaged over four years.

negative relationship with lagged firm assets also rises, as does the negative relationship with industrial concentration. The coefficient on “overheating” turns negative (for three-year data) or insignificant (for four-year data) in these “longer-run” Kiviet regressions, suggesting that while overheating may briefly help exploit shortages, over a longer time span, associated gains for profits disappear. By contrast, the “economic growth” variable remains robustly significant and has a much larger effect than in the analysis from annual data.

Table 5. Longer-Run Profitability Dynamics

| Variables               | (1)                       | (2)                           | (3)                       | (4)                           |
|-------------------------|---------------------------|-------------------------------|---------------------------|-------------------------------|
|                         | 3-Year<br>Averages:<br>FE | 3-Year<br>Averages:<br>Kiviet | 4-Year<br>Averages:<br>FE | 4-Year<br>Averages:<br>Kiviet |
| Lagged profit rate      | 0.009<br>[0.38]           | 0.293***<br>[18.1]            | -0.12***<br>[-4.23]       | 0.212***<br>[11.6]            |
| Sales growth            | 0.079***<br>[12.8]        | 0.085***<br>[21.9]            | 0.094***<br>[11.4]        | 0.104***<br>[20.3]            |
| Market share            | 0.149***<br>[7.15]        | 0.114***<br>[7.15]            | 0.163***<br>[6.47]        | 0.122***<br>[5.10]            |
| Lagged assets           | -0.037***<br>[-11.2]      | -0.037***<br>[-13.2]          | -0.035***<br>[-9.73]      | -0.037***<br>[-12.5]          |
| Sector concentration    | -0.038*<br>[-1.93]        | -0.023<br>[-1.34]             | -0.053**<br>[-2.35]       | -0.043*<br>[-1.84]            |
| Sector-wide profit rate | 0.177***<br>[5.56]        | 0.170***<br>[5.80]            | 0.156***<br>[3.81]        | 0.148***<br>[3.57]            |
| “Overheating”           | 0.004***<br>[3.03]        | -0.004***<br>[-4.06]          | 0.007***<br>[5.30]        | -0.002<br>[-1.63]             |
| “Economic growth”       | 0.022***<br>[9.54]        | 0.019***<br>[7.93]            | 0.014***<br>[8.91]        | 0.012***<br>[6.66]            |
| Constant                | -0.027***<br>[-3.16]      |                               | -0.010<br>[-1.02]         |                               |
| Observations            | 8791                      | 8791                          | 6523                      | 6523                          |
| R-squared               | 0.205                     |                               | 0.241                     |                               |
| Number of firms         | 2966                      | 2966                          | 2888                      | 2888                          |

Robust t-statistics in brackets

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

### C. Differentiating the Firms

In the previous section, we concluded that the persistence of profits tended to decay with time, indicating some tendency for super-normal profits to be competed away. In this section, we look at lagged profits and market shares by exploring various partitions of the data: business groups versus self-standing firms, by size classes of firms, by firms categorized by efficiency (measured as the sales-assets ratio of that firm in relation to other firms in that industry), the degree of industry concentration within which the firm operates, and by manufacturing or nonfinancial services sector (all other sectors have too few firms to be separately analyzed). The aim is to determine if there are systematic differences across these partitions to help resolve the conflicting interpretations of the lagged profits and market share variables remains. All estimations are based on the Kiviet correction with three-year data.

The first partition focuses on different categories of business houses in comparison with the rest of the sample, that is dominated by free-standing firms. The business house is the dominant corporate form in terms of shares of sales and assets, with a long-standing view of its noncompetitive tendencies (see, for example, Bertrand et al., 2002). Business houses can either be a means of solving market failures, by, for example, internalizing capital markets, or of creating inefficiencies through tunneling or greater influence.<sup>7</sup> It is possible that the aggregate results are being driven by the large number of self-standing firms. For this analysis we use the CMIE's classification of business houses into the "top fifty", "large houses other than the top fifty" and "all other."

The results (in Table 6), do not provide evidence for firms linked to business houses behaving differently from stand-alone firms. The top 50 business houses actually have a lower persistence coefficient than free-standing firms, while other large houses have a higher coefficient. The coefficient on market share is actually *higher* for free-standing firms. The result suggests that stand-alone firms need to increase their market share to advance their profitability. With respect to industry characteristics, the Herfindal index is again not robust—it is only significant, and negative, for "other business houses." The association with profitability of other firms in the same industry is highest for the top 50 business houses. This might suggest that the largest business houses are operating in sectors that are amenable to oligopolistic behavior, allowing all firms to maintain high profit rates. But it could also be that those sectors have higher inherent profitability, making the information value of this result unclear. Finally on macro variables, notice that the overheating variable is either insignificant or negative whereas all categories of firms show a significant relation with "economic growth." For free-standing firms, "overheating" is actually bad for profits while "economic growth" brings particularly large dividends.

In general, then, while there are interesting suggestive differences, the profitability of business houses—including the largest business houses—behaves in a largely similar fashion to free-standing firms, with no evidence of greater capacity to use market power to get more profits.

---

<sup>7</sup> See Morck et al. (2005) for a review of the alternative channels of influence.

Table 6. Business Houses, Kiviet Estimation with Three-Year Data

| Variables               | (1)<br>Top Fifty     | (2)<br>Large Houses<br>other than Top<br>Fifty | (3)<br>All other<br>Business<br>Houses | (4)<br>Non-Business<br>Houses |
|-------------------------|----------------------|--|--|-------------------------------|
| Lagged profit rate      | 0.218***<br>[4.01]   | 0.372***<br>[6.38]                             | 0.244***<br>[6.18]                     | 0.308***<br>[14.9]            |
| Sales growth            | 0.079***<br>[5.23]   | 0.092***<br>[6.72]                             | 0.088***<br>[8.73]                     | 0.084***<br>[17.6]            |
| Market share            | 0.096*<br>[1.78]     | 0.077**<br>[2.24]                              | 0.100**<br>[2.42]                      | 0.127***<br>[4.90]            |
| Lagged assets           | -0.029***<br>[-3.67] | -0.030***<br>[-4.14]                           | -0.032***<br>[-5.56]                   | -0.042***<br>[-12.2]          |
| Sector concentration    | -0.018<br>[-0.37]    | -0.016<br>[-0.40]                              | -0.089**<br>[-2.20]                    | -0.011<br>[-0.56]             |
| Sector-wide profit rate | 0.332***<br>[3.21]   | 0.263***<br>[2.62]                             | 0.251***<br>[3.62]                     | 0.116***<br>[3.22]            |
| “Overheating”           | 0.002<br>[0.51]      | -0.009***<br>[-2.85]                           | 0.000<br>[0.081]                       | -0.006***<br>[-4.36]          |
| “Economic growth”       | 0.013**<br>[2.20]    | 0.019***<br>[3.02]                             | 0.010**<br>[2.03]                      | 0.023***<br>[8.48]            |
| Observations            | 929                  | 762  | 1333                                   | 5767                          |
| Number of firms         | 265                  | 224  | 421                                    | 2056                          |

z-statistics in brackets

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Next we examine the difference between large and small firms, based on their real (inflation-adjusted) sales. Because real sales tended to grow in the later part of the sample period, we divided firms at the median in each year, classifying firms with sales above the median as “large.” This, of course, means that the identity of the firm can change category over time. With these partitions there are some interesting differences (Table 7). There is in particular substantially more persistence of profits amongst larger firms. This might imply that larger firms have greater market dominance, which is reflected in their persistent profits.

To further explore this finding, we divided firms into “high” and “low” efficiency groups. The data available limits the nature of this classification. We take the sales-to-assets ratio of a firm *relative* to this ratio for its five-digit sector (to control for technological differences across sectors) as a metric of its relative efficiency. Again, in the partition “high efficiency” firms are those with relative efficiency above the median in a given year. It turns out that high efficiency firms have more persistent profits. Here, then, the pattern supports the view that is efficiency rather than market power that drives the persistence in profits. It turns out that there is considerable overlap between large and high-efficiency firms. To the extent that large firms have persistent profits, this could thus partly be due to higher efficiency.

Table 7. Structural Differentiation, Kiviet Estimation with Three-Year Data

| Variables               | (1)                  | (2)                  | (3)                  | (4)                  | (5)                  | (6)                  |
|-------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
|                         | Size                 |                      | Efficiency           |                      | Concentration        |                      |
|                         | Small                | Large                | Low                  | High                 | Low                  | High                 |
| Lagged profit rate      | 0.240***<br>[10.7]   | 0.388***<br>[18.0]   | 0.251***<br>[8.64]   | 0.358***<br>[18.0]   | 0.314***<br>[12.7]   | 0.254***<br>[13.7]   |
| Sales growth            | 0.068***<br>[13.0]   | 0.120***<br>[18.3]   | 0.070***<br>[13.0]   | 0.113***<br>[15.8]   | 0.097***<br>[15.7]   | 0.070***<br>[12.8]   |
| Market share            | 0.094***<br>[2.86]   | 0.102***<br>[4.37]   | 0.123***<br>[4.28]   | 0.107***<br>[4.21]   | 0.346***<br>[5.24]   | 0.104***<br>[4.74]   |
| Lagged assets           | -0.049***<br>[-12.8] | -0.027***<br>[-7.72] | -0.039***<br>[-9.37] | -0.037***<br>[-10.6] | -0.039***<br>[-10.0] | -0.039***<br>[-9.74] |
| Sector concentration    | -0.009<br>[-0.36]    | -0.040**<br>[-1.97]  | -0.008<br>[-0.35]    | -0.042<br>[-1.52]    | -0.112**<br>[-2.49]  | -0.008<br>[-0.42]    |
| Sector-wide profit rate | 0.074<br>[1.49]      | 0.272***<br>[7.37]   | 0.131***<br>[2.75]   | 0.204***<br>[6.21]   | 0.246***<br>[4.10]   | 0.133***<br>[3.75]   |
| “Overheating”           | -0.003<br>[-1.59]    | -0.005***<br>[-4.16] | -0.003<br>[-1.57]    | -0.006***<br>[-5.06] | -0.006***<br>[-3.20] | -0.003*<br>[-1.77]   |
| “Economic growth”       | 0.028***<br>[7.83]   | 0.011***<br>[4.92]   | 0.023***<br>[6.24]   | 0.015***<br>[5.27]   | 0.019***<br>[5.37]   | 0.018***<br>[6.76]   |
| Observations            | 4431                 | 4360                 | 4442                 | 4349                 | 4414                 | 4377                 |
| Number of firms         | 1667                 | 1299                 | 1576                 | 1390                 | 1462                 | 1504                 |

Robust t-statistics in brackets  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Size and efficiency only makes a modest difference to the coefficient on market share, but there is a much larger association in sectors with *low* levels of concentration. This suggests that there is more scope to exhibit dynamism through increased market shares and higher profitability in low concentration sectors. The industry concentration variable itself is again not robust in value, though it is significant, and more negative, amongst larger firms and those in low concentration industries.

As with persistence, the relation with profitability of other firms in the same industry is much higher for large firms, for the more efficient firms and for those in less concentrated industries. Finally, “economic growth” affects all groups, but there is a larger coefficient for smaller firms and less efficient ones. By contrast, “overheating” has a stronger, and negative, relation with larger firms, more efficient firms, and those in low concentration industries.

Overall, there is no clear support in this data for the view that higher profitability is a function of greater market power. On the whole, we read this data to favor the view that higher profitability is a function of greater dynamism (through increases in market shares) and higher efficiency.

A final partition concerns potential differences between manufacturing firms and nonfinancial service sector firms. These two groups might be expected to exhibit different behavior since external competition mostly affects manufacturing (though some services,

notably IT, are also traded). The services sector was a particularly dynamic source of growth during the period we investigate. We cross this partition with small and large firms, with results reported in Table 8. The sample size gets smaller here, especially for large, service sector firms, so results need to be interpreted with caution.

There is greater persistence for manufacturing firms. This is consistent with a more dynamic evolution of service sector firms. Larger firms again generally exhibit greater persistence than do smaller firms; but because of the overlap between size and relative efficiency, this is not very telling. The relation between market share and profitability is broadly similar for all partitions. Small service firms tend to have a marginally beneficial relationship with “overheating,” suggesting they may operate in some instances as local monopolies. “Growth” is good for all categories of firms; however, for large service firms, there is a dominant relationship with the fortunes of the industry (profitability of other firms in the industry) that appears to overwhelm broader macro relationships.

Table 8. Sectoral Differentiation, Kiviet Estimation with Three-Year Data

| Variables               | (1)                  | (2)                    | (3)                  | (4)                    |
|-------------------------|----------------------|------------------------|----------------------|------------------------|
|                         | Small firms          |                        | Large Firms          |                        |
|                         | manufacturing        | non-financial services | manufacturing        | non-financial services |
| Lagged profit rate      | 0.325***<br>[10.6]   | 0.071<br>[1.48]        | 0.407***<br>[15.7]   | 0.282***<br>[4.25]     |
| Sales growth            | 0.094***<br>[12.2]   | 0.033***<br>[3.28]     | 0.120***<br>[15.8]   | 0.140***<br>[7.43]     |
| Market share            | 0.092**<br>[2.49]    | 0.120*<br>[1.83]       | 0.106***<br>[4.70]   | 0.108**<br>[2.10]      |
| Lagged assets           | -0.063***<br>[-9.44] | -0.027***<br>[-3.71]   | -0.030***<br>[-8.17] | -0.017**<br>[-2.22]    |
| Sector concentration    | 0.004<br>[0.10]      | -0.037<br>[-1.07]      | -0.013<br>[-0.47]    | -0.105**<br>[-2.28]    |
| Sector-wide profit rate | 0.044<br>[0.77]      | 0.072<br>[0.84]        | 0.209***<br>[4.37]   | 0.513***<br>[3.83]     |
| “Overheating”           | -0.005**<br>[-2.25]  | 0.007*<br>[1.85]       | -0.006***<br>[-3.80] | 0.003<br>[0.55]        |
| “Economic growth”       | 0.025***<br>[5.32]   | 0.025***<br>[3.05]     | 0.012***<br>[4.64]   | -0.004<br>[-0.44]      |
| Observations            | 2871                 | 1065                   | 3720                 | 425                    |
| Number of firms         | 986                  | 433                    | 1077                 | 152                    |

Robust t-statistics in brackets  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## V. CONCLUSION

This paper has undertaken what is essentially a structured empirical investigation of the relatively established part of India's corporate sector, listed on the Bombay Stock Exchange. Given the nature of the data, and the underlying challenges over identification, testing of sharply defined hypotheses was not possible. Nevertheless, the patterns are interesting and suggestive.

We interpret the findings to reveal a mixed, but largely positive, story for corporate expansion following the economic liberalization in the late 1980s and early 1990s. The corporate economy represented by the BSE firms looks more like an exemplar of dynamic, competitive capitalism than of concentrated market power and economic entrenchment, at least with respect to product markets. This is in spite of concerns raised by other authors over the continued importance of public sector ownership and of the business house organisational form—including specific evidence of tunneling in business houses. Problems of incentives and behavior in the public sector and in pyramidal groups may well exist, but there is not evidence that it is a driving overall patterns of profitability.

In particular, while firms experience substantial persistence from year to year, this is significantly reduced over a period of three or four years. And where profits do persist, they are in significant measure associated with relative efficiency. While our analysis does indeed provide support for a robust, consistent relationship between *increases in* firm-level profitability and market shares, this is more a sign of dynamism than entrenchment. The fact that this relationship is similar for free-standing firms as well as established business houses, and for small as well as large firms, suggests that it is driven by the effect of better underlying firm performance, as opposed to the exertion of market power. There is no evidence of a profitability-increasing influence of measured industrial concentration, though we may be mis-measuring concentration by basing it only on firms in our BSE data base.

However, the evidence is also consistent with contrary tendencies. First, the robust process of new entry seems to have stopped and, there may well have been some increase in industry concentration in the 2000s. Second, some part of profit persistence may reflect imperfections in domains outside product market structure: good candidates for such imperfections lie in the markets for corporate control, finance, and the management of talent. Third, there continues to be widespread variation in levels of efficiency in Indian corporate production processes, as found in other research (see, Hsieh and Klenow, 2008). Some firms, however, have been able to exploit this variation, through more efficient use of their assets and associated improvements in profitability.

More speculatively, the coexistence of indicators of competitive dynamics, on the one hand, with limited entry, continued dominance of business houses and at least some profit persistence on the other, could be consistent with Schumpeterian processes, in which

positions of advantage are channeled into creative destruction through new products and activities. This paper, however, does no more than recommend such issues for further research.

Finally, an econometric study such as this cannot identify state-corporate links between key firms and players that may have been influential in shaping profits, another worthy topic for future research. Thus, while this paper has positive news on capitalism in India, it does not imply that all is well. The striking dynamism in corporate profits and asset formation in this period contrasts with a surely slower pace of change in the functioning of the state. How these differential speeds will eventually interact may well fashion the next phase of corporate evolution in India.

## REFERENCES

- Aghion, Philippe, Burgess, Robin, Redding, Stephen and Zilibotti, Fabrizio. 2005. "Entry Liberalization and Inequality in Industrial Performance." *Journal of the European Economic Association*, 3(2–3), 291–302.
- Aghion, Philippe, Burgess, Robin, Redding, Stephen and Zilibotti, Fabrizio. 2008. "The Unequal Effects of Liberalization: Evidence from Dismantling the License Raj in India." *American Economic Review* 94 (4): 1397–1412.
- Alfaro, Laura and Anusha Chari. 2009. "India Transformed? Insights from the Firm Level 1988–2007." *India Policy Forum*, 2009.
- Banerjee, Abhijit and Esther Duflo. 2005. "Growth Theory Through The Lens Of Development Economics," in *Handbook of Economic Growth, Volume 1A*. Edited by Philippe Aghion and Steven N. Durlauf, Elsevier B.V.
- Bertrand, Mariane, Paras Mehta and Sendhil Mullainathan. 2002. "Ferretting out Tunneling: An Application to Indian Business groups." *Quarterly Journal of Economics*, 121–148.
- Bosworth, Barry, and Susan M. Collins 2008. "Accounting for Growth: Comparing China and India." *Journal of Economic Perspectives*, 22(1): 45–66.
- Flannery, Mark J. and Kristine Watson Hankins. 2009. "Estimating Dynamic Panel Models in Corporate Finance" mimeo.
- Goddard, John, Manouche Tavakoli and John O. S. Wilson. 2005 "Determinants of profitability in European manufacturing and services: evidence from a dynamic panel model," *Applied Financial Economics*, 15: 1269–1282.
- Hsieh, Chang-Tai and Peter Klenow. 2008. "[Misallocation and Manufacturing TFP in China and India](#)." *Quarterly Journal of Economics*, forthcoming.
- Khanna, Tarun and Krishna Palepu. 2002. "Is Group Affiliation Profitable in Emerging Markets? An Analysis of Diversified Indian Business Groups." *Journal of Finance*, 55(2): 867–891.
- Kohli, Atul. 2006. "Politics of Economic Growth in India, 1980–2005." *Economic and Political Weekly* 41 (13): 1251–59, and 41 (14): 1361–70.
- Morck, Randall, Daniel Wolfenzon, and Bernard Yeung, 2005. "Corporate Governance, Economic Entrenchment and Growth." *Journal of Economic Literature* 43: 657–722

Panagariya, Arvind. 2008. *India: The Emerging Giant*. New York and New Delhi: Oxford University Press

Rodrik, Dani and Arvind Subramanian. 2004. “From ‘Hindu Growth’ to Productivity Surge: The Mystery of the Indian Growth Transition”, Working Paper WP/04/77. International Monetary Fund, Washington, D.C.

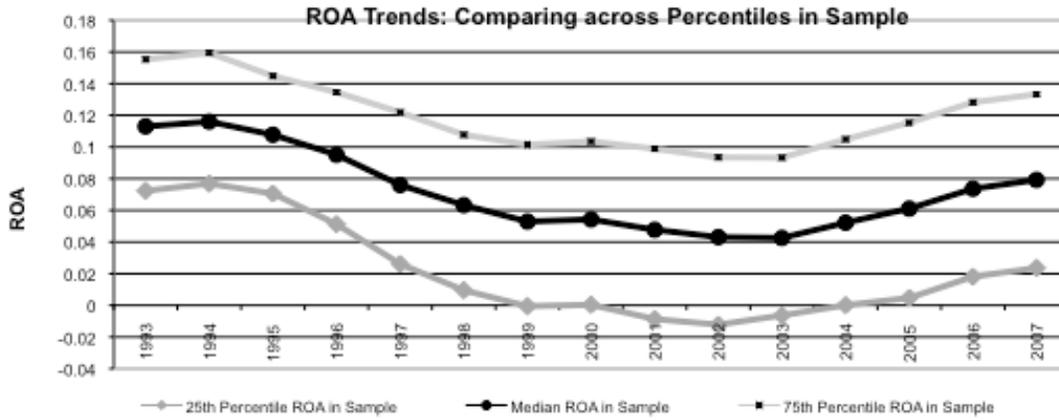
Tregenna, Fiona. 2009. “The fat years: the structure and profitability of the U.S. banking sector in the pre-crisis period.” *Cambridge Journal of Economics*, 33: 609–632.

Topalova, Petia and Amit Khandelwal. 2010. “Trade liberalization and Firm Productivity: The Case of India”. *Review of Economics and Statistics*, forthcoming (posted on-line August 13, 2010)

Virmani, Arvind. 2009. *The Sudoku of India's Growth*. BS Books, Business Standard Ltd., New Delhi.

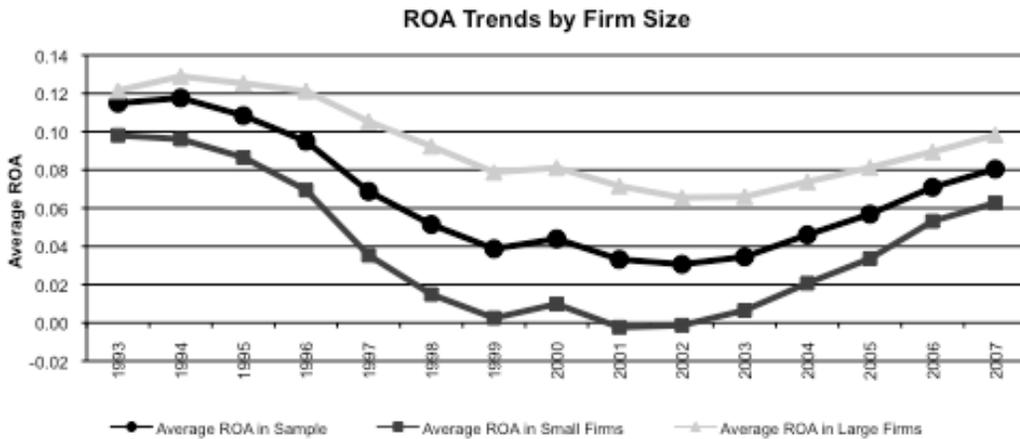
Appendices

Appendix Figure 1. The Evolution of Profitability Across the Distribution



Source: CMIE

Appendix Figure 2. The Evolution of Profitability by Firm Size



Note: "small" and "large" are based on simply partition of the number firms in the sample into two groups of equal numbers.  
Source: CMIE

Appendix Table 1. Descriptive Data from the Prowess Data Base

| Year | Number of Firms |               |                            |   | Median Gross Real Sales |   |   | Median Total Real Assets |  |   | Share of BSE Firms in TOTAL Sales (%) | Share of BSE Firms in TOTAL Assets (%) | Share of Sample in sales of all Non-Banking BSE Firms Sales with Profit Data(%) | Share of Sample in assets of all Non-Banking BSE Firms with Profit Data (%) |
|------|-----------------|---------------|----------------------------|---|-------------------------|---|---|--------------------------|--|---|---------------------------------------|--|---|---|
|      | Firms in Sample | All BSE Firms | BSE Firms with Profit Data | Firms in Entire Database with Profit Data | Firms in Sample         | Non-Banking Services BSE Firms with Profit Data | Firms in Entire Database with Profit Data | Firms in Sample          | Non- Banking Services BSE Firms with Profit Data | Firms in Entire Database with Profit Data |                                       |  |   |   |
| 1993 | 950             | 1884          | 1,526                      | 3,829                                     | 63.7                    | 25.6  | 25.6                                      | 62.1                     | 22.8   | 30.8                                      | 69.7                                  | 70.9                                   | 65.7%   | 79.8%   |
| 1994 | 1,200           | 2636          | 2,126                      | 5,166                                     | 50.9                    | 20.1  | 17.3                                      | 55.2                     | 18.9   | 24.8                                      | 70.9                                  | 69.1                                   | 62.5%   | 79.3%   |
| 1995 | 1,628           | 3482          | 2,798                      | 6,704                                     | 41.4                    | 18.1  | 11.2                                      | 46.3                     | 17.3   | 20.9                                      | 72.3                                  | 70.6                                   | 67.1%   | 80.0%   |
| 1996 | 2,031           | 3751          | 3,006                      | 7,175                                     | 33.2                    | 20.6  | 10.2                                      | 36.7                     | 18.8   | 21.2                                      | 72.3                                  | 70.2                                   | 67.9%   | 79.3%   |
| 1997 | 2,111           | 3754          | 3,002                      | 6,963                                     | 30.2                    | 21.0  | 9.9                                       | 33.6                     | 20.1   | 22.1                                      | 73.2                                  | 69.9                                   | 67.1%   | 81.1%   |
| 1998 | 2,153           | 3774          | 3,035                      | 7,318                                     | 28.1                    | 22.2  | 9.6                                       | 33.1                     | 21.4   | 20.8                                      | 72.0                                  | 69.2                                   | 63.3%   | 80.4%   |
| 1999 | 2,227           | 3859          | 3,101                      | 8,217                                     | 26.9                    | 21.2  | 9.3                                       | 33.0                     | 22.1   | 19.4                                      | 70.5                                  | 67.9                                   | 64.8%   | 80.5%   |
| 2000 | 2,282           | 3811          | 3,030                      | 8,494                                     | 28.4                    | 22.6  | 10.2                                      | 34.6                     | 25.1   | 19.9                                      | 70.8                                  | 68.2                                   | 71.3%   | 81.2%   |
| 2001 | 2,296           | 3788          | 3,006                      | 8,746                                     | 27.5                    | 23.8  | 9.3                                       | 34.8                     | 26.0   | 19.1                                      | 67.0                                  | 65.8                                   | 77.6%   | 85.0%   |
| 2002 | 2,326           | 4075          | 3,235                      | 9,738                                     | 25.9                    | 22.4  | 6.2                                       | 33.7                     | 22.9   | 16.3                                      | 65.1                                  | 67.3                                   | 71.6%   | 84.6%   |
| 2003 | 2,365           | 4080          | 3,217                      | 12,295                                    | 25.5                    | 24.4  | 3.6                                       | 32.3                     | 23.7   | 12.5                                      | 64.8                                  | 66.0                                   | 73.6%   | 85.0%   |
| 2004 | 2,363           | 4025          | 3,171                      | 13,930                                    | 26.7                    | 26.9  | 1.8                                       | 34.0                     | 26.6   | 9.4                                       | 62.6                                  | 64.9                                   | 75.6%   | 88.1%   |
| 2005 | 2,340           | 4059          | 3,177                      | 13,847                                    | 30.4                    | 32.1  | 1.3                                       | 35.8                     | 28.1   | 8.6                                       | 65.9                                  | 67.5                                   | 81.0%   | 88.6%   |
| 2006 | 2,336           | 4017          | 3,122                      | 12,714                                    | 33.2                    | 37.9  | 1.4                                       | 40.4                     | 33.8   | 10.4                                      | 68.1                                  | 68.2                                   | 82.4%   | 86.0%   |
| 2007 | 2,287           | 3864          | 2,997                      | 11,458                                    | 41.6                    | 49.7  | 1.5                                       | 49.5                     | 43.3   | 13.2                                      | 72.3                                  | 70.9                                   | 82.6%   | 85.9%   |

Note: Number of firms for All BSE Firms refers to the count of firms for which CMIE has Financial Data available.

Source: CMIE

Appendix Table 2. Selected Characteristics of Firms in the BSE Sample, by Ownership Category

| Ownership                                 | 1993            |            |                   |                     |            | 2000            |            |                   |                     |            | 2007            |            |                   |                     |            |
|---|-----------------|------------|-------------------|---------------------|------------|-----------------|------------|-------------------|---------------------|------------|-----------------|------------|-------------------|---------------------|------------|
|   | Number of Firms | Median ROA | Median Efficiency | Median Market Share | Median HHI | Number of Firms | Median ROA | Median Efficiency | Median Market Share | Median HHI | Number of Firms | Median ROA | Median Efficiency | Median Market Share | Median HHI |
| Central Government Commercial Enterprises | 31              | 7.6%       | 0.86              | 0.26                | 0.40       | 37              | 8.4%       | 1.16              | 0.20                | 0.41       | 41              | 11.2%      | 1.05              | 0.17                | 0.41       |
| Top Fifty Business Houses                 | 183             | 10.9%      | 1.09              | 0.13                | 0.21       | 223             | 7.3%       | 0.93              | 0.09                | 0.21       | 222             | 8.7%       | 0.96              | 0.08                | 0.20       |
| Large Business Houses                     | 137             | 12.6%      | 1.12              | 0.08                | 0.24       | 176             | 7.4%       | 0.95              | 0.06                | 0.17       | 179             | 9.3%       | 1.06              | 0.04                | 0.19       |
| Other Business Houses                     | 179             | 11.5%      | 1.10              | 0.03                | 0.21       | 339             | 6.8%       | 0.94              | 0.02                | 0.18       | 321             | 7.9%       | 0.92              | 0.02                | 0.20       |
| Private (Indian) Stand Alones             | 327             | 10.8%      | 1.17              | 0.03                | 0.27       | 1377            | 4.3%       | 0.93              | 0.01                | 0.19       | 1,395           | 7.0%       | 0.99              | 0.01                | 0.21       |
| Private (Foreign) Stand Alones            | 59              | 14.2%      | 1.18              | 0.12                | 0.26       | 81              | 10.7%      | 1.19              | 0.10                | 0.28       | 88              | 12.6%      | 1.06              | 0.07                | 0.22       |
| Foreign Business Houses                   | 13              | 9.2%       | 0.86              | 0.34                | 0.41       | 17              | 13.6%      | 1.44              | 0.20                | 0.28       | 16              | 20.1%      | 1.07              | 0.12                | 0.23       |
| NRI Business Houses                       | 10              | 6.9%       | 0.69              | 0.03                | 0.20       | 14              | 3.8%       | 0.66              | 0.05                | 0.21       | 11              | 8.7%       | 0.77              | 0.05                | 0.15       |

Source: CMIE

Appendix Table 3. Sectoral Distribution of Firms in the BSE Sample

| industry                                 | year |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
|--|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|
|  | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2007 |  |
| Abrasives                                | 2    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |  |
| Air transport services                   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Air-conditioners & refrigerators         | 7    | 7    | 3    | 3    | 3    | 3    | 3    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |  |
| Alkalies                                 | 8    | 8    | 11   | 11   | 12   | 13   | 14   | 15   | 15   | 15   | 15   | 15   | 15   | 15   | 15   | 15   |  |
| Aluminium & aluminium products           | 1    | 3    | 3    | 3    | 3    | 2    | 2    | 3    | 3    | 3    | 4    | 3    | 3    | 3    | 3    | 3    |  |
| Animation content provider               | 52   | 59   | 67   | 74   | 75   | 73   | 76   | 74   | 78   | 74   | 73   | 75   | 77   | 75   | 75   | 75   |  |
| Automobile ancillaries                   | 9    | 8    | 9    | 13   | 12   | 13   | 15   | 14   | 16   | 16   | 17   | 16   | 15   | 17   | 17   | 17   |  |
| Bakery products                          | 2    | 1    | 3    | 3    | 5    | 5    | 7    | 9    | 10   | 8    | 8    | 6    | 6    | 7    | 6    | 6    |  |
| Beer & alcohol                           | 2    | 4    | 6    | 7    | 8    | 10   | 10   | 10   | 11   | 11   | 13   | 12   | 13   | 14   | 12   | 13   |  |
| Books & cards                            | 9    | 8    | 10   | 14   | 15   | 15   | 16   | 18   | 15   | 16   | 15   | 15   | 17   | 18   | 16   | 16   |  |
| Brokers                                  | 26   | 28   | 31   | 33   | 33   | 29   | 30   | 32   | 33   | 35   | 33   | 31   | 34   | 35   | 31   | 31   |  |
| Business consultancy                     | 8    | 9    | 8    | 9    | 10   | 9    | 8    | 10   | 11   | 12   | 12   | 12   | 12   | 13   | 13   | 13   |  |
| Casting & forgings                       | 15   | 23   | 26   | 34   | 33   | 34   | 33   | 33   | 35   | 32   | 27   | 36   | 36   | 38   | 38   | 40   |  |
| Cement                                   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Ceramic tiles                            | 2    | 3    | 2    | 3    | 4    | 4    | 4    | 4    | 4    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |  |
| Cloth                                    | 2    | 3    | 2    | 3    | 4    | 4    | 4    | 4    | 4    | 4    | 4    | 4    | 4    | 4    | 4    | 4    |  |
| Coal & lignite                           | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |  |
| Cocoa products & confectionery           | 3    | 4    | 6    | 8    | 8    | 7    | 6    | 9    | 9    | 8    | 9    | 8    | 8    | 6    | 6    | 7    |  |
| Commercial complexes                     | 7    | 12   | 29   | 46   | 49   | 60   | 75   | 107  | 140  | 145  | 151  | 157  | 160  | 153  | 145  | 145  |  |
| Commercial vehicles                      | 1    | 3    | 8    | 9    | 10   | 9    | 8    | 11   | 14   | 14   | 14   | 13   | 13   | 13   | 13   | 13   |  |
| Communication equipment                  | 9    | 8    | 8    | 11   | 11   | 10   | 10   | 11   | 9    | 9    | 10   | 9    | 9    | 9    | 9    | 9    |  |
| Computer software                        | 4    | 6    | 7    | 8    | 8    | 8    | 8    | 7    | 7    | 7    | 6    | 7    | 8    | 8    | 8    | 8    |  |
| Computers, peripherals & storage devices | 1    | 3    | 8    | 9    | 10   | 9    | 8    | 11   | 14   | 14   | 14   | 13   | 13   | 13   | 13   | 13   |  |
| Construction equipment                   | 9    | 8    | 8    | 11   | 11   | 10   | 10   | 11   | 9    | 9    | 10   | 9    | 9    | 9    | 9    | 9    |  |
| Consumer electronics                     | 4    | 6    | 7    | 8    | 8    | 8    | 8    | 7    | 7    | 7    | 6    | 7    | 8    | 8    | 8    | 8    |  |
| Copper & copper products                 | 3    | 4    | 7    | 8    | 10   | 12   | 12   | 12   | 14   | 12   | 12   | 11   | 11   | 11   | 11   | 11   |  |
| Cosmetics, toiletries, soaps & detergent | 37   | 45   | 63   | 80   | 81   | 83   | 82   | 85   | 79   | 79   | 72   | 73   | 73   | 72   | 72   | 72   |  |
| Cotton & blended yarn                    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Courier services                         | 1    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |  |
| Crude oil & natural gas                  | 3    | 6    | 12   | 17   | 19   | 18   | 16   | 13   | 13   | 13   | 13   | 12   | 13   | 13   | 15   | 13   |  |
| Dairy products                           | 24   | 23   | 24   | 25   | 24   | 25   | 26   | 23   | 23   | 25   | 25   | 24   | 23   | 24   | 22   | 22   |  |
| Diversified                              | 5    | 9    | 12   | 14   | 14   | 13   | 13   | 13   | 13   | 13   | 13   | 13   | 13   | 13   | 13   | 13   |  |
| Domestic electrical appliances           | 36   | 51   | 76   | 105  | 109  | 109  | 114  | 115  | 118  | 123  | 120  | 120  | 122  | 122  | 122  | 122  |  |
| Drugs & pharmaceuticals                  | 4    | 4    | 4    | 4    | 4    | 4    | 4    | 4    | 4    | 4    | 4    | 4    | 4    | 4    | 4    | 4    |  |
| Dry cells                                | 11   | 12   | 17   | 20   | 21   | 24   | 24   | 26   | 23   | 22   | 21   | 20   | 22   | 25   | 24   | 24   |  |
| Dyes & pigments                          | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |  |
| Electricity generation                   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Exhibition of films                      | 14   | 21   | 24   | 24   | 22   | 21   | 21   | 23   | 20   | 20   | 22   | 20   | 21   | 21   | 18   | 18   |  |
| Fertilisers                              | 1    | 1    | 2    | 3    | 6    | 9    | 9    | 8    | 7    | 6    | 6    | 5    | 6    | 7    | 6    | 6    |  |
| Financial institutions                   | 3    | 4    | 8    | 9    | 12   | 13   | 14   | 12   | 9    | 10   | 10   | 9    | 8    | 8    | 8    | 8    |  |
| Floriculture                             | 18   | 20   | 14   | 24   | 23   | 21   | 23   | 21   | 22   | 22   | 24   | 23   | 24   | 24   | 24   | 23   |  |
| Footwear                                 | 15   | 17   | 24   | 27   | 27   | 28   | 27   | 27   | 25   | 26   | 27   | 26   | 23   | 24   | 24   | 26   |  |
| Gems & jewellery                         | 8    | 9    | 10   | 12   | 12   | 12   | 11   | 13   | 14   | 15   | 12   | 13   | 14   | 14   | 14   | 14   |  |
| General purpose machinery                | 2    | 6    | 14   | 20   | 21   | 22   | 22   | 24   | 24   | 22   | 22   | 22   | 22   | 22   | 22   | 22   |  |
| Generators, transformers & switchgears   | 8    | 9    | 10   | 12   | 12   | 12   | 11   | 13   | 14   | 15   | 12   | 13   | 14   | 14   | 14   | 14   |  |
| Glass & glassware                        | 2    | 6    | 14   | 20   | 21   | 22   | 22   | 24   | 24   | 22   | 22   | 22   | 22   | 22   | 22   | 22   |  |
| Granite                                  | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    | 3    |  |
| Health services                          | 12   | 20   | 23   | 31   | 31   | 35   | 35   | 32   | 36   | 39   | 34   | 34   | 36   | 37   | 36   | 36   |  |
| Hotels & restaurants                     | 10   | 12   | 18   | 27   | 30   | 32   | 34   | 34   | 33   | 35   | 37   | 38   | 35   | 34   | 30   | 30   |  |
| Housing construction                     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| ITES                                     | 11   | 10   | 14   | 16   | 16   | 17   | 16   | 19   | 21   | 19   | 21   | 21   | 20   | 20   | 20   | 20   |  |
| Industrial construction                  | 16   | 18   | 24   | 24   | 26   | 28   | 28   | 29   | 27   | 27   | 27   | 27   | 27   | 27   | 27   | 27   |  |
| Industrial machinery                     | 7    | 10   | 11   | 12   | 13   | 12   | 12   | 12   | 12   | 12   | 12   | 12   | 12   | 12   | 12   | 12   |  |
| Infrastructure construction              | 10   | 9    | 13   | 22   | 23   | 21   | 20   | 19   | 20   | 20   | 20   | 21   | 20   | 20   | 19   | 19   |  |
| Inorganic chemicals                      | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 3    | 4    | 4    | 4    | 4    | 4    | 5    | 5    |  |
| LNG storage & distribution               | 7    | 6    | 8    | 10   | 8    | 8    | 8    | 8    | 9    | 9    | 9    | 9    | 9    | 9    | 9    | 9    |  |
| Lubricants, etc.                         | 11   | 12   | 13   | 15   | 15   | 15   | 16   | 16   | 14   | 13   | 13   | 11   | 11   | 12   | 12   | 12   |  |
| Machine tools                            | 2    | 8    | 9    | 11   | 12   | 13   | 13   | 13   | 14   | 11   | 9    | 9    | 6    | 7    | 5    | 5    |  |
| Marine foods                             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Media-broadcasting                       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Media-content                            |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Media-print                              | 22   | 26   | 37   | 43   | 41   | 41   | 38   | 37   | 39   | 41   | 38   | 34   | 35   | 35   | 36   | 36   |  |
| Metal products                           | 2    | 4    | 3    | 5    | 7    | 7    | 8    | 7    | 8    | 7    | 8    | 7    | 8    | 9    | 7    | 7    |  |
| Milling products                         | 11   | 13   | 15   | 18   | 18   | 17   | 16   | 14   | 16   | 16   | 16   | 16   | 16   | 15   | 14   | 14   |  |
| Minerals                                 | 2    | 4    | 3    | 5    | 7    | 7    | 8    | 7    | 8    | 7    | 8    | 7    | 8    | 9    | 7    | 6    |  |
| Misc. electrical machinery               | 15   | 10   | 10   | 15   | 12   | 13   | 11   | 10   | 15   | 16   | 16   | 16   | 16   | 16   | 16   | 16   |  |
| Misc. manufactured articles              | 22   | 27   | 42   | 46   | 47   | 48   | 48   | 43   | 44   | 49   | 47   | 43   | 42   | 41   | 41   | 41   |  |
| Financial cos. (NBFCs)                   | 1    | 3    | 9    | 16   | 19   | 19   | 22   | 17   | 18   | 18   | 17   | 18   | 18   | 21   | 21   | 21   |  |
| Organic chemicals                        | 26   | 27   | 30   | 34   | 36   | 38   | 40   | 43   | 41   | 40   | 40   | 40   | 40   | 39   | 39   | 39   |  |
| Other agricultural products              | 5    | 4    | 9    | 8    | 10   | 12   | 11   | 11   | 12   | 12   | 13   | 14   | 15   | 15   | 13   | 13   |  |
| Other chemicals                          | 17   | 26   | 36   | 35   | 40   | 43   | 46   | 45   | 43   | 43   | 42   | 40   | 39   | 39   | 35   | 35   |  |
| Other construction & allied activities   | 10   | 11   | 17   | 18   | 13   | 20   | 29   | 26   | 38   | 46   | 69   | 74   | 64   | 66   | 70   | 70   |  |
| Other electronics                        | 1    | 1    | 2    | 4    | 4    | 5    | 5    | 5    | 6    | 6    | 6    | 5    | 5    | 5    | 5    | 5    |  |
| Other financial services                 | 2    | 4    | 3    | 6    | 8    | 11   | 10   | 9    | 9    | 11   | 9    | 11   | 12   | 11   | 10   | 10   |  |
| Other industrial machinery               | 6    | 7    | 7    | 7    | 8    | 8    | 8    | 8    | 8    | 7    | 7    | 8    | 8    | 8    | 8    | 8    |  |
| Other leather products                   | 1    | 1    | 2    | 4    | 4    | 5    | 5    | 5    | 6    | 6    | 6    | 5    | 5    | 5    | 5    | 5    |  |
| Other misc services                      | 2    | 4    | 3    | 6    | 8    | 11   | 10   | 9    | 9    | 11   | 9    | 11   | 12   | 11   | 10   | 10   |  |
| Other non-ferrous metals                 | 3    | 5    | 6    | 6    | 6    | 6    | 6    | 6    | 6    | 6    | 6    | 6    | 6    | 6    | 6    | 6    |  |
| Other recreational services              | 3    | 1    | 2    | 5    | 3    | 3    | 5    | 4    | 5    | 6    | 4    | 4    | 4    | 4    | 4    | 4    |  |
| Other storage & distribution             | 13   | 18   | 28   | 39   | 40   | 43   | 48   | 44   | 45   | 40   | 41   | 40   | 36   | 37   | 36   | 36   |  |
| Other textiles                           |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Other transport equipment                | 8    | 7    | 7    | 9    | 9    | 9    | 9    | 8    | 8    | 9    | 9    | 8    | 8    | 8    | 8    | 8    |  |
| Paints & varnishes                       | 17   | 16   | 20   | 29   | 33   | 34   | 32   | 32   | 31   | 31   | 31   | 31   | 31   | 30   | 28   | 28   |  |
| Paper                                    | 3    | 5    | 5    | 8    | 5    | 5    | 8    | 6    | 1    | 2    | 2    | 5    | 4    | 3    | 4    | 4    |  |
| Paper products                           | 3    | 3    | 3    | 3    | 4    | 3    | 3    | 3    | 3    | 3    | 2    | 2    | 1    | 1    | 1    | 1    |  |
| Passenger cars & multi utility vehicles  | 12   | 16   | 15   | 18   | 19   | 21   | 22   | 22   | 19   | 19   | 20   | 21   | 20   | 19   | 18   | 18   |  |
| Pesticides                               | 8    | 9    | 12   | 13   | 14   | 13   | 15   | 15   | 16   | 16   | 16   | 14   | 14   | 14   | 14   | 14   |  |
| Pig iron                                 | 11   | 19   | 32   | 41   | 41   | 43   | 44   | 46   | 46   | 47   | 48   | 45   | 44   | 44   | 44   | 44   |  |
| Plastic films                            | 16   | 24   | 37   | 55   | 61   | 56   | 58   | 64   | 60   | 57   | 58   | 51   | 54   | 55   | 50   | 50   |  |
| Plastic packaging goods                  | 8    | 9    | 12   | 14   | 12   | 13   | 14   | 17   | 19   | 19   | 17   | 16   | 14   | 15   | 15   | 15   |  |
| Plastic tubes & sheets, other products   | 1    | 1    | 2    | 2    | 1    | 3    | 4    | 2    | 3    | 4    | 1    | 1    | 1    | 2    | 2    | 2    |  |
| Polymers                                 | 4    | 5    | 5    | 5    | 5    | 5    | 4    | 4    | 4    | 4    | 5    | 5    | 5    | 5    | 5    | 5    |  |
| Poultry & meat products                  | 3    | 6    | 8    | 11   | 7    | 8    | 10   | 11   | 13   | 5    | 7    | 11   | 11   | 11   | 10   | 10   |  |
| Prime movers                             | 1    | 1    | 2    | 2    | 2    | 2    | 2    | 2    | 3    | 4    | 5    | 6    | 7    | 7    | 7    | 7    |  |
| Processed/packaged foods                 | 5    | 6    | 12   | 16   | 22   | 24   | 21   | 21   | 22   | 21   | 24   | 26   | 25   | 24   | 24   | 24   |  |
| Ready-made garments                      | 7    | 7    | 7    | 7    | 7    | 7    | 7    | 7    | 7    | 7    | 7    | 7    | 7    | 7    | 7    | 7    |  |
| Refinery                                 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Refractories                             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Retail trading                           | 1    | 2    | 3    | 4    | 3    | 3    | 4    | 1    | 2    | 2    | 2    | 1    | 1    | 1    | 1    | 1    |  |
| Road transport services                  | 5    | 9    | 14   | 18   | 15   | 17   | 16   | 17   | 16   | 15   | 15   | 15   | 15   | 15   | 14   | 14   |  |
| Rubber & rubber products                 | 4    | 3    | 5    | 7    | 9    | 9    | 11   | 11   | 15   | 25   | 25   | 29   | 26   | 27   | 35   | 35   |  |
| Securities and stock traders             | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    |  |
| Shipping                                 | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    | 1    |  |
| Shipping transport services              | 4    | 7    | 8    | 7    | 6    | 7    | 8    | 8    | 8    | 8    | 8    | 7    | 7    | 7    | 7    | 7    |  |
| Sponge iron                              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Starches                                 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| Steel                                    | 30   | 38   | 56   |      |      |      |      |      |      |      |      |      |      |      |      |      |  |

Appendix Table 4. Principal Components Analysis: Correlation of First Two Principal Components with Underlying Variables

|   | pca  | pcb  | Inflation | Real Effective exchange Rate | GDP Growth | Bank Rate | Yield on Government Securities |
|---|------|------|-----------|------------------------------|------------|-----------|--------------------------------|
| First Principal Component (pca/"Overheating") | 1.00 |      |           |                              |            |           |                                |
| Second Principal Component (pcb/"Growth")     | 0.16 | 1.00 |           |                              |            |           |                                |
| Inflation                                     | 0.68 | 0.48 | 1.00      |                              |            |           |                                |
| Real Effective exchange Rate                  | 0.95 | 0.28 | 0.59      | 1.00                         |            |           |                                |
| GDP Growth                                    | 0.52 | 0.74 | -0.07     | -0.37                        | 1.00       |           |                                |
| Bank Rate                                     | 0.91 | 0.42 | 0.59      | 0.91                         | -0.26      | 1.00      |                                |
| Yield on Government Securities (Short Term)   | 0.91 | 0.08 | 0.48      | 0.88                         | -0.48      | 0.79      | 1.00                           |

Source: authors' analysis of macroeconomic data.

Appendix Table 5. Cross-Sectional Relationships

| Variables                           | (1)<br>All           | (2)<br>Top-Fifty<br>Indian<br>Business<br>Houses | (3)<br>Large Indian<br>Business<br>Houses | (4)<br>Other<br>Business<br>Houses | (5)<br>Small Firms  | (6)<br>Large Firms   |
|-------------------------------------|----------------------|--|---|------------------------------------|---------------------|----------------------|
| Sales growth (mean)                 | 0.075***<br>[40.3]   | 0.090***<br>[12.9]                               | 0.093***<br>[12.6]                        | 0.092***<br>[18.9]                 | 0.062***<br>[26.6]  | 0.102***<br>[33.2]   |
| Market share (mean)                 | 0.068***<br>[15.6]   | 0.090***<br>[7.65]                               | 0.099***<br>[7.87]                        | 0.075***<br>[6.87]                 | 0.066***<br>[8.39]  | 0.076***<br>[14.8]   |
| Lagged assets (mean)                | 0.011***<br>[22.8]   | -0.003**<br>[-2.13]                              | 0.001<br>[0.50]                           | 0.005***<br>[3.39]                 | 0.011***<br>[11.7]  | -0.002***<br>[-3.28] |
| Sectoral concentration<br>(mean)    | -0.024***<br>[-7.19] | -0.065***<br>[-6.24]                             | -0.043***<br>[-3.57]                      | -0.055***<br>[-5.65]               | 0.002<br>[0.42]     | -0.048***<br>[-9.30] |
| Sector-wide profitability<br>(mean) | 0.271***<br>[22.0]   | 0.291***<br>[7.46]                               | 0.563***<br>[13.4]                        | 0.259***<br>[8.02]                 | 0.204***<br>[11.9]  | 0.348***<br>[21.3]   |
| Foreign Firms                       | 0.029***<br>[7.96]   |  |   |                                    | -0.021**<br>[-2.54] | 0.036***<br>[10.5]   |
| Foreign Business Houses             | 0.024***<br>[3.04]   |  |   |                                    | 0.014<br>[0.60]     | 0.030***<br>[4.05]   |
| Joint-Sector                        | -0.000<br>[-0.025]   |  |   |                                    | -0.017<br>[-0.79]   | 0.005<br>[0.57]      |
| Public Sector                       | -0.018***<br>[-3.47] |  |   |                                    | -0.003<br>[-0.20]   | -0.000<br>[-0.083]   |
| Constant                            | 0.054***<br>[30.6]   | 0.055***<br>[11.3]                               | 0.028***<br>[5.64]                        | 0.055***<br>[12.8]                 | 0.045***<br>[13.0]  | 0.050***<br>[24.8]   |
| Observations                        | 12253                | 1212   | 997                                       | 1792                               | 6520                | 5733                 |
| R-squared                           | 0.260                | 0.217  | 0.320                                     | 0.253                              | 0.165               | 0.276                |

t-statistics in brackets  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1