Profitability in Emerging Markets: Efficiency or Market Power? A Study of Indian Firms

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January 2020

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The legal systems in emerging economies are weak and hence unsuccessful in completely eliminating market abuse, which could benefit some segment of firms to earn higher profits. This further leads to market imperfections and eventually to higher concentration. The problem persists even after strengthening market discipline and improving overall competition in emerging markets. Large and group firms in these markets could gain differential advantage and destroy value. We analyse the profitability of firms in an emerging economy, India; and find that large and group firms are more profitable than small and standalone firms. Further, we explicitly use cost efficiency of firms to understand the impact of market power on profitability and find that large firms in concentrated industries generate more profits. We also find that higher profitability of large firms is due to market power.

Keywords: Profitability, Size, Group Affiliation, Cost efficiency, Market power

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Abstract

The legal systems in emerging economies are weak and hence unsuccessful in completely eliminating market abuse, which could benefit some segment of firms to earn higher profits. This further leads to market imperfections and eventually to higher concentration. The problem persists even after strengthening market discipline and improving overall competition in emerging markets. Large and group firms in these markets could gain differential advantage and destroy value. We analyse the profitability of firms in an emerging economy, India; and find that large and group firms are more profitable than small and standalone firms. Further, we explicitly use cost efficiency of firms to understand the impact of market power on profitability and find that large firms in concentrated industries generate more profits. We also find that higher profitability of large firms is due to market power.

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1 Introduction

The legal systems in emerging economies are still weak and hence unsuccessful in completely eliminating market power and industry concentration. As a result, some segment of firms may still be reaping the benefits and could be generating higher profits. Research on profitability in emerging economies, has, however, been limited because of the difficulty in observing cost structure of firms. We contribute to industrial organisation literature by analysing the profitability of firms in an emerging economy, India, by considering cost structure of firms. The impact of market power on the profitability is also analysed by taking firm size and group affiliations into account.

The structure of industries in the economy, the behaviour of firms and the individuals in these industries has been the central focus of industrial organisation studies. The economic and social outcome of markets has been the primary focus, assuming a deviation from the idealised conditions of perfect competition, either because of scale economies or strategic behaviour of some segment of firms. This led to many empirical questions, during 1950s, about the role of competition in different industries and the way competition relates to industry structure and finally its impact on output and profits. Subsequently, attempts were made to find the relationship of industry structure with economic outcomes, conventionally referred to as 'structure-conduct-performance' paradigm and can be traced back to Bain (1951). A typical study under this paradigm regress accounting profit on industry concentration measure to make inferences. However, this type of studies lack on two fronts: first is the accounting measure of profits, which might not be an accurate measure of true economic activity (Einav and Levin, 2010) and the second is non-availability of clear theoretical foundations for imperfectly competitive markets. These concerns set a stage to shift the line of literature towards 'New Empirical Industrial Organisation', first coined by Bresnahan (1989). This new wave of research emerged to understand the institutional details of industries, and to test the firm behaviour. However, most of the research focuses on a single industry

or market and there do exist concerns about measurement of key variables and econometric specifications. Single industry studies also have their own drawbacks, such as narrow research, and as a result it is difficult to generalise the findings.

Another strand of literature that was long standing and a central issue in industrial organisation is the abuse of market by exploiting the consumer either through market power or some form of implicit or explicit collusion. The most common methodology was determining the equilibrium conditions under imperfectly competitive markets. In a celebrated paper, Bresnahan (1982) theoretically identified that firm set its output price equal to marginal cost plus a mark-up. The mark-up, which is in a way considered as firm's market power, is determined by the semi-elasticity of the firm's demand curve. Though, these types of studies appear to be well accepted in the theoretical front, they were criticized in empirical front primarily because accounting data is not suitable to report the economic notion of marginal cost. Here comes an alternative to infer marginal cost from observed output price of firm by relying on the profit maximisation assumption. Marginal cost is estimated as the difference between observed output price and the optimal mark-up arrived using estimated demand elasticity, however, it relies on the strong assumption of profit maximisation output price. The basic framework of imperfect competition was prevalent in the empirical studies to distinguish the exercise of market power, in merger reviews and antitrust litigations. Subsequent research in the field shifted to understanding the influence of a set of firms on market competition or factors determining a set of firms in an industry to be market leaders. The focus shifted towards the impact of market structure on a firm's entry or exit from an industry. Questions like whether new industries follow a life cycle of entry, consolidation and exit were also attempted. However, all these studies, to my knowledge, could only partly address the central issue of industrial organisation. Further, higher market concentration help firms to operate in less competitive market, utilise resource sub-optimally and charge higher prices.

Assuming a life cycle for firms, they enter the industry small and grow to become large, provided they survive in the industry. Practically, a firm may not exit the industry however stays in the industry as a large firm.[1] These small firms become large during sufficiently long period, say 20-30 years. The process of new firms entering into the market and growing possibly faster than the existing firms, will continue to keep the growth momentum of an industry intact. This process will keep on evolving in the industry as long as there is a conducive environment for business growth. However, there do exist concerns that these large firms may create obstacles for the entry of new firms to retain their market share. Therefore, firm size is used as a readily available proxy for market power in the empirical studies. A dominant set of firms, which have common interest, can impact the industry concentration by pulling the market share in their favour. Concerns exist that firms with business group affiliation, generally having the same promoter, act as the dominant set to impact the industry concentration. Therefore, firm size and business group affiliation are considered as good instruments to study the impact of market power on firm performance in an industrial organisation setup.

In the empirical studies, though it is difficult to obtain the marginal cost, the same is obtained relying on the profit maximisation assumption. In a perfectly competitive industry, profit maximisation is same as that of cost minimisation. However, it does not hold true when we relax the assumption of perfect competition. This assumption has been playing a vital role and has been attracting more attention in industrial organisation studies. A firm can maximise profit either by minimising cost or by maximising revenue. Therefore, profit maximisation is not necessarily implied only by cost minimisation. Firms with market power have several internal and external constraints which force the said firms to behave/operate like competitive firms (Ashton, 1987). The effect of these constraints on each individual firm is not uniform and the differences can be

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[1] As one can see from the long-term perspective of say, 20-30 years, firms enter the market (generally small) and grow faster.

understood only empirically. Thus, profits of a firm can be higher despite incurring higher costs and these higher costs would have been offset by higher revenues. These higher profits, without cost minimisation, indicates the existence of market power to some extent, which in turn could imply a possible industry concentration.[2] Suppose, if it continued to generate higher profits by maximising revenue (but not cost minimisation), then industry will be concentrated towards these few firms (which already have some market power) and hence there is a possibility that these few firms can exploit the consumer by charging even higher mark-ups. Contrary, if higher profits are generated by cost minimisation then the industry becomes competitive.

However, it is difficult to identify the firm behaviour of cost minimisation or revenue maximisation by looking at the accounting data. We can only observe the total costs and revenues but not the marginal cost or marginal revenue. One should look into the cost structure of firms and their profits with respect to observed cost structure to arrive at broader understanding of the existence of market power. Therefore, an attempt is made in this paper to understand the stated relationship by considering cost structure of firms, as obtained in Jangili (2019), to make meaningful inferences. An unbalanced panel data for the period 1994-95 to 2013-14 is used in the study. We establish a relationship of profitability with that of size and moves on to establish a relationship of profitability with that of industry concentration, market power and (cost)efficiency. We find that profitability of large firms (group firms) is higher than that of small firms (standalone firms) and this higher profitability is because of market power.

The rest of the paper is organised as follows: In section 2, we discuss our data and present a preliminary industry level analysis. In section 3, we analyse the profitability relation with firm size. We briefly specify the model, present our results and discuss profitability of small vis-à-vis large firms in this section. In section 4, we investigate

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[2] Profit dynamics, in the existing empirical industrial organisation literature, were explained using Structure Conduct Performance (SCP), Relative Market Power (RMP) and Efficiency hypotheses.

the profitability dynamics, i.e., whether higher profits are due to (cost)efficiency or market power. In addition to panel regression, we also present classification tables to understand the dynamics between profitability, market power and efficiency. Section 5 concludes.

2   Data and Preliminary Analysis

2.1   Sample and Data source

A long sample period of 1994-95 to 2013-14 is used to understand the profit dynamics of the Indian corporates. Since the problem of interest is more important in the free entry and exit regime, sample is considered from 1994-95 onwards, after nearly three years of liberalisation. The data has not been considered from 1991 onwards, immediately after liberalisation as the entries of firms could have been more sporadic. Therefore, we considered data from 1994-95 to allow for stabilisation of liberalisation impact. Terminal year was based on the availability of the data when the study is undertaken.

The data set used in this study is firm level data for the sample period, which has been sourced from an electronic database named PROWESS maintained by the Centre for Monitoring Indian Economy (CMIE), a private limited company. The number of companies in the database is increasing over the years and mostly comprises of public limited companies, whose annual reports are publicly available. Some private limited companies data are also available in the database. The database contains the information on financial performance of companies, mostly culled out from balance sheet and income & expenditure statements available in their annual reports. Therefore, it is audited information. Further, the database also contains information on ownership structure, industry classification, stock prices, etc. The entire information required to study the problem of interest is available in the database. However, since many firms

have entered and exited the market during the long span of 20 years, use of a balanced sample would have led to loss of data and could not capture the dynamics of young/new firms. Therefore, an unbalanced sample is used for better exploration.

2.2 Preliminary Analysis

Many industries in India witnessed significant growth after liberalisation as it created a conducive environment for entry of new firms. Moreover, the process of industrial growth is associated with systematic change in market structure. As the number of firms increases, concentration ratios in most of the industries showed a weak tendency to fall (Figure 1). Despite free entry and exit in the market, certain industries remained to be concentrated, which might be because of higher establishment costs involved in setting up the business in these industries.

Figure 1: Concentration among Indian industries, 1995-2014
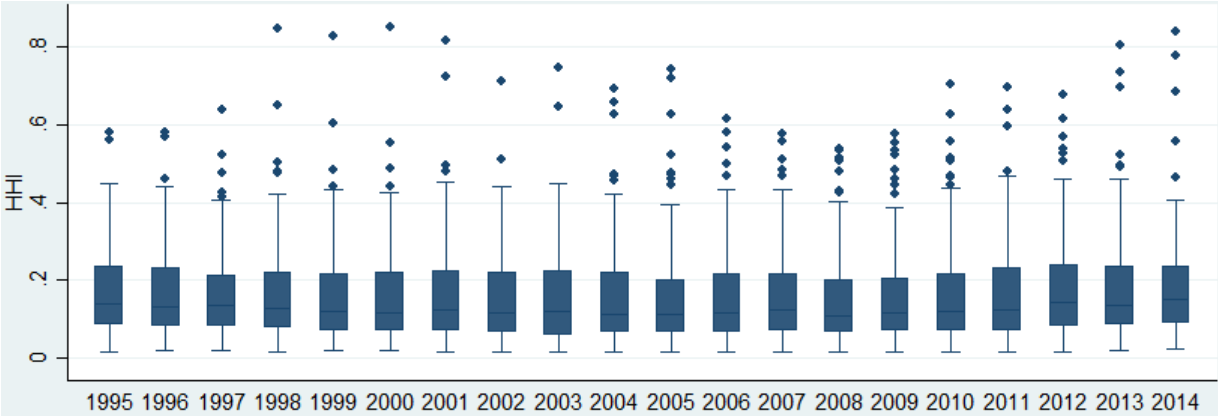
Industry concentration measured by Herfindahl-Hirschman Index (HHI) was lower during 1994-95 for many industries. However, HHI increased to higher levels, before almost all industries became more competitive in 2009-10. Since then there are signs of increased concentration. Though some industries were highly competitive in entire sample period, few industries have showed increased concentration, which resulted in

more variation in the HHI, particularly in the late 1990's. It may be concluded that Indian industries have broadly become more competitive during the study period.

Figure 2: Ratio of the 4-firm sales concentration to the 8-firm sales concentration
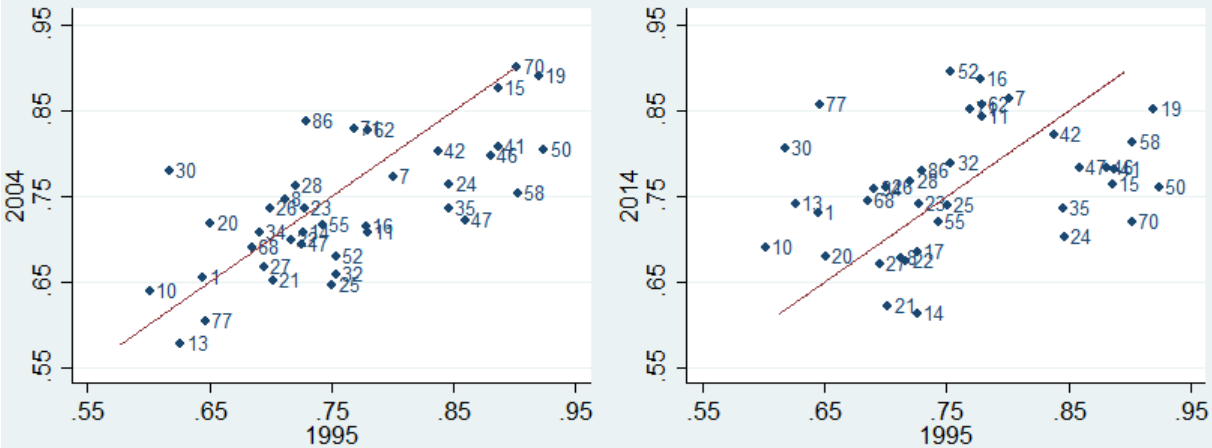
We now look at the ratio of four firm sales concentration ratio (C4) with the eight firm concentration ratio (C8). Figure 2 shows scatter diagram of the ratio of C4 to C8 at two widely separated time periods, 1994-95 to 2003-04 and 1994-95 to 2013-14 for the set of 2-digit Indian industries.[3] If the sale of goods by top four firms and the next four firms remains unchanged over time, the scatter points will lie on the diagonal line. On the contrary, if the scatter points lie below the diagonal line, it implies that either top four firms' sales have come down or next four firm sales have gone up, therefore they converge in their sale of goods. Similarly, if the scatter points lie above the diagonal line, it implies that either top four firms' sales have gone up or next four firms' sales have decreased leading to higher concentration in the industry. The scatter diagram suggested that industries have become more concentrated and few have become more competitive.

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[3]The two-digit industry codes used in this analysis are taken from National Industrial Classification 2008 (NIC-2008). For example, the two digit code '13' represents firms operating in 'Manufacture of Textiles', the two digit code '77' represents firms engage in 'Rental and leasing activities' and so on.

Figure 3: Ratio of the top 4-firm profits to the top 8-firm profits
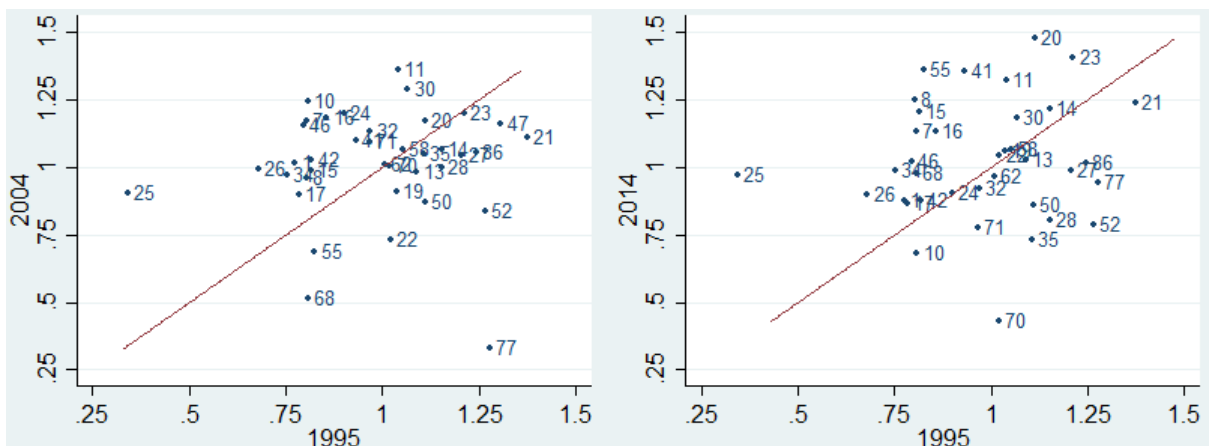
Now, let us look at the ratio of top four firms' profit rate (P4) with the top eight firms profit rate (P8) (top four firms and top eight firms according to the largest market share in each industry) (Figure 3). Scatter diagram shows the ratio of P4 to P8 at two time periods, initial 10 years period (1994-95 to 2003-04) and whole 20 years period (1994-95 to 2013-14) for the two digit (NIC) Indian industries. If the profit rate of top four firms and next four firms converge over the time period, the scatter points will lie on the diagonal. Scatter points below and above the diagonal indicate that profit rate of top four firms has increased and decreased relative to next four firms, respectively, in those industries. Further, it is observed that profit rate of top four firms is higher than that of next four firms in most of the industries, as the ratio of P4 to P8 is higher than one.

However, looking at the ratio of top four firms efficiency[4] with the top eight firms efficiency (we continue to maintain the top four firms and top eight firms according to their market share in each industry for better understanding), it is observed that

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[4]Efficiency measured in crude way as the ratio of wages and material cost to value added.

efficiency of top four firms is not higher than that of next four firms' efficiency in most of the industries (Figure 4). Though, in some industries efficiency of the largest four firms converge with that of next four firms' efficiency, profit rate of largest four firms is not converging with that of next four firms. Further, it is observed that industries for which largest four firms profit rate has increased from 1995 to 2014, showed a decline in their efficiency level over the same period. This may be supporting the traditional structure-conduct-paradigm (SCP) hypothesis.

Figure 4: Ratio of the top 4-firm efficiency to the top 8-firm efficiency
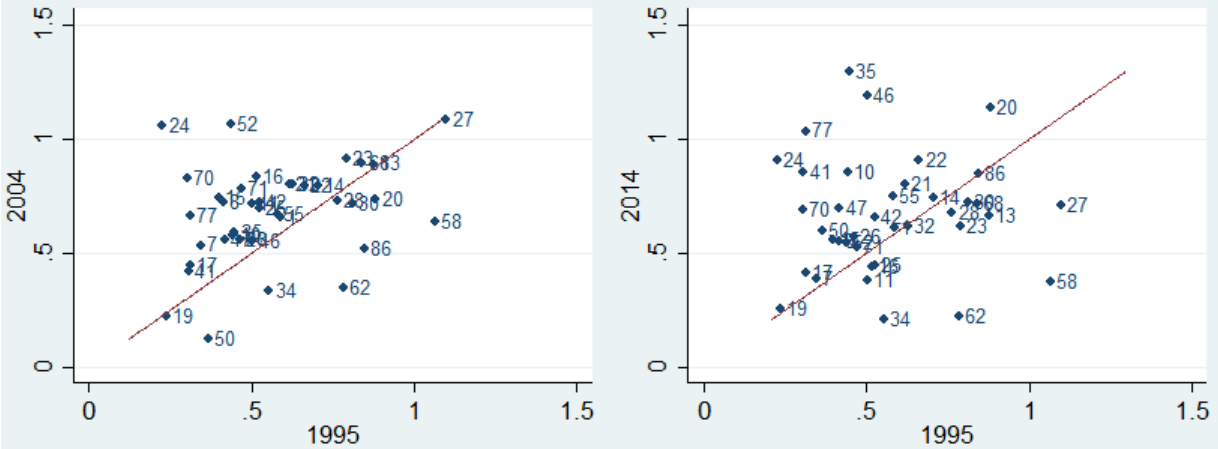
Ranks have been assigned to select Indian industries based on their competition, profit rate and efficiency and are presented in Annex (Tables A.1, A.2 and A.3). Manufacturing of textiles is the most competitive industry; in fact, it remained highly competitive industry throughout the study period. Whereas, manufacturing of wood and related products has become the most concentrated industry. The industries, such as, information service activities, manufacture of basic metals and manufacturing of paper and paper products, which were highly concentrated in 1994-95, have gradually become more competitive during the study period. Whereas industries, such as,

manufacturing of beverages, manufacturing of computer and electronic products and warehousing and support activities, which were relatively competitive in 1994-95, have become more concentrated during the study period.

Looking at the ranks based on profit rate, many industries have changed their ranks from higher to lower and vice versa. However, computer programming and related activities maintained its rank consistently throughout the study period. In 2012, mining of metal ores industry generated the highest rate of profit and sports amusement and recreation activities registered the lowest profit rate. Surprisingly, more competitive industry (manufacturing of textiles) and more concentrated industry (manufacturing of wood and related products) were ranked 18th and 19th, respectively, in their profit rate rankings. This may mean profit rate does not have relationship with competitiveness of industry.

Further looking at the ranks based on efficiency, it is observed that ranks have changed markedly among industries. Manufacturing of motor vehicles industry was the most efficient industry in 2011-12. Manufacturing of textiles and manufacturing of food products are also more efficient industries. On the other hand, retail trade industry is the least efficient industry in the last three years. Telecommunications industry is consistently among the lesser efficient industries. Real estate activities was efficient in some years but has become less efficient in recent period. On the other hand, manufacturing of rubber and plastic products, which was relatively less efficient in earlier period, has become relatively more efficient in recent period.

Preliminary finding from these ranks is that some industries which are highly concentrated could generate higher profit rate, irrespective of their efficiency (Table 1). In fact, the least efficient industry could also generate the highest profit rate provided it was more concentrated. It may be concluded that some industries which are highly competitive could not generate more profits but are becoming more efficient, that is

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Table 1: Top and Bottom 5 industries with respect to their rankings

Competition	Profit rate	Efficiency
(1) Manf of Textiles	(1) Mining of Metal Ores	(1) Manf of Motor Vehicles
(2) Manf of Chemicals and Chemical products	(2) Computer Programming and related activities	(2) Crop, Animal Production and related activities
(3) Wholesale Trade	(3) Manf of Leather and related products	(3) Manf of Textiles
(4) Manf of Pharmaceuticals and related products	(4) Information Service Activities	(4) Manf of Food Products
(5) Manf of Electrical Equipment	(5) Warehousing and Support Services	(5) Manf of Rubber and Plastic Products
(-5) Manf of Motor Vehicles	(-5) Wholesale Trade	(-5) Sports, Amusement Activities
(-4) Mining of Metal Ores	(-4) Construction of Buildings	(-4) Human Health Activities
(-3) Human Health Activities	(-3) Land Transport Activities	(-3) Telecommunications
(-2) Warehousing and Support Services	(-2) Retail Trade	(-2) Mining of Metal Ores
(-1) Manf of Wood and Related Products	(-1) Sports, Amusement Activities	(-1) Retail Trade

firms may be competing in prices, lowering their profits. Moreover, there is no evidence of efficient industries generating more profits, but highly competitive industries are generating lower profits and highly concentrated industries are generating more profits. These preliminary observations are made by looking at the data, however, detailed analysis has to be done using sophisticated econometric methods and an appropriate measure of efficiency. This will be done in the next sections.

Before going into the discussion of competition, efficiency and profit rate, let us explore the relation between firm size vis-à-vis efficiency and profit rate as the large firms have advantage of economies of scale and therefore can be more profitable without being more efficient. Further, it is argued that large firms would have more market power and can create obstacles to the entry of new firms by lowering their product prices below the marginal cost till the exit of these small new firms and after that they can make-up for their losses by charging higher prices and generating super normal profits. Moreover, large firms' presence in industry makes that industry to be more concentrated and therefore the industry may not become efficient.

3 Firm size and Profitability

The relation between firm size and profits has always been a topic of interest in empirical industrial organisation literature as profits can be generated either by minimising costs or by exploiting higher market power. Small firms are becoming more important in the creation of wealth and employment in most developed countries (Storey, 1989). However, large firms can have advantages in cost management because of their diverse capabilities, economies of scale and scope, and also the formalization of procedures. As a result, large firms could generate superior profits relative to small firms. Alternatively, it is argued that firm size is correlated with market power (Shepherd, 1986), which helps large firms to generate more profits hiding their inefficiencies in operating practices. Similarly, firms with business group affiliation can reap the benefits of group affiliation and manage their costs optimally. Alternatively, they can also exploit the market power to generate superior profits. Though, the relationship between firm size and profits has been the central focus of many industrial economics studies, there is no clear consensus on the type of relationship. Some studies[5] have found a positive relationship, few found a negative relationship and some found no relationship between firm size and performance. Since it is difficult to understand the profitability dynamics with that of competition, market power and efficiency; without analysing relationship of size with profits, in this section the relationship of profits with that of firm size and group affiliation is analysed.

3.1 Specification of Model

In order to analyse the impact of size on corporate profitability, the basic model in reduced form is assumed as:

$$\Pi_{it} = f(X_{it}; \beta) \qquad (1)$$

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[5]detailed review can be found in Lee (2009).

where Π_{it} represents firm i's profit rate in period t, $X_{it} = [x_{1it}, ..., x_{kit}]$ is a vector of explanatory variables and their corresponding coefficients are included in β.

Therefore, a linear model of firm profitability takes the form:

$$\Pi_{it} = \alpha + \gamma Size_{it} + X'_{it}\beta + \epsilon_{it} \qquad (2)$$

The subscript i denotes an individual firm and the subscript t denotes a time period. The error term ϵ_{it}, depending on the method of estimation, may vary across the N individual firms as well as across T time periods. Therefore, it can be expressed as:

$$\epsilon_{it} = \lambda_i + \mu_t + \eta_{it} \qquad (3)$$

where λ_i is the time invariant component that varies across firms (firm effects), μ_t is the firm invariant component that varies across time (time effects) and η_{it} is a normally distributed random error. The model controls for unobserved factors that differ from one firm to another firm, such as location advantages, but are constant over time. Further, the time dimension of the model controls for variables that vary over time, such as competition and demand for goods, but are constant across firms.

The profit rate, Π_{it}, is measured as the return on assets in line with the existing literature in the field of industrial organisation. Further, the firm size is measured as the natural logarithm of total assets. The next step in the model is to identify the control variables. The previous literature offers considerable guidance on the list of control variables to be included in the model that can explain firm profitability.

The list of variables that could impact firm profitability includes: (1) age, measured as number of years since its inception; (2) liquidity, measured as the ratio of current assets over current liabilities; (3) leverage, measured as the ratio of total borrowings over total assets; (4) advertising intensity, measured as the ratio of advertising expenses

over sales; (5) export intensity, measured as the ratio of export income over sales; (6) capital intensity, measured as the ratio of gross fixed assets over total assets; (7) capital labour ratio, measured as the ratio of gross fixed assets over remuneration to employees, a proxy for capital available per employee.

The advertising intensity and capital intensity are considered as sources of entry barriers, and hence these variables are commonly regarded as industry oriented factors. Export intensity is included to control for the export orientation of firms. Since these firms compete in the international markets, a priori, better profitability is anticipated. Though, there is no theory which links capital labour ratio to firm profitability, India being the labour abundant country, it is assumed that capital is costly when compared to labour. Therefore, it is expected to have negative relation with profitability.

Old firms are experienced and learn by doing and therefore, perform in a better way. However, it is also true that old firms are prone to inaction, and therefore, unlikely to have flexibility to absorb the recent developments and hence, may lose out to young firms. Ability to manage working capital and generating more cash flows relative to current liabilities reflect better management and therefore, generate relatively better profits and is controlled by using liquidity ratio. Capital intensity, which is measured as the ratio of gross fixed assets to total assets, helps to control industry specific effects given that some industries need greater capital holdings for production, whereas, some industries can produce with lower capital. Leverage is included to control the institutional factors. Higher the outside liabilities, lower incentives to managers for superior performance, and hence negative relation is expected.

3.2 Empirical Analysis

3.2.1 Descriptive Statistics

We first analyse the data based on summary statistics. We present summary statistics for profit rates and other firm characteristics of the sample in Table 2. For ease of exposition, the summary statistics are computed over two sub periods, 1995-2004 and 2005-2014. The firm size, measured by log of total assets, varied widely across the sample. The average size of 5.7 in the first half of the sample, increased to 6.3 in the second half of the sample, indicating a general increase in firm size during the sample period.

The profit rate varied across the firms. Mean return on assets of 9 per cent during the first half of the sample period with standard deviation of 23 per cent has increased to 11 per cent with standard deviation of 27 per cent. Similarly, mean return on sales of 29 per cent with standard deviation of 12 per cent increased to a mean of 57 per cent with decreased standard deviation of 19 per cent. The control variables also varied widely in the sample. Mean age of the sample increased from 22 years to 26 years from the first half of the sample to second half of the sample, indicating the dominance of the existing firms in the sample rather than new entrants. Further, it is observed that size distribution is positively skewed. Variability in liquidity of the firms has increased to a great extent, however, mean as well median liquidity remained stable during the sample period. Corporate leverage, on the average, remained stable, however, the highest leverage increased significantly. Similarly, the intensities of advertising, export and capital varied widely among firms.

We present the correlation matrix of all variables considered for our analysis in Table 3. The profit rate is positively correlated with firm size, age, export intensity and capital intensity, and negatively correlated with leverage, advertising intensity and capital labour ratio. We could not find any significant correlation among explanatory

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Table 2: Summary Statistics

Variable	N	Range	Min	Mean	Median	Max	Std
				1995-2014			
Return on Assets	124824	28.87	-8.08	0.10	0.10	20.79	0.26
Size	124824	16.32	-1.20	6.07	5.89	15.12	1.92
Age	124824	151.0	0.0	24.29	19.00	151.0	19.31
Liquidity	124824	1826.0	0.00	4.67	2.13	1826.0	22.50
Leverage	124824	95.23	0.00	0.47	0.32	95.23	1.57
Advertising Intensity	124824	16.66	0.00	0.01	0.00	16.66	0.11
Export intensity	124824	27.16	0.00	0.13	0.00	27.16	0.32
Capital intensity	124824	21.87	0.00	0.60	0.53	21.87	0.53
Capital labour ratio	124824	3.33	0.00	0.00	0.00	3.33	2.66
				1995-2004			
Return on Assets	54005	21.96	-8.08	0.09	0.10	13.88	0.23
Size	54005	14.69	-1.20	5.70	5.53	13.49	1.64
Age	54005	142.0	0.0	21.86	15.0	142.0	19.0
Liquidity	54005	929.5	0.0	4.2	2.2	929.5	16.2
Leverage	54005	80.13	0.00	0.50	0.34	80.13	1.58
Advertising Intensity	54005	12.61	0.00	0.01	0.00	12.61	0.07
Export intensity	54005	25.00	0.00	0.13	0.00	25.00	0.30
Capital intensity	54005	12.43	0.00	0.59	0.55	12.43	0.39
Capital labour ratio	54005	1.95	0.00	0.00	0.00	1.95	1.59
				2005-2014			
Return on Assets	70819	26.65	-5.86	0.11	0.10	20.79	0.27
Size	70819	16.32	-1.20	6.34	6.23	15.12	2.07
Age	70819	151.0	0.0	26.14	21.0	151.0	19.3
Liquidity	70819	1826.0	0.0	5.0	2.1	1826.0	26.3
Leverage	70819	95.23	0.00	0.44	0.30	95.23	1.57
Advertising Intensity	70819	16.66	0.00	0.01	0.00	16.66	0.13
Export intensity	70819	27.16	0.00	0.13	0.00	27.16	0.34
Capital intensity	70819	21.87	0.00	0.61	0.51	21.87	0.62
Capital labour ratio	70819	3.33	0.00	0.00	0.00	3.33	3.24

Table 3: Correlation matrix

	ROA	Size	Age	Liquidity	Leverage	Advt_Int	Exp_Int	Cap_Int	Cap_Lab	HHI	CE	MS
ROA	1											
Size	0.0539	1										
Age	0.0345	0.1774	1									
Liquidity	0.0011	-0.0358	-0.0278	1								
Leverage	-0.1319	-0.0515	0.0267	-0.0193	1							
Advt_Int	-0.0205	0.0089	-0.0272	-0.0032	-0.004	1						
Exp_Int	0.0284	0.0903	-0.0519	0.0214	-0.009	0.035	1					
Cap_Int	0.0159	-0.1677	0.0763	-0.0541	0.192	-0.0187	-0.058	1				
Cap_Lab	-0.0090	0.0320	-0.0453	0.0268	0.0202	-0.0019	-0.0208	0.0828	1			
HHI	0.0070	0.0481	0.0090	-0.0068	-0.0081	0.0009	-0.0114	-0.0215	0.0057	1		
CE	-0.0242	-0.4830	-0.0514	0.0109	0.0204	0.0011	-0.0540	0.1180	-0.0217	0.0072	1	
MS	0.0493	0.4204	0.1305	-0.0208	-0.0291	0.0037	0.0267	-0.0407	-0.0078	0.2629	-0.0964	1

Note: ROA: Return on Assets, Advt_Int: Advertising Intensity, Exp_Int: Export Intensity, Cap_Int: Capital Intensity, Cap_Lab: Capital labour ratio, HHI: Herfindahl-Hirschman Index, CE: Cost Efficiency and MS: Market Share.

variables. Variance inflation factor (VIF) test suggests that the correlations among explanatory variables do not pose problem of multicollinearity. It has also been observed that the correlation of profitability with that of cost efficiency is negative and with that of market share is positive.

3.2.2 Empirical Results

Primary findings

To understand the variation in profitability of small and large firms, and firms with business group affiliations and standalone firms, the average profitability for these groups is presented along with the significance of differences for each year of the sample period. The average profitability of small and large firms over the entire sample period is compared and presented in Table 4. The table provides some insights into the dynamics of profitability of small and large firms. It is observed that average profitability of large firms is always higher than that of small firms and is statistically significant. Though the results are preliminary in nature, they suggest that large firms are more profitable. However, the source of this higher profitability needs to be ascertained.

Further, profitability of firms with business group affiliation and standalone firms has also been compared in Table 5. It is evident that firms with business group affiliation are more profitable than standalone firms. The difference in profitability of these two groups is statistically significant for all the years of the study. The profitability of firms, either large firms or with group affiliation, is higher. This raises the questions that whether these large firms are more profitable because of efficiency which they would have gained because of their size or having business group affiliation or because of market power that might have gained due to their size or group affiliation.

Table 4: Average Profitability over the sample period: small vs large firms

Year	Small Firms					Large Firms					T-stat
	25th Percentile	Mean	Median	75th Percentile	Standard Deviation	25th Percentile	Mean	Median	75th Percentile	Standard Deviation	
1995	4.88	11.39	10.94	16.93	14.64	9.60	13.95	13.31	17.41	8.08	-4.86*
1996	2.70	8.75	8.55	14.98	20.72	9.38	13.75	13.42	17.75	8.85	-7.35*
1997	1.24	6.39	6.70	12.98	15.93	8.06	12.48	12.66	17.28	9.01	-11.07*
1998	0.00	5.23	6.37	13.11	18.92	6.88	11.39	11.84	16.19	10.06	-9.91*
1999	-0.36	4.87	6.26	13.53	23.06	5.87	10.82	11.12	16.07	12.13	-8.33*
2000	0.53	5.21	7.05	13.37	24.52	5.96	11.20	11.22	16.15	10.45	-8.4*
2001	0.28	4.92	5.78	12.09	25.03	6.12	11.32	11.21	16.26	10.07	-8.96*
2002	-0.11	4.99	5.46	11.58	28.04	5.70	10.97	10.79	15.91	10.23	-7.74*
2003	1.07	6.12	6.69	13.09	26.69	5.92	11.31	10.86	16.46	12.90	-7.26*
2004	1.66	8.31	7.51	13.66	20.67	6.34	12.42	11.92	17.86	14.39	-6.9*
2005	1.71	8.73	7.24	13.90	25.60	7.15	13.09	12.17	17.82	11.51	-6.77*
2006	2.00	9.20	7.64	14.83	32.03	8.08	13.57	12.54	17.78	13.23	-5.58*
2007	2.51	10.51	8.24	15.66	30.20	8.30	13.90	12.79	17.93	11.19	-4.68*
2008	1.91	8.38	7.85	14.47	27.45	8.09	13.40	12.32	17.83	9.78	-7.7*
2009	1.71	8.57	7.94	14.14	23.79	6.90	12.37	11.58	16.84	12.22	-6.37*
2010	2.61	8.86	8.22	14.41	25.81	7.47	12.32	11.83	16.81	9.13	-5.6*
2011	2.36	9.07	7.97	14.49	20.76	6.86	11.90	11.34	15.98	10.48	-5.11*
2012	1.48	7.12	6.90	13.19	23.24	6.44	11.05	10.59	15.27	10.59	-6.16*
2013	1.51	7.53	6.67	12.62	21.10	5.78	10.57	9.86	14.69	9.40	-4.85*
2014	1.59	7.32	6.83	12.50	19.60	5.41	10.73	9.85	14.76	9.48	-5.29*

Note: (1) * represent statistical significance at 5 per cent level.
(2) T-stat represents T-statistic for difference of means of two groups (small vs large).

Table 5: Average Profitability over the sample period: Business group vs standalone firms

Year	Standalone Firms					Business group Firms					T-stat
	25th Percentile	Mean	Median	75th Percentile	Standard Deviation	25th Percentile	Mean	Median	75th Percentile	Standard Deviation	
1995	7.16	12.74	12.45	17.50	9.71	8.46	13.05	13.08	17.98	14.73	-0.8
1996	5.36	10.97	11.03	15.89	12.22	7.88	12.51	13.01	18.07	17.65	-3.41*
1997	3.38	8.99	9.48	14.92	12.22	6.26	10.72	12.00	17.01	16.59	-3.98*
1998	2.35	7.83	8.80	14.80	13.64	4.72	9.27	10.99	16.03	18.71	-3.06*
1999	2.22	7.68	8.77	14.71	15.94	3.30	8.02	9.84	15.40	20.69	-0.66
2000	3.38	9.25	9.54	15.67	15.66	3.17	7.75	9.80	15.51	22.13	2.97*
2001	2.93	8.72	8.93	14.76	14.89	2.92	8.22	9.47	15.32	20.75	1.05
2002	2.52	8.42	8.49	14.21	18.04	2.79	8.18	9.11	15.18	18.71	0.51
2003	3.40	9.06	9.06	14.57	17.33	3.17	9.21	9.44	15.69	20.42	-0.32
2004	3.89	10.30	9.64	15.37	16.42	3.98	10.81	10.38	16.96	19.99	-1.13
2005	4.50	11.20	9.75	15.63	19.15	4.39	10.79	10.44	16.99	20.12	0.87
2006	4.94	11.88	10.41	16.41	21.42	5.16	11.31	11.17	17.02	22.14	1.1
2007	5.55	12.43	10.86	16.61	19.56	4.82	12.10	10.98	17.29	23.88	0.67
2008	5.51	11.70	10.71	16.23	17.73	4.92	10.86	10.58	17.09	21.10	1.86*
2009	4.84	11.18	10.34	15.84	16.33	4.03	10.42	10.18	16.55	24.55	1.66*
2010	5.41	11.35	10.52	15.96	15.71	4.72	10.93	10.53	16.53	22.36	0.97
2011	5.37	11.08	10.34	15.53	14.99	4.40	10.09	9.95	15.89	16.16	2.59*
2012	4.29	9.83	9.53	14.63	14.37	4.22	9.46	9.40	15.27	16.22	0.95
2013	3.91	9.52	9.48	14.49	13.03	3.74	9.39	8.78	14.69	16.98	0.33
2014	3.71	9.85	9.31	14.23	12.92	3.49	9.14	9.07	14.59	15.66	1.67*

Note: (1) * represent statistical significance at 5 per cent level.
(2) T-stat represents T-statistic for difference of means of two groups (standalone vs group affiliation).

Evidence from the fixed effects regression

The results presented in Table 6 are obtained using the fixed effects panel regression model. The model of firm profitability specified in equation (2) is estimated separately for all firms in the sample, firms with business group affiliations, standalone firms, firms operating in industry and firms operating in services activities. We also estimated the model using pooled OLS and random effects panel regression, however, the F test rejected pooled OLS and Hausman test[6] rejected the random effects panel regression. Firm fixed effects as well as time fixed effects have been included in all the models.

The results from all models consistently show that firm size is positively related with profitability and is statistically significant. Similar results were obtained by Majumdar (1997) for Indian firms and by Lee (2009) for US firms. Becker-Blease et al. (2010) also found that large firms are more profitable than small firms considering various measures and could not find any evidence that small manufacturing firms are more profitable than larger firms.

Our empirical results suggests that large firms are more profitable, and profitability increases with firm size. However, the relationship is non linear as the squared firm size is also significant and is negative, indicating that profit rate increase with decreasing rate as firm becomes larger and larger. Further, it is observed that the points of inflection are 7.55, 8.84, 7.07, 7.19 and 7.14, respectively for all firms, firms with business group affiliations, standalone firms, firms operating in industry and firms operating in service activities. The profit rate start decreasing when the firm size is beyond these levels. The highest point of inflexion is observed for firms with business group affiliations. Further, it is observed that all these point of inflexions cover around 90 percentile of the sample. That is, only for few large firms profit rates are not in proportion with that of their size.

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[6]Hausman (1978) test is used to determine whether the fixed or random effects model should be used. The question is whether there is any significant correlation between the unobserved firm-specific random effects and the regressors. If there is no such correlation then the random effects model may be more powerful and parsimonious. If correlation exists, the random effects model would be inconsistently estimated and the fixed effects model would be preferred.

Table 6: Effect of firm size on Rate of Profit (Return on Assets)

	All firms	Business group firms	Standalone firms	Firms in Industry	Firms in Services
Size	1.8848***	2.4718***	2.0566***	1.8817***	1.8266**
	(0.4653)	(0.9060)	(0.5644)	(0.5617)	(0.8048)
$Size^2$	-0.1250***	-0.1386***	-0.1423***	-0.1303***	-0.1281***
	(0.0184)	(0.0342)	(0.0234)	(0.0217)	(0.0337)
Age	1.1055***	2.3480***	0.4271	1.0701***	1.8467***
	(0.3087)	(0.5540)	(0.3748)	(0.3467)	(0.6342)
Liquidity	0.0068***	0.0201*	0.0046**	0.0087*	0.0050*
	(0.0024)	(0.0121)	(0.0021)	(0.0050)	(0.0030)
Leverage	-0.7133***	-0.1958	-0.9500***	-1.5461***	-0.0314
	(0.2622)	(0.4959)	(0.3276)	(0.5176)	(0.3131)
Advertising intensity	-2.5840***	-3.4778***	-1.4124	-4.2183*	-2.7970***
	(0.8460)	(1.2357)	(0.8905)	(2.5398)	(0.9727)
Export intensity	0.7570***	0.4616	0.8263***	1.2628***	0.4846**
	(0.1949)	(0.5297)	(0.2143)	(0.4755)	(0.2143)
Capital intensity	-0.0152	-0.1744	0.0832	0.4137	0.1144
	(0.3743)	(0.6786)	(0.4437)	(0.5868)	(0.5051)
Capital labour ratio	-0.0006***	-0.0002	-0.0010***	-0.0012***	-0.0003
	(0.0002)	(0.0002)	(0.0003)	(0.0004)	(0.0002)
Constant	7.9412***	2.0088	9.4675***	8.8518***	6.0951**
	(1.6664)	(3.4214)	(1.9703)	(1.9996)	(2.7907)
Number of Observations	124736	40223	84513	80368	37609
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes

Note: Values in parentheses are robust standard errors.

*, ** and *** represents statistical significance at 10%, 5% and 1% level, respectively.

The above findings imply that large firms in India are more profitable, however, they are not efficient in terms of cost (Jangili, 2019). This behaviour is consistent with the rent seeking perspective that has been explained in the industrial organisation studies. The policy instruments meant to foster the growth of small as well as medium sized firms and also to control monopoly power are found to be ineffective even after four decades of industrial licensing. The lack of monitoring might have allowed large entrepreneurs to exploit the consumers to their advantage, which might have generated more profits for them. Further, lack of monitoring not only gave market power to larger firms but also generated inefficiencies among these firms, as there are no incentives to minimize costs or improve efficiency of these firms. However, the relationship of profits with that of efficiency and market power will be established empirically in the next section.

The coefficients of the control variables are significant and broadly in line with the expectations. Advertising intensity turns out to be negatively significant for all sets of firms except for standalone firms, indicating that firms which spend more on advertising expenditure have lower profits. The coefficient of export intensity is significantly positive, except for business group firms. The positive relationship can be interpreted as exporting firms learn better practices to compete in the international market, which generates more profits when compared to non-exporting firms. The coefficient of capital labour ratio is negative and significant. India being a labour abundant country, capital is more costly than labour, which could have resulted in lower profits. The age coefficient is significantly positive, indicating older firms generate more profits may be by learning through their experience.[7] Liquidity ratio is significant and positively related with profit rate. The results indicate that firms which manages their receivables and payables optimally are rewarded. The coefficient of leverage ratio is negative and is

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[7]De and Nagaraj (2014) also found that older firms in India perform better than their young counterparts.

statistically significant for all firms, standalone firms and firms operating in industry. The higher the leverage ratio lower the profit rate. The results imply that firms which are overburden with debt tend to have lower profits as part of their profits have to be paid in the form of interest payments.

3.3 Discussion

The profitability is simulated from the estimated regression and is presented in Figure 5. It is clearly observed that the profitability increased from lower quantiles to higher quantiles. However, the rate of increase is lower in higher quantiles compared to lower quantiles. Further, profitability is presented for firms with business group affiliation along the quantiles. It is observed that profitability of firms with business group affiliation is much higher compared to the overall profitability, indicating firms with business group affiliation get supernormal profits. The existing literature on Indian business groups emphasizes that group firms' substitute for missing markets in an emerging economy (Khanna and Palepu, 2000; Khanna and Yafeh, 2007) and would act as a catalyst for the superior performance, however, after some critical level of diversification, group affiliation may not be good. We found that group firms are more profitable than standalone firms, however, profitability started diminishing after a certain size threshold.

It is observed that small firms tried to catch-up with the large firms, however, they were unable to do so (Figure 6). When the difference between small firms profitability and large firms profitability narrowed down, a sudden spike, increasing the gap has been observed. Again, the gap started narrowing down, before another spike increases the gap. The gap between small and large firms profitability is maximum during 1995-96 and 2007-08. It appears that when the economy is in upward cycle the gap started widening, could be because of higher demand, which could have been captured by large firms. Incidentally, it is observed that the gap is minimum during 2012-13, when the

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Figure 5: Relationship between firm size and profitability in regression
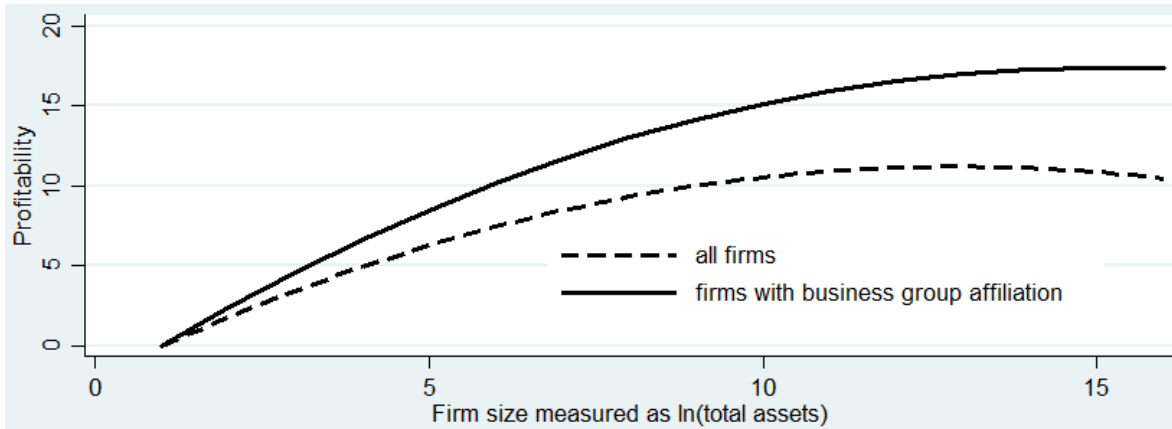
Figure 6: Average profitability: small vis-à-vis large firms, 1995-2014
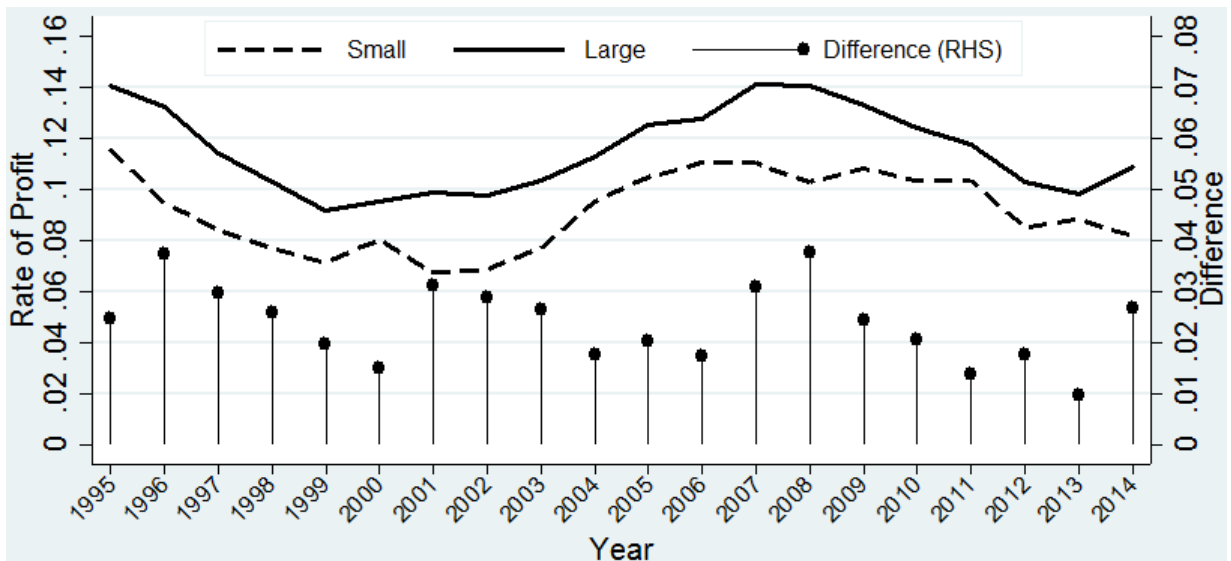
demand is very low, supporting our argument.

It may be argued that firms in certain industries, by their nature, will be large and higher profits of those industries (if exists) may be leading to higher profits for large firms. However, ranks assigned to profit rates based on two digit NIC codes (Annex Table A.2), reveal that no single industry continued to generate superior profits over the years and the ranks of almost all industries changed over the years. This supports that higher profit rate for large firms is not because of any specific industry.

4   Profitability Dynamics: Efficiency or Market Power?

Profit maximisation is a key assumption in the industrial organisation (IO) literature. Firms maximise their profits by maximising revenue and by minimising costs. Firms may be able to increase the output prices depending on their market power and decrease the input costs to the extent of their efficiency. In a perfectly competitive situation, profit maximisation should be equivalent to cost minimisation. However, it will be distorted in imperfect competitive situation. Profit maximisation output levels in imperfect competitive situation are no longer minimising the average costs. Therefore, profit rates are attributable to the market power which firms might have gained due to imperfect competition.

It has been observed that the relationship of firm size with profit rate is positive (from the previous section) and with efficiency is negative (Jangili, 2019) and both are significant. That is large firms have higher profitability, despite their low efficiency. That is, firms are generating more profits not by reducing their marginal costs, but instead, pricing their products well above their marginal costs. In a way, firms would be generating more profits due to market imperfections or because of market power. This kind of profit generation was first addressed by Hicks (1935), who argued that firms which have monopoly power encourage its owners to slack managerial efforts as

opposed to competitive market. Subsequently, Bain (1951) hypothesised that the profit rates of firms in high concentration industries should, on the average, be larger than the of firms operating in industries of low concentration. Hall and Weiss (1967) concluded that firm size tends to result in higher profits and monopoly profits has been the classic criticism which imply that product prices are more than the opportunity costs of factors employed and therefore result in the misallocation of resources. Since then, profit concentration relation has been the central focus on many IO studies. The significant positive relation between market concentration and profits has been interpreted using traditional Structure Conduct Performance (SCP) hypothesis and also Relative Market Power (RMP) hypothesis.

SCP hypothesis asserts that as a result of competitive imperfections, prices are set less favourable for consumers (generally high prices) in more concentrated markets and hence leading to super normal profits. Whereas, it is argued in RMP hypothesis that firms with higher market share and well differentiated products are able to exercise market power in pricing their products and earn super normal profits. However, these interpretations were challenged by Demsetz (1973), and laid foundations to Efficiency hypothesis, in which the positive relation is interpreted as an evidence of efficiency profitability relationship and incidentally to industry concentration. On the other hand, Clarke et al. (1984) found that industry concentration didn't have any impact on the small and large firm profitability for the UK and concluded that both efficiency and market power are at work for higher profitability. The interpretation was supported by Berger and Hannon (1989), who also construed that the positive profit relationship is not only because of higher efficiency but also exercise of market power.

However, initial studies in the empirical IO literature used market share as proxy for market power and supported either SCP or RMP hypothesis. Later, it was argued that the most efficient firm would have lower marginal costs and could gain market share. Thus, market share should be used as a proxy for efficiency supporting efficiency

Figure 7: Illustration of profit relationship with that of concentration, market share and efficiency
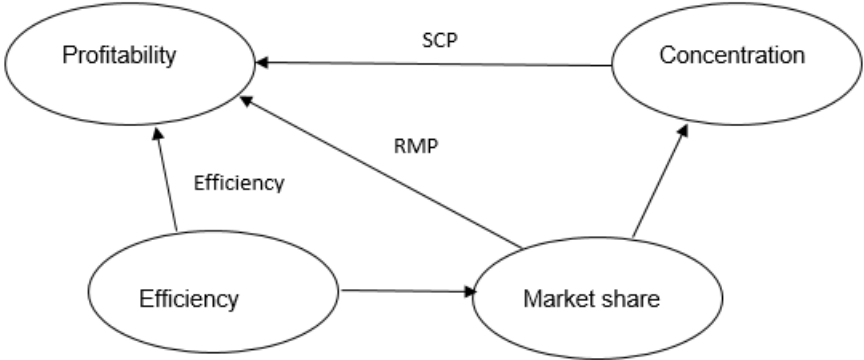
hypothesis. However, subsequent empirical studies questioned the use of market share as a proxy for efficiency and argued that market share variable would capture the effect of other variables affecting the market structure rather than efficiency.

The relationship of profit with that of industry concentration, market power and efficiency has been illustrated in Figure 7. First, higher industry concentration would help some firms to set the prices above marginal costs and as a result generate above normal profits. However, earlier studies ignored the causes of higher concentration. It can be stated that higher concentration could be either due to market power or because of efficiency. Firms could get higher market share by being more efficient, however, leading to higher concentration in this case would be difficult as all firms try to become efficient. On the other hand, firms may actually have market power with certain advantages, such as being large or having group affiliation, compared to other firms in the industry.

Therefore in this section, first the relation between profit rate with that of concentration is explored. If profitability has significant positive relation with that of concentration, a further analysis of profitability with that of market share will also be

carried out. Further, relationship of market share needs to be explored with that of efficiency. Suppose if efficiency has significant positive relation with that of profit, it is clearly evident that higher profitability is because of efficiency. Suppose if market share has significant positive relation with profit but efficiency is not significant then it can be interpreted as higher profits are due to market power. Sheer market power, in this case, is hiding inefficiencies and generating super normal profits.

4.1   Empirical Strategy

It may be noted that efficient firms can capture the market and therefore, the industry may be concentrated towards efficient firms. Similarly, firms with high net worth/brand value capture the market for them, again leading to a concentrated market. In both these cases, firms can generate higher profits through market concentration. Empirical studies investigated whether the superior profits are attributable to high concentration or market power or efficiency. But, efficiency could lead to concentration, raising concerns about market power hypothesis. Therefore, we explicitly incorporate efficiency and market share variables along with the concentration variable in our specifications.

The structural model underlying the SCP hypothesis is

$$\Pi_{ijt} = \beta_0 + \beta_1 Conc_{jt} + \gamma^{'} Z + \varepsilon_{it} \tag{4}$$

where Π_{ijt} is the profit rate of firm i in period t, which is in jth industry and $Conc_{jt}$ reflects the concentration of industry j at time t for which firm i belongs and is measured as Herfindahl-Hirschman index (HHI). Vector Z represents the control variables. $\beta_1 > 0$ implies that higher concentration results in higher profits.

But concentration may not be exogenous, more efficient firms will grow/survive and capture the market share. As a result, concentration will increase over time. However,

higher market share for a firm may not imply that firm is efficient. There could be other unobserved factor influencing the market share. Thus, first market share is incorporated into the model to test whether market share has any influence on the profit. Therefore, the following model is estimated:

$$\Pi_{ijt} = \beta_0 + \beta_1 MS_{it} + \gamma' Z + \varepsilon_{it} \tag{5}$$

Then, concentration is also incorporated into the model first and finally, interaction term of market share and concentration is also included. However, there is a difficulty in interpreting the coefficient of market share, as market share can also reflect the market power. Large/group firms can have differentiated products and have higher market share despite being inefficient. Therefore, the profitability model should incorporate efficiency variable into the model to have proper interpretation of the results. Thus, the following model is estimated:

$$\Pi_{ijt} = \alpha_0 + \alpha_1 Eff_{it} + \gamma' Z + \varepsilon_{it} \tag{6}$$

The results of both the models put together can be interpreted as below: if $\beta_1 > 0$ and $\alpha_1 > 0$ and both are significant, then the higher profits can be attributable to efficiency of the firms, which is driving both market share as well as profitability. However, if $\beta_1 > 0$ and significant and α_1 either insignificant or negative, then the higher profits are because of market power and supports the relative market power hypothesis. In this case, even industry concentration is also an outcome of market power.

4.2 Regression Results

The results obtained by estimating profitability regression specified in equation 4 are given in Table 7. The main variable of interest in these regressions is concentration measured by Herfindahl-Hirschman index (HHI), separately constructed for each year of the study period. The concentration measure is an industry measure and therefore

varies across years as well as industry. The control variables used in this regression are similar to those used in the previous section and therefore they are not discussed in this section. Column (1) reports the results obtained when only concentration measure is included in the regression. The result is surprising as the many empirical IO studies found a positive relationship of concentration with that of profits. However, it may be argued that all firms in the concentrated industry need not get higher profits. The firms with higher market share in these industries only get more profits at the expense of other firms in these industries.

Therefore, concentration variable is segregated for large and small firms to check the differential impact of industry concentration on large and small firm profits. A variable is created in such a way that for large firm it takes the value of HHI and zero for other firms. Similarly, another variable is created which takes the value of HHI for small firm and zero for other firms. The results are reported in Column (2) of the Table 7. The variable which takes the value of HHI for large firms is shown as interaction term of large firm and concentration and similarly for small firm is shown as interaction term of small firm and concentration. Basically, these coefficients capture the differential impact of industry concentration of large and small firms on their profitability.

Surprisingly, all the concentration variables have become significant, supporting the existing empirical IO studies. Further, it also shows that the coefficient for large firm is positively significant and for small firms, it is negatively significant. The result indicates that in a concentrated industry not all firms would get benefit and generate superior profits. It is the large firms which get the benefit and generate more profits and the small firms operating in concentrated industries will lose out to these large firms. Large firms' ability to exercise the market power can be limited by competition from smaller firms (Martin, 1988), however, it appears that in the current environment their survival is difficult. Therefore, it may be possible that these small firms may exit from the industry making the industry even more concentrated. As a result, large firms

Table 7: Profitability relation with that of concentration

	(1)	(2)	(3)	(4)
Concentration	0.4617	3.0233**	1.0728	-0.6992
	(1.2420)	(1.3866)	(1.4164)	(2.3210)
Large firm * Concentration		9.6540***		
		(1.4716)		
Small firm * Concentration		-19.9309***		
		(1.5133)		
Group firm * Concentration			-1.7721	
			(2.6890)	
Standalone * Concentration				1.7721
				(2.6890)
Age	1.1152***	0.6871**	1.1175***	1.1175***
	(0.3032)	(0.3031)	(0.3036)	(0.3036)
Liquidity	0.0075***	0.0080***	0.0075***	0.0075***
	(0.0024)	(0.0024)	(0.0024)	(0.0024)
Leverage	-0.7121***	-0.6724**	-0.7118***	-0.7118***
	(0.2643)	(0.2631)	(0.2642)	(0.2642)
Advertisement intensity	-2.6694***	-2.4875***	-2.6698***	-2.6698***
	(0.8264)	(0.8313)	(0.8269)	(0.8269)
Export intensity	0.6451***	0.5500***	0.6445***	0.6445***
	(0.1909)	(0.1893)	(0.1908)	(0.1908)
Capital intensity	0.2327	0.5079	0.2313	0.2313
	(0.3583)	(0.3577)	(0.3581)	(0.3581)
Capital labour ratio	-0.0006***	-0.0004***	-0.0006***	-0.0006***
	(0.0002)	(0.0001)	(0.0002)	(0.0002)
Constant	11.8198***	12.7040***	11.8125***	11.8125***
	(0.7200)	(0.7194)	(0.7210)	(0.7210)
Number of observations	124736	124736	124736	124736
Firm fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes

Note: Values in parentheses are robust standard errors.

*, ** and *** represents statistical significance at 10%, 5% and 1% level, respectively.

will become further large and become industry leaders and may get a power to set the price of their product much above the marginal cost and generate super normal profits. Nickell (1996) established that higher level of productivity growth is associated with higher competition, however, the impact of competition is lower when firms are under financial pressure (Nickell et al. 1997). It appears that Indian firms are under financial pressure, as a result, despite having lower cost efficiency for large firms, they manage to have better profits, might be using their power.

Further, concentration variable has been segregated for firms with business group affiliation and firms which do not have group affiliation. As in the case of small and large firms, these variables cannot be incorporated in the same regression as the problem multicollinearity may arise. Here, the firms are either group firms or not, whereas, in the size classification, firms can be either small, medium or large. Therefore, the results obtained in case of group firms are reported in Column (3) and for non group firms the results are reported in Column (4). It is observed that none of the concentration coefficients are statistically significant, indicating having business group affiliation has nothing to do with the industry concentration. Therefore, group affiliation will not be included in the subsequent profitability regressions, which incorporate market share and efficiency variables.

Then the regression model specified in equation 5 is estimated incorporating the market share variable and the results are presented in Table 8. It is observed that coefficient for market share is positive and significant supporting the argument that higher market share would earn superior profits. However, at this stage it is difficult to say whether this is because of market power or efficiency. The results reported in Column (1) are just using market share variable in the profitability regression along with control variables. The results are augmented to incorporate industry concentration and the interaction effect of market share with that of industry concentration are reported in Column (2) and (3) of the Table 8, respectively.

Table 8: Profitability relation with that of market share

	(1)	(2)	(3)
Market share	0.2669***	0.2671***	0.4970***
	(0.0329)	(0.0328)	(0.0446)
Concentration		-0.1605	1.6695
		(1.2543)	(1.2965)
Market share * Concentration			-0.6905***
			(0.0995)
Age	0.9222***	0.9213***	0.8401***
	(0.3045)	(0.3044)	(0.3045)
Liquidity	0.0074***	0.0074***	0.0075***
	(0.0024)	(0.0024)	(0.0024)
Leverage	-0.7097***	-0.7095***	-0.7078***
	(0.2641)	(0.2640)	(0.2632)
Advertisement intensity	-2.6394***	-2.6398***	-2.6198***
	(0.8234)	(0.8234)	(0.8215)
Export intensity	0.6077***	0.6077***	0.5899***
	(0.1891)	(0.1891)	(0.1885)
Capital intensity	0.3158	0.3163	0.3442
	(0.3579)	(0.3583)	(0.3582)
Capital labour ratio	-0.0005***	-0.0005***	-0.0005***
	(0.0002)	(0.0002)	(0.0002)
Constant	11.6830***	11.7041***	11.4379***
	(0.7057)	(0.7212)	(0.7232)
Number of observations	124736	124736	124736
Firm fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes

Note: Values in parentheses are robust standard errors.

*, ** and *** represents statistical significance at 10%, 5% and 1% level, respectively.

The coefficient for interaction term of market share variable and industry concentration is statistically significant and negative. The result can be interpreted as, the firms which cannot increase market share when the industry concentration is increasing will lose out. In this case, other firms will expand in the industry and increase their market share, leading to industry becoming more concentrated. From the results reported in Table 8, it is clear that firms with higher market share would have more profits compared to firms with lower market share. The results are similar to that obtained five decades ago (Rhoades, 1985; Smirlock and Brown, 1986; Smirlock et al. 1986), wherein it was showed that the market share is a source of high profits regardless of the level of concentration. The only improvement is that firms with higher market share generate high profits in concentrated markets.

Finally, the regression model specified in equation 6 is estimated, which incorporates cost efficiency (as obtained using stochastic frontier methodology in Jangili, 2019) as an explanatory variable in the profitability regression and the results are reported in Table 9. None of the existing empirical studies, to my knowledge, incorporated a formal measure of efficiency in their profit regressions. Earlier studies used market share for both market power and efficiency, which led to contra interpretations in their studies. Since, we are explicitly incorporating efficiency variable in the profit regression, it is expected to have an appropriate interpretation of market share, as well. As hypothesised, if the coefficient of efficiency is positively significant along with positive significant market share coefficient, it will support the Demsetz (1973) argument of efficiency hypothesis. Otherwise, market power argument holds true.

The results reported in Column (1) of Table 9 incorporate only efficiency variable along with control variables. Further, industry concentration along with efficiency and the interaction of efficiency with that of industry concentration are reported in Column (2) and (3), respectively. Surprisingly, it is observed that efficiency coefficient is nega-

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Table 9: Profitability relation with that of efficiency

	Profitability			Market share
	(1)	(2)	(3)	(4)
Efficiency	-7.7797	-7.8064	-5.4372	-0.3265
	(8.2264)	(8.2331)	(8.9102)	(0.2901)
Concentration		0.5045	0.9786	
		(1.2451)	(1.3313)	
Efficiency * Concentration			-23.4428	
			(23.7322)	
Age	1.0720***	1.0741***	1.0765***	0.7136***
	(0.3048)	(0.3047)	(0.3046)	(0.0855)
Liquidity	0.0075***	0.0075***	0.0075***	0.0001
	(0.0024)	(0.0024)	(0.0024)	(0.0004)
Leverage	-0.7062***	-0.7065***	-0.7071***	-0.0078
	(0.2644)	(0.2643)	(0.2643)	(0.0076)
Advertisement intensity	-2.6679***	-2.6663***	-2.6654***	-0.1179***
	(0.8256)	(0.8256)	(0.8260)	(0.0447)
Export intensity	0.6355***	0.6352***	0.6350***	0.1407**
	(0.1897)	(0.1896)	(0.1896)	(0.0589)
Capital intensity	0.2985	0.2974	0.3005	-0.3038***
	(0.3622)	(0.3625)	(0.3623)	(0.0530)
Capital labour ratio	-0.0006***	-0.0006***	-0.0006***	-0.0000
	(0.0002)	(0.0002)	(0.0002)	(0.0001)
Constant	12.0584***	11.9922***	11.9351***	0.7489***
	(0.7240)	(0.7349)	(0.7380)	(0.1806)
Number of observations	124736	124736	124736	124736
Firm fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes

Note: Values in parentheses are robust standard errors.

*, ** and *** represents statistical significance at 10%, 5% and 1% level, respectively.

tive in all specifications but is not significant at the conventional level of significance. The coefficient is significant only at 35% level of significance, which is not acceptable. That means the higher profits gained because of market share are attributable to market power, not to efficiency. Similar results were obtained by Allen (1983) for American Manufacturing, who found that large firm efficiency, concentration and market power are intermingled, and the market power has the dominant effect in the concentration profit relationship.

Further, to understand whether efficiency has any relationship with that of market share, a model is estimated with market share as dependent variable and efficiency is independent variable along with control variables. The results obtained are reported in Column (4) of Table 9. The coefficient of efficiency is negative in this regression as well but not significant. This confirms that higher profitability of Indian corporates is attributable to their market power and has nothing to do with their efficiency levels. This could be the reason for higher profits of large firms despite them being less efficient when compared to small firms.

Our empirical results find that large firms are more profitable than small firms; and firms that are affiliated to business group tend to be more profitable than standalone firms. The higher profitability was attributed to market power, which over compensates the negative impact of higher cost (lower cost efficiency). Similar results were obtained by Berger (1995), he found that X-efficiency or superior management of resources is consistently associated with higher profits, however, X-efficiency is positively related to concentration or market share. Market share is positively related to profitability after controlling for the concentration and efficiency, supporting relative market power hypothesis. It is only the larger firms in the market that can exercise market power. An attempt is made to understand the possible reasons for higher cost with respect to R&D expenditure and advertising expenditure. We computed the R&D intensity (R&D

Table 10: R&D intensity: small vis-à-vis large and standalone vis-à-vis business group firms

Year	Small	Large	T-stat		Standalone	Business group	T-stat
1995	0.0008	0.0015	-1.79		0.0069	0.0061	-2.87*
1996	0.0011	0.0026	-1.50		0.0082	0.0068	-2.04*
1997	0.0012	0.0020	-1.42		0.0074	0.0066	-2.55*
1998	0.0006	0.0023	-3.22*		0.0106	0.0093	-2.64*
1999	0.0145	0.0036	0.79		0.0065	0.0065	0.78
2000	0.1044	0.0028	0.98		0.0062	0.0070	0.79
2001	0.0008	0.0030	-4.45*		0.0080	0.0157	0.77
2002	0.0004	0.0036	-7.60*		0.0071	0.0077	-4.39*
2003	0.0008	0.0030	-4.35*		0.0059	0.0068	-1.75
2004	0.0014	0.0038	-1.95*		0.0055	0.0077	-0.19
2005	0.0045	0.0038	0.18		0.0052	0.0072	-1.98*
2006	0.0005	0.0041	-5.93*		0.0054	0.0075	-0.24
2007	0.0008	0.0039	-4.40*		0.0059	0.0103	-1.95
2008	0.0007	0.0039	-6.16*		0.0051	0.0156	-0.46
2009	0.0009	0.0041	-6.29*		0.0057	0.0109	-1.52
2010	0.0009	0.0039	-5.51*		0.0075	0.0102	-1.62
2011	0.0009	0.0041	-5.64*		0.0055	0.0132	-1.60
2012	0.0017	0.0048	-3.11*		0.0062	0.0113	-1.63
2013	0.0009	0.0059	-3.67*		0.0112	0.0143	-2.60*
2014	0.0014	0.0055	-4.66*		0.0076	0.0173	-1.29

Note: (1) * represents statistical significance at 5 per cent level.

(2) T-stat represents T-statistic for difference of means of two groups (small vs large and standalone vs group affiliation).

Table 11: Advertising intensity: small vis-à-vis large and standalone vis-à-vis business group firms

Year	Small	Large	T-stat		Standalone	Business group	T-stat
1995	0.0089	0.0062	1.54		0.0007	0.0014	0.80
1996	0.0120	0.0063	2.47*		0.0011	0.0022	1.08
1997	0.0102	0.0065	1.63		0.0010	0.0020	0.62
1998	0.0070	0.0158	-1.03		0.0010	0.0020	0.26
1999	0.0055	0.0078	-2.19*		0.0087	0.0029	0.00
2000	0.0066	0.0078	-1.07		0.0439	0.0022	-1.10
2001	0.0195	0.0098	1.06		0.0371	0.0021	-1.56
2002	0.0083	0.0087	-0.15		0.0013	0.0025	-0.42
2003	0.0055	0.0084	-2.65*		0.0016	0.0022	-0.97
2004	0.0056	0.0082	-2.35*		0.0026	0.0028	-2.55*
2005	0.0049	0.0077	-2.13*		0.0015	0.0056	-1.69
2006	0.0048	0.0084	-2.72*		0.0026	0.0030	-2.12*
2007	0.0055	0.0118	-1.53		0.0019	0.0034	-1.84
2008	0.0056	0.0078	-2.14*		0.0024	0.0028	-3.05*
2009	0.0065	0.0063	0.12		0.0019	0.0236	-2.99*
2010	0.0072	0.0077	-0.30		0.0020	0.0118	-0.84
2011	0.0066	0.0137	-1.06		0.0022	0.0068	-2.13*
2012	0.0064	0.0090	-1.06		0.0027	0.0048	-2.45*
2013	0.0189	0.0163	0.20		0.0027	0.0056	-0.47
2014	0.0088	0.0076	0.71		0.0031	0.0041	-1.28

Note: (1) * represents statistical significance at 5 per cent level.

(2) T-stat represents T-statistic for difference of means of two groups (small vs large and standalone vs group affiliation).

expenditure[8] as a proportion of sales) as well as the advertising intensity (advertising expenses as a proportion of sales) of small and large firms as well as standalone and business group affiliated firms for our sample. These results are reported in Tables 10 and 11.

As we can see from Table 3.10, the R&D intensity of large firms is significantly higher than that of small firms, particularly in recent years. R&D intensity of business group firms, though, higher than that of standalone firms, is not statistically significant.

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[8]It may be noted that firms disclose R&D expenditure and advertising expenditure in their accounts only when they exceed 5 percent of the total expenditure. As a result, many firms do not have these expenditure in their accounts. The results, therefore, may be read with this caveat.

From Table 3.11, which gives the advertising intensity of the different types of firms, we could not find any significant difference in advertising of small vis-à-vis large firms as well as standalone vis-à-vis business group affiliated firms (Table 3.11).

4.3   Further insights

The regression results obtained in the previous section provides the average effect of market share and efficiency on the profitability. Though there is an evidence that market share positively affects the profitability, the relation of efficiency with that of profits or with that of market share could not be established. Therefore, to further explore the relationship the companies are grouped into 10 equal groups based on their market share, efficiency and profitability. For example, the first group pertains to profitability of the bottom 10 per cent of firms when ordered in profitability from low to high. That is the first group contains the 10 percent of companies with lowest profitability, second group contains next 10 percent of companies whose profitability is higher than that of first group but lower than the remaining companies, and so on. The last group contains the 10 percent of companies with the highest profitability. Therefore, each company is assigned to only one group depending on its profitability, companies with the lowest profitability in the first group to the highest profitability in the last group. Similarly, firms have been assigned to 10 equal groups with respect to market share and efficiency. In each classification, group 1 represents the companies with the lowest values of the underlying variable (profitability, market share or efficiency) and group 10 contains the companies with the highest values of the same underlying variable.

Now a 10×10 classification table is prepared for (i) market share and profitability, (ii) cost efficiency and market share and (iii) cost efficiency and profitability. The cells of each table represents the proportion of firms in that combination. For example, cell in a market share and profitability classification table represented by row 1 and column 1 indicates the proportion of firms whose profitability is the lowest and at the same time

Table 12: Classification Table: Market share vis-à-vis Profitability

		Profitability (1-lowest and 10 highest)									
		1	2	3	4	5	6	7	8	9	10
Market share (1-lowest and 10 highest)	1	2.26	2.69	1.45	0.85	0.60	0.48	0.36	0.32	0.36	0.65
	2	1.56	1.70	1.44	1.17	0.88	0.74	0.60	0.50	0.58	0.82
	3	1.35	1.15	1.20	1.13	0.98	0.89	0.83	0.74	0.79	0.93
	4	1.16	0.97	1.15	1.10	1.04	0.98	0.93	0.87	0.83	0.98
	5	0.93	0.82	1.01	1.14	1.10	1.10	1.01	1.03	0.95	0.91
	6	0.78	0.73	0.90	1.00	1.06	1.10	1.13	1.16	1.11	1.04
	7	0.65	0.63	0.85	0.95	1.04	1.16	1.18	1.22	1.21	1.11
	8	0.54	0.52	0.76	0.90	1.07	1.18	1.23	1.30	1.32	1.18
	9	0.48	0.46	0.67	0.97	1.10	1.16	1.35	1.34	1.37	1.08
	10	0.29	0.32	0.58	0.80	1.11	1.20	1.38	1.52	1.51	1.29

whose market share is also the lowest. Similarly, cell represented by row 10 and column 10 indicates the proportion of firms whose profitability is the highest and market share is also the highest.

The classification table of market share and profitability is presented in Table 12. Let us consider the first row of the table (i.e., firms having the lowest market share), when we move from left to right the proportion of firms has decreased, indicating that most of the firms with the lowest market share have lower profitability. Though, there exist some firms with higher profitability, maximum number of firms are with lower profitability. Similarly, looking at the last row indicates that there are firms with lower profitability when their market share is the highest, but this proportion is much smaller than that of firms with higher profitability with this market share. Suppose the classification table divided into four quadrants: (1) having lower market share and low profitability (2) low market share and high profitability (3) high market share and low

Table 13: Classification Table: Cost efficiency vis-à-vis Profitability

| | | Profitability (1-lowest and 10 highest) | | | | | | | | |
		1	2	3	4	5	6	7	8	9	10
Cost efficiency (1 lowest and 10 highest)	1	0.39	0.78	0.88	1.03	1.20	1.22	1.20	1.26	1.13	0.89
	2	0.61	0.79	0.78	0.89	1.04	1.10	1.21	1.24	1.30	1.03
	3	0.73	0.78	0.79	0.88	1.02	1.05	1.17	1.25	1.18	1.14
	4	0.81	0.74	0.81	0.89	1.00	1.08	1.12	1.15	1.21	1.18
	5	0.94	0.85	0.85	0.97	0.99	1.04	1.10	1.07	1.12	1.06
	6	1.02	1.01	0.92	1.00	1.04	0.99	1.07	1.02	1.02	0.92
	7	1.16	1.01	1.05	1.05	1.01	1.02	0.96	0.90	0.93	0.90
	8	1.24	1.11	1.23	1.17	0.97	0.93	0.88	0.84	0.75	0.87
	9	1.41	1.42	1.37	1.10	0.91	0.84	0.67	0.67	0.70	0.90
	10	1.67	1.51	1.31	1.02	0.83	0.74	0.63	0.59	0.66	1.09

profitability (4) high market share and high profitability. It is observed that 30.8 per cent of firms each fall into quadrant 1 and 4, whereas, only 19.2 per cent firms each fall into quadrant 2 and 3. The proportion of firms were maximum along the diagonal from top left to bottom right, which further supports the hypothesis that firms with large market share tend to be more profitable.

The classification table of cost efficiency with that of profitability is presented in Table 13. The table could not provide any conclusive evidence on the relationship as found in the regression. For example, a number of firms whose cost efficiency is lower could generate higher profitability and at the same time, there are also number of firms whose cost efficiency is lower but which generated higher profitability. Similarly, there are a number of firms which have reasonable cost efficiency scores with higher profitability as well as lower profitability. Further, a look into the four quadrants also indicates that there are almost similar proportion of firms in each quadrant.

Table 14: Classification Table: Cost efficiency vis-à-vis Market share

Cost efficiency (1-lowest and 10 highest)	Market share (1-lowest and 10 highest)									
	1	2	3	4	5	6	7	8	9	10
1	0.07	0.09	0.11	0.17	0.28	0.47	0.72	1.21	2.28	4.58
2	0.10	0.19	0.30	0.37	0.64	0.91	1.25	1.75	2.13	2.36
3	0.16	0.32	0.41	0.64	0.91	1.21	1.49	1.72	1.74	1.38
4	0.25	0.47	0.67	0.94	1.06	1.38	1.50	1.50	1.41	0.82
5	0.40	0.73	0.91	1.10	1.26	1.52	1.46	1.28	0.93	0.40
6	0.60	0.93	1.17	1.32	1.43	1.35	1.32	0.99	0.67	0.20
7	0.75	1.20	1.42	1.55	1.55	1.22	1.00	0.80	0.41	0.10
8	1.23	1.59	1.65	1.57	1.30	1.06	0.74	0.50	0.25	0.11
9	2.05	2.20	1.82	1.43	1.06	0.64	0.41	0.20	0.14	0.03
10	4.39	2.28	1.55	0.90	0.50	0.22	0.11	0.06	0.03	0.02

Further, considering only a subset of the classification table, 3×3 bottom and top cells indicate that firms with low efficiency and low profitability is only 6.5 percent and firms with high efficiency and high profitability is 7 percent. But the proportion of firms with low efficiency and high profitability is 10.4 per cent; and high efficiency and low profitability is 12.3 per cent. However, as there is no clear pattern in proportion of firms in either direction, it is difficult to establish any clear relationship of cost efficiency with that of profitability.

Finally, a classification table of cost efficiency with that of market share is presented in Table 14 to close the profitability, market share and efficiency arguments. It is observed form the table that there are more proportion of firms with higher cost efficiency and lower market share and at the same time lower cost efficiency and higher market share. The result can be interpreted as market share is not because of cost efficiency.

There exist some unobservable factors leading to higher market share, in fact the firms with relatively higher market share have lower cost efficiency. This result is in contradiction with the Demsetz (1983) argument of efficiency leading to higher market share, which in turn translates to higher profits. Thus, the higher profitability of the Indian corporates could be attributable to market power rather than their efficiency.

5 Summary and Conclusions

The study examines the profitability dynamics of the Indian corporates for a 20 year period, ranging from 1994-95 to 2013-14. The study contributes to the existing literature majorly on two fronts: first it establishes a relationship between profitability and firm size and second on profitability dynamics with that of industry concentration, market power and efficiency. The study has been motivated by certain theoretical and empirical observations coupled with policy stance. Firm size heterogeneity is a common phenomenon and more important in the context of a developing country. Small firms coexist with large firms and produce similar products. Though, theoretically both small and large firms have certain advantages such as scale economies in case of large firms and more flexible management structure in case of small firms, it is empirically found that small firms are more efficient in terms of their cost structure. This led us to ask whether these small firms are also more profitable, since profit is the difference between revenue and cost.

However, the study finds an evidence that profitability of large firms is always higher than that of small firms and the difference is statistically significant. Similarly, firms with business group affiliation have higher profitability when compared to standalone firms. Therefore, further attempt is made to understand the profitability dynamics using a continuous measure of firm size in the fixed effects panel regression. The study empirically finds that there exists a positive relation between firm size and profitability. However, the impact of firm size on profitability diminishes for the largest firms.

Therefore, profitability dynamics have been further explored to understand the source of profitability, such as market power or efficiency. The empirical IO literature suggests that higher profitability could either be because of market power or efficiency, both of which affect the profitability through industry concentration. The study finds an evidence that large firms in concentrated industries generate more profits, at the same time small firms lose out their profits. In a way, it can be interpreted that concentrated industries provide a differential advantages to large firms to become more profitable at the expense of small firms.

Profitability relation with that of market power and efficiency is also analysed. It is found that efficiency doesn't affect the firm profitability, whereas, market share positively influences the profitability. Thus, the relationship of market share with that of profitability should have come from other unobservable factor, possibly market power as hypothesised in the empirical IO literature. Therefore, the study empirically finds that the higher profitability of large firms compared to small firms is because of market power large firms have and not because of cost efficiency, which was found to be higher for small firms. The study highlights the positive relationship of profit with that of firm size is due to market power by using cost efficiency, in an appropriate way.

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Table A.1: Ranks based on Industry Concentration

Indsutry	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Agriculture, etc	21	19	20	20	19	18	17	18	17	18	13	7	16	20	15	16	17	17	8	10
Mining and quarrying	7	8	7	13	15	15	14	16	15	13	16	20	18	19	22	21	24	25	25	25
Manf of food prod	9	9	9	12	10	10	12	11	12	8	9	13	11	15	13	18	20	21	20	21
Manf of beverages	12	10	11	10	6	6	6	5	7	5	7	9	10	10	12	13	22	22	24	24
Manf of textiles, etc	2	1	2	1	2	1	1	1	2	1	2	1	1	1	5	2	2	5	5	6
Manf of leather, etc prod	26	25	25	25	26	26	26	26	26	26	25	26	22	21	25	26	25	24	23	23
Manf of wood etc prod	19	20	19	21	21	17	18	15	13	11	10	19	21	24	23	25	26	26	26	26
Manf of paper etc prd	15	15	10	17	8	11	10	10	11	6	6	6	6	6	8	6	5	4	3	3
Manf of rubber & plastic prod	10	13	15	15	16	16	13	14	16	14	17	14	13	18	18	15	13	13	14	12
Manf of chemicals etc prod	8	7	8	11	13	12	11	12	14	9	8	8	7	9	10	9	8	7	7	5
Manf of mineral prod	11	11	13	14	14	13	15	17	18	16	14	12	17	17	16	14	18	19	19	14
Manf of basic metals	18	18	17	18	17	20	19	19	21	19	21	21	20	23	19	19	16	16	16	19
Manf of other metal prod	16	17	18	16	18	19	16	20	20	17	15	16	15	16	17	17	14	15	18	17
Manf of electronic prod	17	21	21	19	20	21	20	22	23	21	20	18	19	22	21	22	19	20	22	22
Manf Other	14	12	14	7	12	14	21	8	10	12	12	15	12	13	20	20	15	12	13	11
Manf of transport equp etc	4	3	1	4	4	4	3	4	4	2	1	4	2	3	7	5	3	2	2	2
Manf Diversified	1	2	3	2	3	3	2	2	5	4	4	3	5	4	4	7	6	9	9	9
Electricity, etc	22	24	24	23	23	23	23	23	19	15	18	10	9	12	9	10	11	10	12	18
Construction	24	22	23	22	22	22	22	21	22	20	19	17	14	14	14	11	10	11	11	13
Trade	13	14	16	9	11	9	7	13	1	10	5	5	4	2	3	3	7	6	6	7
Transportation	25	26	26	26	25	25	25	25	25	25	22	23	24	26	26	24	23	23	21	20
Accommodation	6	6	6	6	7	7	8	6	6	3	3	2	3	5	2	1	1	1	1	1
Warehousing	23	23	22	24	24	24	24	24	24	24	23	22	23	25	24	23	21	18	15	16
Information & communication	20	16	12	8	9	5	5	7	9	7	11	11	8	11	11	12	12	14	17	15
Real estate activities	3	4	4	3	1	2	4	3	3	22	24	24	25	8	1	4	4	3	4	4
Other Services	5	5	5	5	5	8	9	9	8	23	26	25	26	7	6	8	9	8	10	8

Note: Rank 1 is assigned to the most competitive industry and therefore the highest rank indicates the most concentrated industry.

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Table A.2: Ranks based on the average profitability of the industry

Industry	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Agriculture, etc	5	12	21	23	25	15	20	16	22	22	21	26	26	23	6	11	17	15	8	26
Mining and quarrying	18	17	16	16	23	22	17	9	3	4	3	12	14	5	10	1	20	7	10	14
Manf of food prod	23	19	17	6	11	14	13	19	24	24	15	23	20	25	12	18	16	6	11	10
Manf of beverages	25	24	20	12	7	8	21	11	20	17	22	24	18	22	26	24	1	16	14	17
Manf of textiles, etc	20	22	19	21	26	25	23	24	26	3	18	7	10	20	25	10	10	22	12	6
Manf of leather, etc prod	21	20	25	25	21	24	25	22	4	26	25	20	4	14	8	7	26	26	2	1
Manf of wood etc prod	17	8	7	9	13	18	12	25	23	25	24	22	16	18	16	23	25	25	25	25
Manf of paper etc prd	10	5	15	14	17	11	5	7	13	15	17	8	15	24	3	22	19	21	21	8
Manf of rubber & plastic prod	13	18	12	11	10	16	19	10	9	9	19	3	9	8	1	2	2	2	3	5
Manf of chemicals etc prod	11	15	8	8	9	5	7	4	8	6	6	5	6	9	5	6	7	3	5	3
Manf of mineral prod	6	11	9	20	19	23	16	15	7	10	7	18	8	1	4	5	6	8	13	22
Manf of basic metals	19	14	18	24	18	19	18	18	18	12	5	15	11	3	17	12	15	14	20	20
Manf of other metal prod	9	9	10	10	14	10	15	12	12	11	14	4	2	7	9	9	5	4	17	11
Manf of electronic prod	16	16	13	13	12	17	14	8	16	23	12	10	5	4	2	8	4	18	19	19
Manf Other	22	23	23	7	5	6	6	26	17	20	26	25	23	16	21	13	18	11	23	16
Manf of transport equp etc	3	2	1	3	8	2	10	1	2	2	2	1	7	10	14	4	3	1	6	4
Manf Diversified	4	7	6	17	6	9	8	6	10	13	13	16	17	12	20	3	8	19	9	15
Electricity, etc	7	4	5	5	3	3	3	5	5	5	10	13	19	17	24	21	23	23	15	13
Construction	15	13	11	19	16	12	11	17	11	18	11	17	21	21	23	15	21	20	22	23
Trade	24	21	24	22	22	21	24	23	21	21	23	21	25	26	22	26	24	24	24	18
Transportation	14	6	3	2	2	4	1	2	1	1	1	2	1	6	11	16	13	10	26	9
Accommodation	12	3	4	4	4	7	9	20	14	16	16	11	3	2	13	25	12	12	16	12
Warehousing	8	26	14	15	15	13	4	3	6	7	9	9	12	11	7	14	11	5	4	24
Information & communication	1	1	2	1	1	1	2	14	19	8	8	6	13	13	18	17	14	9	7	2
Real estate activities	2	10	22	18	20	20	22	13	15	19	20	19	24	19	15	19	22	13	18	7
Other Services	26	25	26	26	24	26	26	21	25	14	4	14	22	15	19	20	9	17	1	21

Note: Rank 1 is assigned to industry with the highest average profitability and the highest rank indicates industry with the lowest profitability.

Table A.3: Ranks based on average efficiency scores of the industry

Industry	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Agriculture, etc	10	15	18	19	16	12	13	6	12	13	14	11	14	17	13	15	16	18	16	18
Mining and quarrying	23	23	23	21	20	22	19	18	18	12	13	14	17	16	15	19	20	21	20	19
Manf of food prod	6	3	3	3	4	5	6	4	4	6	9	9	10	8	8	7	7	7	4	4
Manf of beverages	17	19	20	17	14	17	17	8	14	18	15	16	12	12	17	13	14	14	12	5
Manf of textiles, etc	14	12	11	12	12	15	15	16	13	15	16	15	15	14	14	14	12	10	10	8
Manf of leather, etc prod	9	4	7	15	10	4	4	12	5	7	5	6	5	6	6	6	5	2	2	2
Manf of wood etc prod	19	20	17	6	9	10	5	15	15	14	11	13	11	10	7	8	9	9	5	12
Manf of paper etc prd	3	5	8	10	6	11	7	5	7	10	8	5	7	9	9	9	11	13	14	11
Manf of rubber & plastic prod	7	14	12	13	11	13	14	13	8	4	7	7	6	5	5	4	3	4	3	3
Manf of chemicals etc prod	4	7	6	5	5	7	10	10	6	5	12	12	13	13	12	12	13	12	11	13
Manf of mineral prod	21	21	21	23	23	18	21	20	19	21	19	19	18	18	18	16	18	16	17	16
Manf of basic metals	5	6	5	4	3	3	3	3	3	3	1	2	2	2	2	3	2	3	6	7
Manf of other metal prod	15	9	10	11	8	8	8	9	9	8	6	8	8	7	10	10	10	11	13	14
Manf of electronic prod	8	8	9	9	7	6	9	7	11	11	4	4	4	3	4	5	6	8	9	6
Manf Other	2	2	2	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1
Manf of transport equp etc	11	10	4	7	13	9	12	14	10	9	10	10	9	11	11	11	8	6	7	10
Manf Diversified	13	11	15	8	15	14	11	11	16	16	17	17	16	15	16	17	15	15	15	15
Electricity, etc	25	25	25	26	26	26	26	26	26	26	26	26	26	25	25	25	25	25	25	26
Construction	18	17	14	14	17	16	16	17	17	17	18	18	19	20	20	20	19	19	19	20
Trade	1	1	1	2	2	2	2	2	2	2	3	3	3	4	3	2	4	5	8	9
Transportation	26	26	26	25	25	25	25	25	25	25	25	25	25	26	26	26	26	26	26	25
Accommodation	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	23	23	24	24
Warehousing	12	16	13	18	18	20	18	22	22	22	23	23	23	23	23	23	24	24	23	23
Information and communication	22	22	22	22	21	21	22	23	23	23	22	21	21	19	19	18	17	17	18	17
Real estate activities	16	13	16	16	19	19	20	19	20	19	20	22	22	22	22	22	22	22	22	22
Other Services	20	18	19	20	22	23	23	21	21	20	21	20	20	21	21	21	21	20	21	21

Note: Rank 1 is assigned to industry with the highest average efficiency and therefore lower ranks indicate industries with lower average efficiency.

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