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Changing Distribution of Leverage and Formation of "Clubs" in Indian Corporate Firms during 1991-2021: A Nonparametric Approach

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Abstract:

This paper investigates the evolution of leverage ratio in Indian corporate firms over the 31-year period from 1991 to 2021 i.e. the entire post-reform period. We use kernel density estimation techniques to analyse the distribution of leverage across firms. We find that most of the estimated densities exhibit bimodal distribution while considering all firms. Two separate 'clubs' have also been observed in all categories of firms, viz., group-affiliated, stand-alone, good-performing, and bad-performing firms. There exists intra-distribution dynamics and persistence of leverage. To explain the reasons for formation of two "clubs", we argue that although the stock market was flourishing in India during the post-reform period, small firms did not have much access to that market due to higher informational asymmetries

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between insiders in these firms and the capital markets. Moreover, we observe that firms with a greater percentage of fixed assets to total assets have higher leverage because fixed assets can be used as collateral. Thus, two “clubs” with high and low leverage co-existed in the Indian corporate firms in the post-reform period. Our findings also raise questions against the conventional wisdom that the leverage of business group firms is different from that of the stand-alone firms and that firms with high profitability should be less leveraged. Such observations are usually based on the conditional mean of leverage which is misleading. Our observations reveal that these average effects mask the heterogeneity in the distribution of leverage. These findings have several policy implications for the managers of the companies and the regulators of the Indian stock markets.

Keywords: Leverage, club formation, kernel density, mobility matrix, multimodality, post-reform period, India.

JEL Classification: C10; C14; G20; G30: G32: G39

1.0 Introduction

The theory of capital structure has been the most debated issue in the theory of finance during the past quarter century. Studies on the capital structure of corporations started decades back with the works of Lintner (1956), Hirshleifer (1958), and Modigliani and Miller (1958). Theoretical and empirical studies that have since appeared comprise an extremely large body of literature[1]. Modigliani and Miller (1958) showed that in the perfect financial market, under certain assumptions, the value of a company is independent of its financing choice. The key assumptions of the Modigliani-Miller Theorem are as follows: in the perfect capital market insiders and outsiders have symmetric information; no transaction cost or bankruptcy cost exists; equity and debt choice becomes irrelevant and internal and external funds can be perfectly substituted. In the subsequent research these assumptions came under scrutiny and alternative theories emerged which suggested that capital structure might be relevant to the firm's value. The three main theories that came up subsequently are the static trade-off theory (Myers, 1984), the pecking order theory (Myers and Majluf, 1984; Myers, 1984) and the agency cost theory (Jensen and Meckling, 1976).

Most studies on capital structure attempted to answer the question "How do firms choose their capital structures?" (Marsh, 1982; Bradley,Jarrell and Kim, 1983; Jalilavand and Harriss, 1984; Titman and Wessels, 1988; Rajan and Zingales, 1995; Bevan and Danbolt, 2002; Gaud et. al., 2005, Booth et. al, 2001; Wiwattanakantang, 1999; Chen, 2004 among others). Some of these studies are on developed economies and some others are on developing economies. However, very few studies have addressed the question of the evolution of capital structure over time (Lemmon, Roberts, and Zender, 2008; Graham, Leary,

1. For an extensive review of literature on capital structure, see Harris and Raviv (1991).

and Roberts, 2015). Lemmon, et. al. (2008) show that leverage ratios exhibit convergence over time i.e. the firms with high (low) leverage tend to move toward a more moderated level of leverage. Moreover, they observe that leverage ratios remain stable across firms i.e. firms with high (low) leverage tend to maintain relatively high (low) leverage over a considerably long period of 20 years or so.

The objective of this paper is to address the question of the evolution of leverage ratio in Indian corporate firms over the period 1991-2021. This exercise will help improve our understanding of what determines heterogeneity in the capital structure of business group firms vis-a-vis the stand-alone firms as well as for the good performing vis-à-vis bad performing firms. In India business group firms dominate the corporate scene. A similar picture could be observed in South Korea before 1990 where Chaebols were the most important group of corporate firms. Studies show that high leverage of these firms had some role in the evolution of the1997 crisis there (Fattouah et. al., 2005). Hence, it can be argued that if the leverage ratio of business group firms in India remains at a relatively higher level over time, there is the risk of financial fragility. The choice of capital structure by corporate firms to some extent determines company failure, as Hunter and Isachenkova (2001, 2006) observed in the U.K. and Russia during the 1990s. Here lies the importance of this study for the policymakers.

The issue of capital structure has become very important in India, especially since the gradual initiation of the reform measures in the financial sector of India in July 1991. Financing choices of firms in India remained quite constrained till 1992. Access to the equity market was controlled by the Controller of Capital Issues which imposed severe restrictions on firms (Bhaduri, 2000). In May 1992, the Controller of Capital Issues was abolished and more freedom of access to the equity market was given to firms.

In 1994 the National Stock Exchange (NSE) was set up with nationwide stock trading and electronic display and clearing and settlement facilities. Due to the competitive pressure from the NSE, the Bombay Stock Exchange (BSE), the oldest stock exchange in India, also introduced electronic trading in 1995. Certain reform measures were initiated in the banking sector at the same time which enhanced financing by firms through debt. These reform measures include, first, the deregulation of interest rates by the banking sector. Second, some liberalization measures have been undertaken on the cash reserve ratio (CRR) and statutory liquidity ratio (SLR). Before 1991, the CRR was as high as 25 per cent and SLR was 40 percent. The CRR has come down to 4.5 percent and SLR is 18 percent at present. Third, since 1991, a number of foreign banks and private entrepreneurs have been invited to commence banking operation in India. The numbers of foreign and private banks operating in India increased from 21 and 23 in 1991 to 45 and 30 in 2023, respectively. Finally, since March 1996, uniform prudential norm was established in the lines of Basel Committee on Banking Supervision. Very few banks had a capital adequacy ratio up to 8 percent level before 1991. By March 1998 only one of the 28 public sector banks fell short of this standard (Ahluwalia, 1999). Following the reform measures there were efforts to reduce the nonperforming assets (NPA) too, which came down to 1.3 per cent by the end of 2007-08 (Government of India, 2009). NPA in public sector banks increased by about Rs. 6.2 lakh crore between March 2015 and March 2018, accounting for 20.41% of the gross advances (India Today, August 28, 2018). However, NPA in public sector banks dropped to 3.5% in March 2023.

As a result of these reform measures in the financial sector of India, the capital structures of Indian firms have changed significantly. This provides an opportunity to study the changing nature of financing decisions of Indian firms.

Previous empirical studies on capital structure regress leverage ratio on a set of determinants (e.g. size, profitability, tangibility, non-debt tax shields, growth opportunity, etc) for a single country or cross-section of countries using firm-level data. These empirical studies clearly provide several important insights. However, a severe limitation of this regression exercise is the implicit assumption that the estimated model is common to all countries. However, this may not be the case, because the institutional structures of corporate firms of the developing countries are significantly different from those of the developed countries. Therefore, an analysis of the distribution of leverage ratio across firms in a particular country would provide more useful information than the analysis of the conditional mean. A common finding of many studies is the presence of different leverage ratios for group-affiliated and stand-alone firms. Moreover, it has been argued by Fama and French (2002) that firms with high profitability should be less leveraged. To examine this latter proposition we have considered two categories of firms, viz., firms with high profitability and firms with low profitability. The analysis is conducted using data on 3547 Indian non-financial firms for the 31-year period 1991-2021 i.e. the entire post-reform period. We have also carried out separate analyses for the three decades viz., 1991-2001, 2001-2011, and 2011-2021.

Kernel density estimation techniques have been used to analyse the distribution of leverage across firms in India in detail. In particular, we are interested to see if there exists more than one peak in the distribution of leverage in India. We find that most of the estimated densities exhibit bimodal distribution (multimodality in certain cases too) while considering all firms. We also observe the existence of two separate “clubs” in all other categories of firms, viz., group-affiliated, stand-alone, good performing and bad-performing firms. We also show that there exists intra-distribution dynamics and persistence of leverage. To explain the reasons for the formation of two “clubs” in the distribution

of leverage in post-reform India, we argue that although the stock market was flourishing in India during the post-reform period, small firms did not have much access to that market due to higher informational asymmetries between insiders in these firms and the capital markets. Moreover, we observe that firms with a greater percentage of fixed assets to total assets have higher leverage because fixed assets can be used as collateral and hence taking debt would be less risky. Thus, two "clubs" with high and low leverage co-existed in the Indian corporate firms in the post-reform period, which is quite revealing. Our findings raise questions about the conventional wisdom which states that the leverage of business group firms is different from that of the stand-alone firms and that firms with high profitability should be less leveraged. Such findings arise from observing the conditional mean of leverage which is quite misleading. Our observations reveal that these average effects mask the heterogeneous effects along the distribution of leverage.

The rest of the paper is organised as follows: Section 2 discusses the literature on capital structure reflecting on different leverages for group-affiliated and stand-alone firms and good performing and bad-performing firms. Section 3 discusses the nonparametric techniques for the estimation of distribution of leverage across firms over time. Section 4 describes the data and descriptive statistics. Section 5 reports the result of the empirical analysis and section 6 concludes.

2. Review of Previous Literature

The three main theories of capital structure that emerged over time are the static trade-off theory, the pecking order theory, and the agency cost theory.

In the static trade-off theory (also referred to as the tax-based theory) a firm is viewed as setting a target debt-to-equity ratio

and gradually moving towards it (Myers, 1984). In other words, this theory assumes that some form of optimal capital structure exists that can maximize the firm value while simultaneously minimizing external claims to the cash flow stream. Such claims include bankruptcy cost, agency costs between shareholders and bondholders, and taxes. Thus a firm's target leverage is determined by the trade-off between interest tax shields of debt and the cost of financial distress.

The pecking order theory (also referred to as the information asymmetry theory), developed by Myers and Majluf (1984) and Myers (1984), argues that firms choose to finance new investment, first by internal retained earnings, then by debt, and finally by equity. There is no concept of target capital structure for a firm in the pecking order theory. The explanation provided by Myers for the pecking order theory is based on the assumption that firm insiders have more information than outsiders.

The agency cost theory (Jensen and Meckling, 1976) proposes that the optimal capital structure is determined by agency costs, which include the costs for both debt and equity issue. Thus, agency conflicts within firms have been advocated as a possible explanation for the observed variation in capital structure across firms (Jensen and Meckling 1976). Agency theory recognizes that the interests of shareholders and managers may be in conflict, which would, in turn, be reflected in the financing choice of firms. According to this theory, given the opportunity, the managers will make their choice between debt and equity in such a way that will serve their self-interest at the expense of the value maximization of firms. The source of agency costs of debt financing in Jensen and Meckling (1976) is the "asset substitution effect." This effect arises due to the conflicts between debt-holders and equity-holders when the debt contracts are such that equity-holders invest suboptimally and benefit from investing in a very risky project, even if it is value-decreasing. However, the debt-holders

bear the entire costs if the project fails. If the debt-holders correctly anticipate equity-holders' future behaviour, the cost will be borne by the equity-holders rather than the debt-holders. In this situation, the equity holders receive less for the debt than they otherwise would. This is known as the "asset substitution effect." On the other hand, according to Jensen (1986), debt has the benefit of reducing the free cash flow available to the managers so that they do not engage in consuming perquisites, thus resolving agency conflicts.

An excellent review of the literature on capital structure is presented by Harris and Raviv (1991). In this study, a comparison between the models of Jensen and Meckling (1976) and Jensen (1986) on the one hand, and those of Harris and Raviv (1990) and Stulz (1990), on the other, is presented. According to Harris and Raviv (1990), a conflict between managers and investors arises with respect to failure to liquidate the firm. In this model, the managers are assumed to want to continue the firm's current operations even if liquidation of the firm is preferred by the investors. Debt resolves this problem by giving investors the option to liquidate if cash flows are poor. The optimal capital structure in this model depends on the trade-off between improved liquidation decisions and higher investigation costs. A larger debt level improves the liquidation decision because debt makes default more likely. In the event of default, investors have to expend more resources to get additional information in this respect. Hence, a larger debt level leads to higher investigation costs. In Stulz's (1990) model, like Jensen (1986), debt payments reduce free cash flow. However, the cost of debt in this model is that debt payments may exhaust free cash flows to such an extent that there will be no more funds for profitable investment, and consequently, underinvestment. Harris and Raviv (1991) also discuss studies where optimal capital structure is determined through the reputational consideration of a firm. Studies by Diamond (1989) and Hirshleifer and Thakor (1989)

show how managers have an incentive to pursue relatively safe projects in order to maintain the reputation of the firm. In these studies, firms choose projects that assure debt repayment, and thereby, the firm builds a reputation among the investors and enjoys a lower borrowing cost. Some other studies show that managers will have incentives to avoid risk when making financing decisions so as not to increase the variance of the non-diversifiable component of their human capital (Amihud and Lev, 1981). One way in which this can be achieved is to reduce the use of debt financing as debt increases the bankruptcy risk of a firm and the corresponding job loss of the managers (Friend and Hashbrouck, 1988)

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However, the role of debt in disciplining management becomes weak in business group-affiliated firms where the ownership structure is concentrated. In such firms, debt may be used by the controlling insiders to expropriate minority shareholders rather than disciplining the management (Sarkar and Sarkar, 2008). Such expropriation takes place in group-affiliated firms due to their pyramidal ownership structure, where firms higher in the pyramid have higher ownership rights. Due to this pyramidal ownership structure, the controlling insiders tunnel resources from affiliated companies at the bottom of the pyramid to those at the top (Bertrand, Mehta, and Mullainathan, 2002). The controlling insiders in business group firms have greater control over the resources of group affiliates if the proportion of debt is higher in the capital structure of these affiliates. Therefore, by increasing debt in the capital structure relative to equity, the controlling insiders would tunnel resources from the affiliates where they have low cash flow rights to other firms where their cash flow rights are higher, and this phenomenon would finally lead to the expropriation of the minority shareholders (Sarkar and Sarkar, 2008).

Managerial insiders in the business group firms try to optimize

their own interests at the cost of the minority stockholders' interests, which takes the form of the principal-agent problem, which is slightly different from the standard agency problem in modern corporations that many scholars have so far discussed (Baumol, 2008; Jensen &Meckling, 1976). In the case of business group firms, the asymmetry of information between the majority and minority shareholders needs special analytical attention, since the former's interests merge with the managers' interests. To reduce bankruptcy risks and the risk of losing control over their firms by the family members, managers of business group affiliated firms tend to use an amount of debt that is less than optimum in the sense that it does not necessarily maximize the firm's value (Friend & Lang, 1988). High levels of managerial ownership strengthen managerial discretion, possibly leading to managerial entrenchment, which in turn reinforces managerial incentives to choose a lower leverage than optimal. Manager's preference for lower leverage for business group affiliated firms is also the result of another risk, i.e. the human capital risk (Mehran, 1992). If the firm goes bankrupt, managers' professional reputation may be damaged and hence the earning capacity. At sufficiently high levels of ownership, managers of business group affiliated firms would, therefore, prefer lower leverage as the increases in leverage could impose high cost on their human capital as well. Therefore, the financing choices of group-affiliated and stand-alone firms may be different.

The choice of capital structure may also depend on the level of performance of the firms. According to the pecking order theory (Myers, 1984), as retained earnings increase with good performance, management will choose to fund new projects with internal retained earnings instead of debt or equity. This implies that leverage and performance are negatively related. However, according to the trade-off theory, leverage and performance may have a positive relationship due to the interest tax shields of debt. Following this theory, better performance leads to a higher

debt capacity and accompanying tax shields. Therefore, there are conflicting views regarding the choice of capital structure by good performing vis-à-vis bad-performing firms.

The preceding discussion calls for an in-depth analysis of distribution dynamics for leverage for different categories of firms, viz., business group-affiliated, stand-alone, good-performing and bad-performing firms in India.

3. Methodology

We have used nonparametric techniques for the estimation of the distribution of leverage across firms over time. The nonparametric approach is a distribution-free method. In this approach, the density functions are estimated based on actual observations. Density estimation can be done by various methods. Pagan and Ullah (1999) present an exhaustive discussion of all such methods. These methods apply a smoothing technique viz. the "local averaging procedure". This technique, for a given value of X= xi, considers a small neighbourhood around xi (denoted by h, which is known as 'window width' or 'bandwidth' or smoothing parameter') and takes the average of all the corresponding observations on y. Then the resulting curve for m (x) becomes smooth. Formally, this procedure can be defined as

$m(x) = n-1\sum_{i=1}^{n} wni(x)yi$ where $\sum_{i=1}^{n} wni(x)$ denotes the weight sequence which depends on the vector $\{Xi\}i=1^{n}$. The particular method we adopt in our analysis is called the kernel smoothing. Here the observations closer to xi are given higher weights and the weight decreases as the observations lie far from xi. The shape of the weight function w_{ni} (x) is represented by a density function known as kernel function [k(u)] which adjusts the size of the weights.[k (u)] has the properties that it is a continuous, bounded, and symmetric real function that integrates to unity. Silverman (1986) and Hardle (1990) give a detailed discussion on kernel density estimators. Out of this

class of kernel estimators, we choose the Nadaraya-Watson estimator where the weight sequence is defined as:

$$w_{ni}(x) = k\left(\frac{xi - x}{h}\right) / (n-1)\sum_{i=1}^{n} k\left(\frac{xi - x}{h}\right)$$

The shape of the kernel weight is determined by the kernel function k(u), whereas the size of the weight depends upon the window-width, h. Kernel functions may be of various shapes viz., parabolic, uniform, normal, canonical etc. However, it is observed that any kernel is optimal for large samples (Pagan and Ullah, 1999)[2]. Therefore, for practical problems, the choice of kernel is not a major issue provided the sample is large enough. In our analysis, we use the Gaussian kernel. However, the choice of window-width, h, is very crucial. As h increases, variance decreases because a large number of points are used in the estimation of density. But it results in an over-smoothed density which increases the bias. Therefore, the choice of h involves a trade-off between bias and variance. The guiding principle is to choose h such that the integrated mean square error of the estimated density is minimized. It is achieved when h α (n-1)/ (4+q) where q is the number of explanatory variables[3].

We have also tested for the presence of multimodality in the distribution of leverage. We have used Silverman's test of multimodality which uses nonparametric kernel density estimation techniques to determine the most probable number of modes (Silverman, 1981). A critical bandwidth h^{crit} is defined as the smallest window-width which shows at most k modes. In other words, every bandwidth $h < h^{crit}$ generates a density function with more than k modes. This suggests that h^{crit} can be

2. For a discussion on the optimality properties of the kernel function see Hardle (1990) and Scott (1992).

3. For further details on the choice of h, see Pagan and Ullah (1999), Ullah (1989) and Hardle (1990).

used as a statistic to test the null hypothesis that f(x) has at most k modes vs. the alternative hypothesis that f(x) has more than k modes. A large value of h^{crit} indicates more than k modes and rejects the null hypothesis. The value of the critical bandwidth is computed using the STATA programme developed by Salgado-Ugarte et. al. (1997).

4. Data and Descriptive Statistics

This The data for the present analysis are obtained from PROWESS, a database provided by the Centre for Monitoring Indian Economy (CMIE). As mentioned above, we have chosen a 31-year period from 1991 to 2021, the entire post-reform period. We have also considered the decadal data for the period from 1991-2001, 2001-2011, and 2011-2021 for separate analyses. The sample is drawn from the listed firms, listed either at the Bombay Stock Exchange or the National Stock Exchange. However, the sample size is different in different years. In 1991 we have 1773 firms; in 2001, 2766; in 2011, 3227; and in 2021, 3547.Since the sample contains missing values in most years, the number of observations reported in subsequent tables may be different from the reported sample size.

We have also classified the entire sample into business group firms (BG), stand-alone firms, high-performance firms, and low-performance firms. The last two categories of firms are obtained by dividing the entire sample as above the median value of Tobin's q and below the median value of Tobin's q. For leverage, we are using two alternative measures viz., book leverage and market leverage. Book leverage is defined as the book value of total debt divided by the book value of total assets. Market leverage is defined as the book value of total debt divided by the book value of total liabilities plus the market value of total equity. We use both the measures of leverage in this study, viz. the ratio of total borrowing to asset (LEV1) and the ratio of total liability

to sum total of total liability and equity (LEV2). These measures were used in an earlier study on Indian firms by Bhaduri (2002) and Chakraborty (2013).

The mean values of LEV1 and LEV2 for all firms for the entire 31 years and for each 10 years are reported in Table 1. It appears that the mean value of LEV1 was 0.309 in the second decade (2001-2011) and it has decreased compared to the first decade (1991-2001). Again, in the third decade (2011-2021), LEV decreased more. Thus the mean value of LEV1 shows that there was a declining trend during this 31-year period. But LEV2 shows an increasing trend first, then a decreasing trend. Similar trends are observed for LEV1 and LEV2 for all other categories of firms in Tables 2-5.

Before turning to the empirical analysis of our data, we highlight a further feature of the data. The changes in average leverage hide large differences across firms. This is illustrated in Fig. 1. We have plotted the kernel density function for LEV1 and LEV2 for all firms for the years 1991, 2001, 2011, and 2021 in Fig.1. Different colours represent different years' graphs. A similar interpretation holds for Figs. 2-5 too. The leverage (LEV1) of 2021 was relatively narrowly distributed across firms because most firms' leverages were closely clustered. The decrease in leverage between 1991 and 2021 was accompanied by a decreased dispersion of leverage. As leverage decreased between 1991 and 2021, the distribution of leverage also shifted to the left. Thus, the proportion of firms with lower leverage has increased between 1991 and 2021. It is evident from Fig. 1 that there is a long right tail in all the years viz., 1991, 2001, 2011, and 2021, which indicating that a few firms are having very high LEV1 in all these years. On the other hand, very low values of LEV1 seem to be concentrated in a few firms in 2021. However, LEV2 represents the opposite picture which shows that leverage distribution has shifted towards the right direction from 1991 to

2021. A similar picture emerges for LEV1 and LEV2 distributions over time for all other categories of firms (Fig.2-Fig.5).

Table 1: Average leverage for all firms for the 31 years and for each 10-year period (for both LEV1 and LEV2)

LEV1		LEV2	
1991-2021	0.306	1991-2021	0.65
1991-2001	0.339	1991-2001	0.698
2001-2011	0.309	2001-2011	0.701
2011-2021	0.287	2011-2021	0.635

Table 2: Average leverage for BG firms for the 31 years and for each 10-year period (for both LEV1 and LEV2)

LEV1		LEV2	
1991-2021	0.319	1991-2021	0.65
1991-2001	0.374	1991-2001	0.681
2001-2011	0.327	2001-2011	0.687
2011-2021	0.277	2011-2021	0.627

Table 3: Average leverage for stand-alone firms for the 31 years and for each 10-year period (for both LEV1 and LEV2)

LEV1		LEV2	
1991-2021	0.301	1991-2021	0.66
1991-2001	0.318	1991-2001	0.711
2001-2011	0.302	2001-2011	0.713
2011-2021	0.292	2011-2021	0.639

Table 4: Average leverage for high Tobin's q firms for the 31 years and for each 10-year period (for both LEV1 and LEV2)

LEV1		LEV2	
1991-2021	0.302	1991-2021	0.436
1991-2001	0.332	1991-2001	0.467
2001-2011	0.307	2001-2011	0.481
2011-2021	0.284	2011-2021	0.422

Fig. 1: Kernel density function for LEV1 and LEV2 for all firms for 1991, 2001, 2011 and 2021

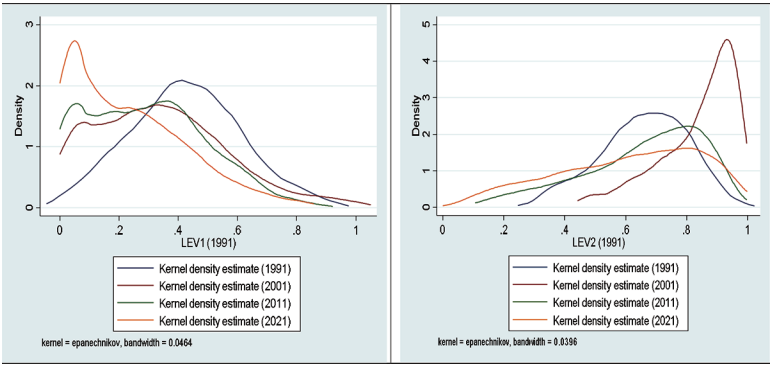


Fig. 2: Kernel density function for LEV1 and LEV2 for BG firms for 1991, 2001, 2011 and 2021

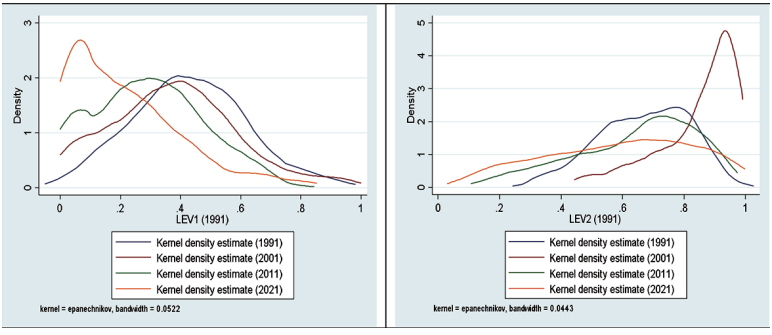


Fig. 3: Kernel density function for LEV1 and LEV2 for stand-alone firms for 1991, 2001, 2011 and 2021

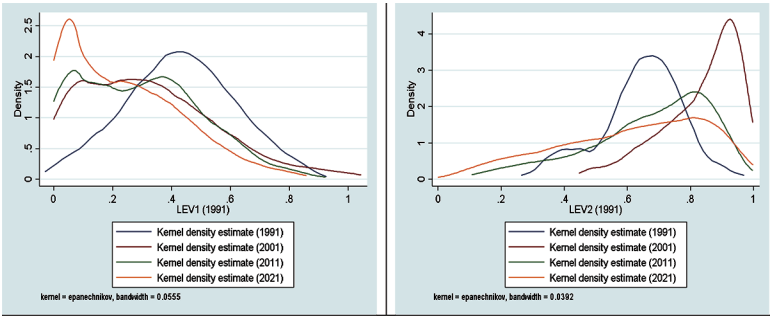


Fig. 4: Kernel density function for LEV1 and LEV2 for high Tobin's q firms for 1991, 2001, 2011 and 2021

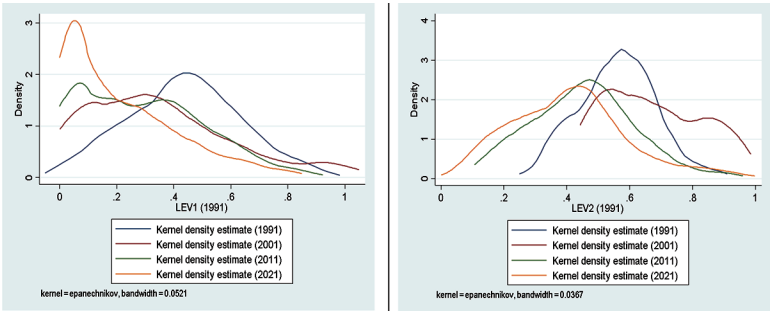
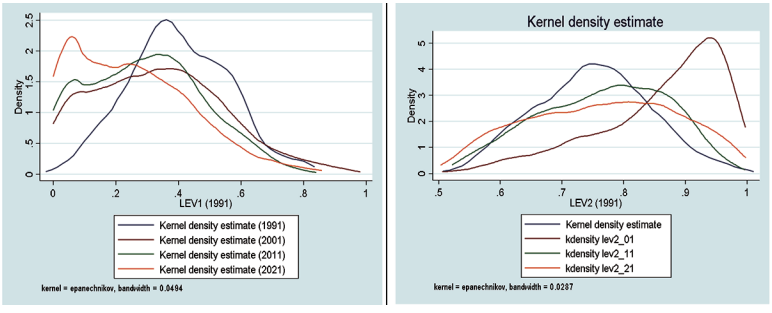


Fig. 5: Kernel density function for LEV1 and LEV2 for low Tobin's q firms for 1991, 2001, 2011 and 2021



5. Empirical Analysis

It is assumed that the leverage of a firm either remains the same or changes its relative position in the distribution of leverage over time. As leverage, we are using two alternative measures, LEV1 and LEV2, as stated earlier. The mobility matrices are used to estimate the distributional dynamics of leverage following Quah (1993). We have estimated the mobility matrix for different types of firms' viz., for all firms, for business group (BG) firms, for stand-alone firms, for high Tobin's q firms, and for low Tobin's q firms. Table 6 reports the results for the mobility matrix for all firms for the years 1991 and 2021. Table 6 considers 677 firms over the 31-year period from 1991-2021. Our objective is to understand the changing pattern of leverage relative to the

average of these 677 firms. To construct the mobility matrix, first, we take the ratio of leverage of each firm to the average leverage of all firms in 1991 and 2021. If for any particular firm, this ratio is less than or equal to 0.25, we put this firm in the category of 0.25. Similarly, firms with ratios greater than 0.25 and less than or equal to 0.5 are put in the next category 0.5. In this way, we consider nine categories, viz., 0.25, 0.5, 0.75, 1, 1.25, 1.5, 1.75, 2, 3.This classification of leverage into nine categories is done for each firm for the two-time points, viz., 1991 and 2021. Then we estimate the number of firms that move from one category to another over these 31-year periods and put these values in respective cells of Table 6 which presents the mobility matrix. The value 86 in the cell corresponding to the first column and the first row tells us that 86 firms' leverage was less than or equal to 25% of the leverage of an average of 677 firms, both in 1991 and 2021.Thus there was no change in their relative position. All the diagonal values represent the number of firms that held the same relative position in 1991 and 2021. The off-diagonal values represent the number of firms that changed their relative position over the same period. Table 6 reveals that out of 677 firms, the leverage of 414 firms has decreased during these 31-year periods i.e., moving from a higher category to a lower category. In other words, the equity share of 61.15% of firms has increased during these 31-year periods. The total number of firms on the diagonal of the mobility matrix in Table 6 is 179 i.e. only for 26% of the firms the persistence of leverage has been observed during these 31years. Similar distributional dynamics of leverage (LEV1) are observed for the other categories of firms viz. BG firms (Table 7), stand-alone firms (Table 8), high Tobin's q firms (Table 9), and low Tobin's q firms (Table 10). We have also estimated the mobility matrix for the years 2001 and 2021 for all these categories of firms and observed a similar pattern. However, we have not reported these results for the sake of brevity.

We have estimated the mobility matrix for all these categories of firms for LEV2 over the years 1991and 2021 and the results are reported in Tables 11-15. In this case, too, the distributional dynamics of LEV2 reveal a similar pattern to LEV1.

Table 6: Mobility matrix for all firms for LEV1 for 1991-2021

	All Firms									
LEV1-	LEV1-2021									
1991	0.25	0.5	0.75	1	1.25	1.5	1.75	2	3	Total
0.25	86	16	10	1	0	0	0	0	3	116
0.5	205	79	14	5	4	1	2	2	7	319
0.75	109	52	12	7	1	1	2	1	4	189
1	19	9	1	2	0	0	1	0	0	32
1.25	5	3	1	1	0	1	0	0	0	11
1.5	1	1	0	0	1	0	0	0	1	4
1.75	1	1	0	0	0	0	0	0	0	2
3	1	3	0	0	0	0	0	0	0	4
Total	427	164	38	16	6	3	5	3	15	677

Table 7: Mobility matrix for BG firms for LEV1 for 1991-2021

	Business Group Firms								
LEV1-	LEV1-2021								
1991	0.25	0.5	0.75	1	1.25	1.5	1.75	3	Total
0.25	42	8	4	1	0	0	0	2	57
0.5	121	44	7	3	2	1	2	3	183
0.75	64	31	6	5	0	1	2	0	109
1	11	4	0	2	0	0	0	0	17
1.25	2	1	1	1	0	0	0	0	5
1.5	1	0	0	0	1	0	0	0	2
3	0	3	0	0	0	0	0	0	3
Total	241	91	18	12	3	2	4	5	376

Table 8: Mobility matrix for stand-alone firms for LEV1 for 1991-2021

1991	2021									
	0.25	0.5	0.75	1	1.25	1.5	1.75	2	3	Total
0.25	37	5	5	0	0	0	0	0	1	48
0.5	73	29	7	2	2	0	0	2	4	119
0.75	42	19	6	2	0	0	0	0	4	73
1	6	5	0	0	0	0	1	0	0	12
1.25	3	2	0	0	0	1	0	0	0	6
1.5	0	1	0	0	0	0	0	0	1	2
1.75	1	1	0	0	0	0	0	0	0	2
Total	162	62	18	4	2	1	1	2	10	262

Table 9: Mobility matrix for High Tobin's q firm for LEV1 for 1991-2021

	High Tobin Q Firms									
LEV1 -1991	LEV1-2021									
	0.25	0.5	0.75	1	1.25	1.5	1.75	2	3	Total
0.25	29	5	1	1	0	0	0	0	3	39
0.5	81	10	6	2	3	1	0	1	3	107
0.75	40	11	1	1	1	0	2	1	4	61
1	9	4	1	1	0	0	1	0	0	16
1.25	2	2	0	1	0	1	0	0	0	6
1.5	0	0	0	0	1	0	0	0	1	2
1.75	1	0	0	0	0	0	0	0	0	1
3	1	2	0	0	0	0	0	0	0	3
Total	163	34	9	6	5	2	3	2	11	235

Table 10: Mobility matrix for Low Tobin's q firm for LEV1 for 1991-2021

Low Tobin Q Firms					
LEV1-1991	LEV1-2021				
	0.25	0.5	0.75	1	Total
0.25	14	2	1	0	17
0.5	29	22	3	1	55
0.75	18	12	0	1	31
1	1	1	0	1	3
Total	62	37	4	3	106

Table 11: Mobility matrix for all firms for LEV2 for 1991-2021

1991	2021				
	0.25	0.5	0.75	1	Total
0.25	1	0	1	0	2
0.5	22	18	18	7	65
0.75	27	71	65	50	213
1	10	24	39	45	118
Total	60	113	123	102	398

Table 12: Mobility Matrix for Business Group Firms for LEV2 for 1991-2021

1991	2021				
	0.25	0.5	0.75	1	Total
0.25	0	0	1	0	1
0.5	10	8	10	7	35
0.75	20	41	42	22	125
1	5	13	29	38	85
Total	35	62	82	67	246

Table 13: Mobility Matrix for Standalone Firms for LEV 2 for 1991-2021

1991	2021				
	0.25	0.5	0.75	1	Total
0.25	1	0	0	0	1
0.5	11	9	7	0	27
0.75	7	28	21	27	83
1	5	11	10	7	33
Total	24	48	38	34	144

Table 14: Mobility Matrix for High Tobin Q Firms for LEV2 for 1991-2021

1991	2021				
	0.25	0.5	0.75	1	Total
0.25	1	0	0	0	1
0.5	22	18	2	1	43
0.75	15	41	8	1	65
1	2	4	0	3	9
Total	40	63	10	5	118

Table 15: Mobility Matrix for Low Tobin Q Firms for LEV2 for 1991-2021

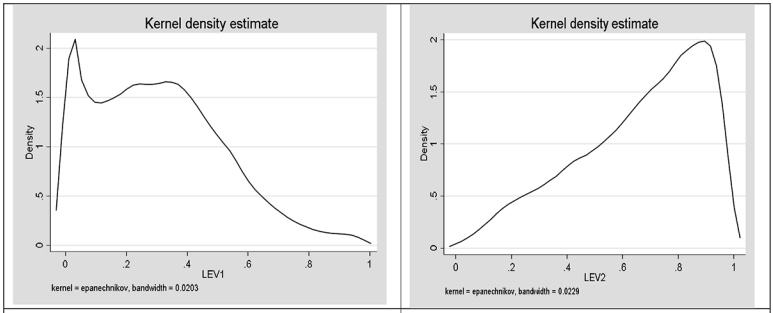
1991	2021		
	0.75	1	Total
0.75	25	20	45
1	25	36	61
Total	50	56	106

Fig. 6 displays the kernel densities for LEV1 and LEV2 for all firms during the 31-year periods, 1991-2021. It suggests a bimodal distribution for LEV1 only. The first local maximum is at 0.6 for LEV1 and the second mode is at 3.9. The density shows that there are

more firms in the club with low leverage than there are in the club with high leverage. This figure leads us to believe that there is a 'twin peak' formation in the distribution of leverage (LEV1) among the Indian firms during these 31-year periods. Bimodal distribution of LEV1 is observed when we consider decadal data from 1991-2001, 2001-2011, and 2011-2021 (Fig.7). From Fig. 7 it appears that the dominant mode decreased from a value of 3.9 to 0.6 during the second decade (2001-2011) compared to the first (1991-2001). During the third decade (2011-2021) again the dominant mode remained at 0.6 as before. Moreover, the distance between the peaks has decreased substantially over the decades, with the right mode becoming less prominent over time. These observations suggest that firms that had high leverage during the initial years after economic reforms do not seem to remain at the level of high leverage after three decades of reforms. It had been possible because of the liberalization of the stock market in India which encouraged the firms to move to equity financing more. Bimodal distribution of LEV1 is observed for BG firms (Fig.8& 9), for stand-alone firms (Fig.10&11), for high Tobin's q firms (Fig.12 &13), and low Tobin's q firms (Fig.14 &15). Similar pattern in the distribution of leverage (LEV1) is observed in the decadal data for all these groups of firms too. Hence, choice of financing of firms has been moved towards equity financing by a large section of firms, since the implementation of economic reforms in India, for all types of firms such as BG firms, stand-alone firms, good- performing and bad-performing firms. So this is not specific to any particular type of firm. It is a general phenomenon. With the presence of bimodal distribution, we confirm that both low-leverage and high-leverage co-exist in all these categories of firms. Prior studies show that BG firms have lower leverage than stand-alone firms since the managers of BG firms seem to prefer equity as high leverage increases bankruptcy risk (Chakraborty, 2013). This is also because that high leverage forces the firms to cut capital requirements and R&D investments, to service debt payments, which will damage the long-run efficiency and competitive position of the BG firms. But from our analysis, we observe that both high and low leverages are

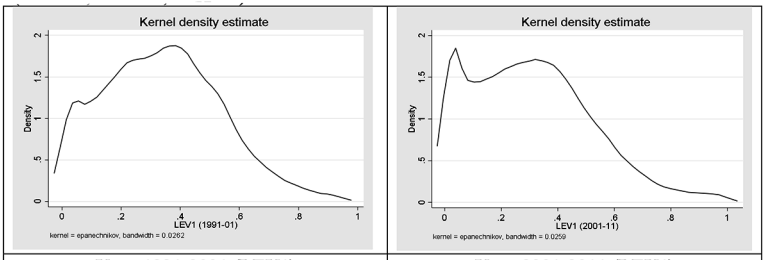
coexisting in India in all categories of firms after economic reforms, which is a novel finding. These findings suggest that focussing on the average leverage of firms suppresses the cross-section dynamics which reveals a richer picture to investigate. However, LEV2 reveals only unimodal distribution. Therefore, the nature of the distribution of leverage is sensitive to the definition of leverage.

Fig.6: Kernel Density for LEV1 and LEV2 for all firms using 30 years data (1991-2021)

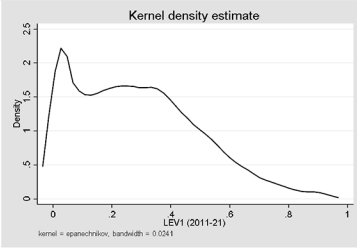


LEV1 | LEV2

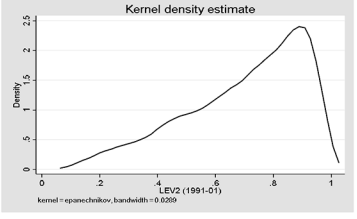
Fig.7: Kernel Density for LEV1 and LEV2 for all firms using data for each decade (1991-01; 2001-11; 2011-21)



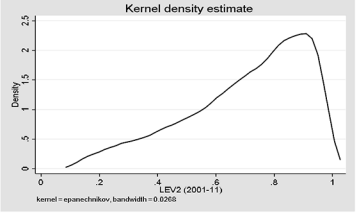
Year 1991-2001 (LEV1) | **Year 2001-2011 (LEV1)**



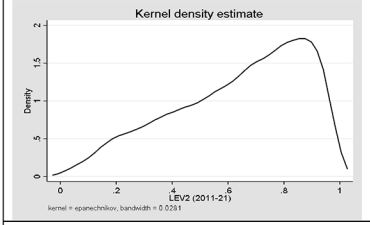
Year 2011-21 (LEV1)



Year 1991-2001 (LEV2)

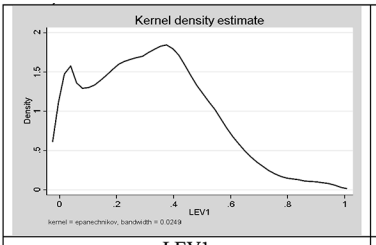


Year 2001-2011 (LEV2)

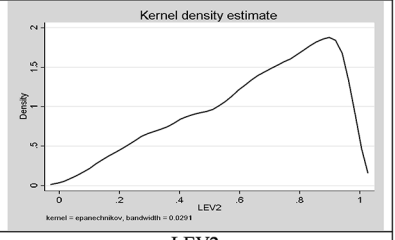


Year 2011-21 (LEV2)

Fig.8: Kernel Density for LEV1 and LEV2 for BG firms using 30 years of data (1991-2021)

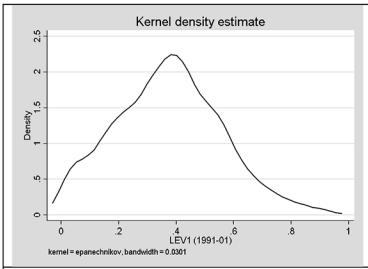


LEV1

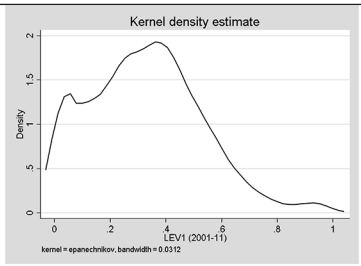


LEV2

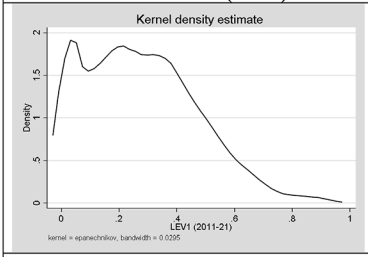
Fig.9: Kernel Density for LEV1 and LEV2 for BG firms using data for each decade (1991-01; 2001-11; 2011-21)



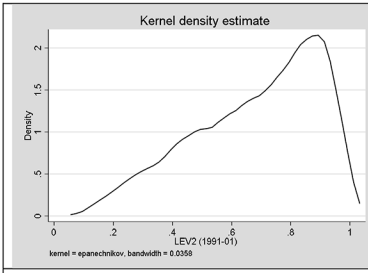
Year 1991-2001 (LEV1)



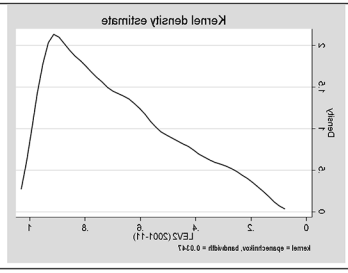
Year 2001-2011 (LEV1)



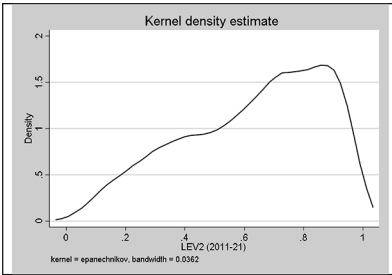
Year 2011-21 (LEV1)



Year 1991-2001 (LEV2)

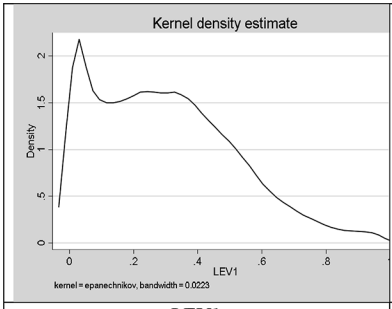


Year 2001-2011 (LEV2)

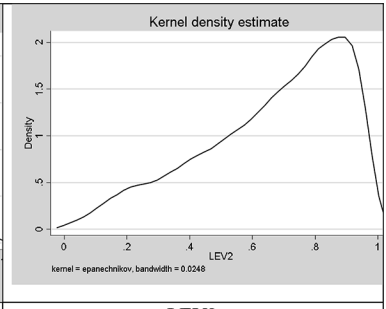


Year 2011-21 (LEV2)

Fig.10: Kernel Density for LEV1 and LEV2 for stand-alone firms using 30 years of data (1991-2021)

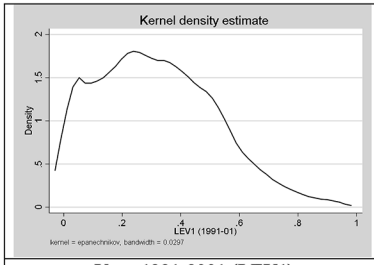


LEV1

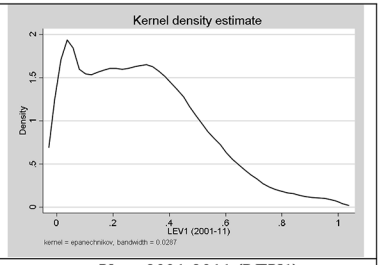


LEV2

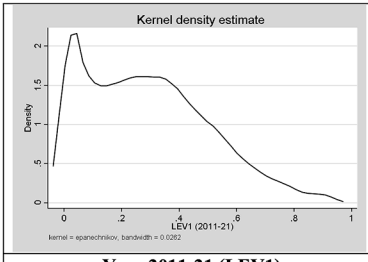
Fig. 11: Kernel Density for LEV1 and LEV2 for stand-alone firms using data for each decade (1991-01; 2001-11; 2011-21)



Year 1991-2001 (LEV1)



Year 2001-2011 (LEV1)



Year 2011-21 (LEV1)

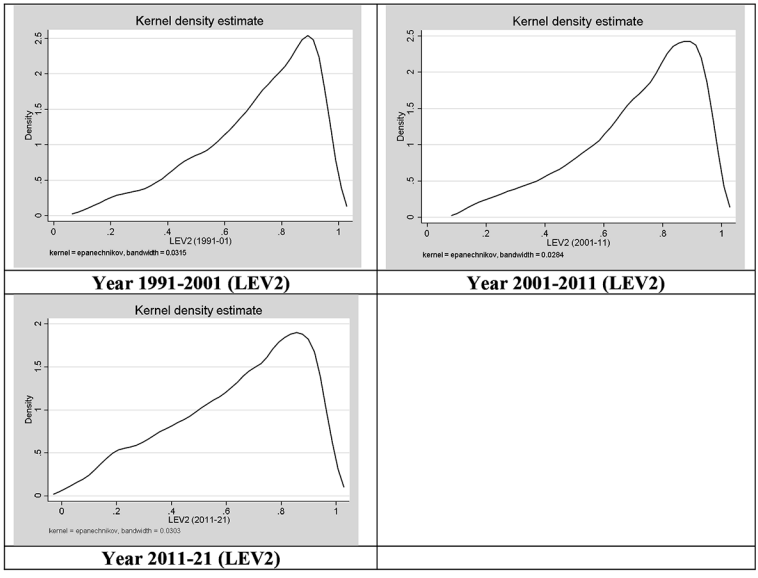


Fig. 12: Kernel Density for LEV1 and LEV2 for high Tobin's q firms using 30 years of data (1991-2021)

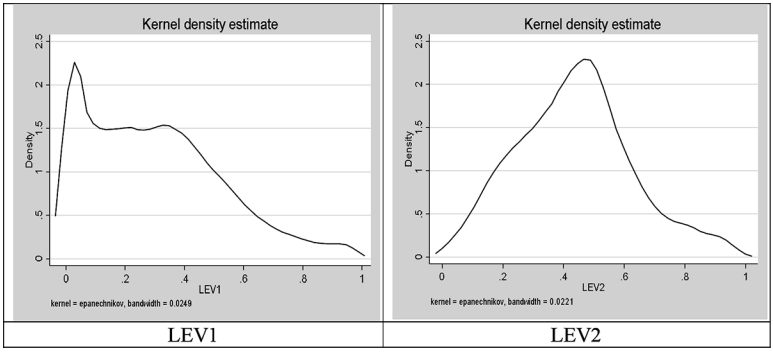
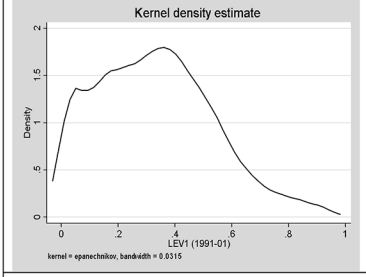
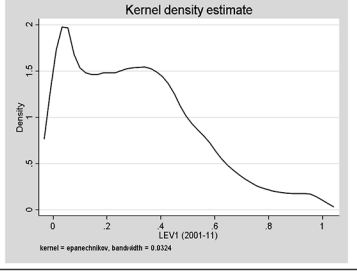


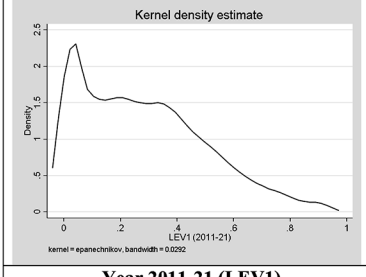
Fig. 13: Kernel Density for LEV1 and LEV2 for high Tobin's q firms using data for each decade (1991-01; 2001-11; 2011-21)



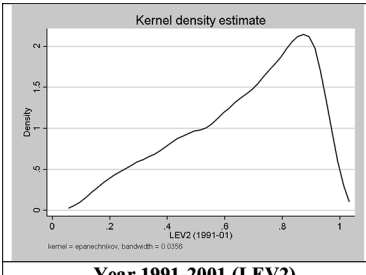
Year 1991-2001 (LEV1)



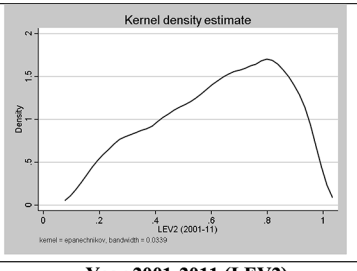
Year 2001-2011 (LEV1)



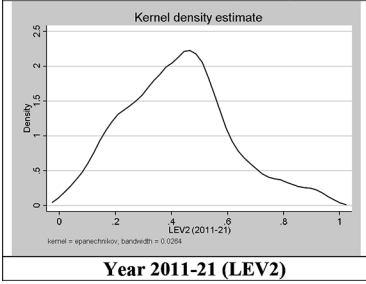
Year 2011-21 (LEV1)



Year 1991-2001 (LEV2)

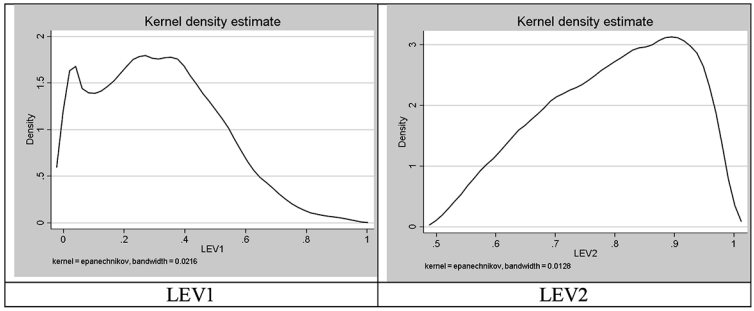


Year 2001-2011 (LEV2)



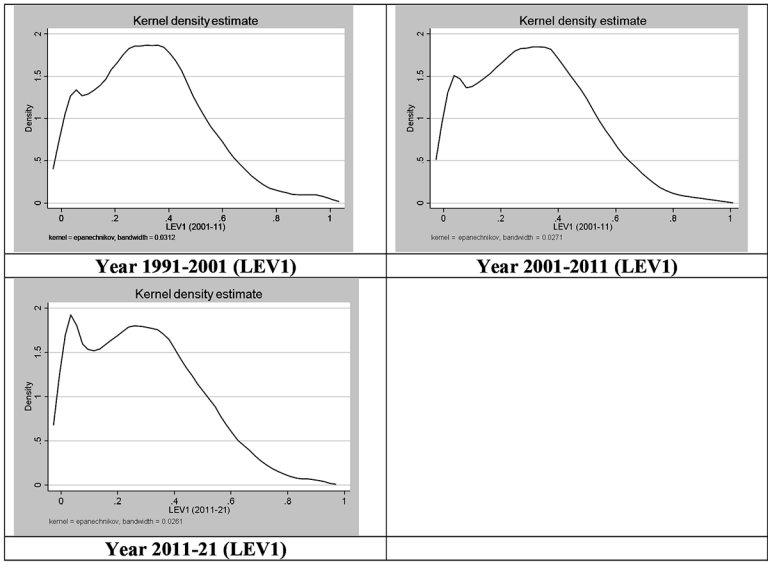
Year 2011-21 (LEV2)

Fig. 14: Kernel Density for LEV1 and LEV2 for low Tobin's q firms using 30 years of data (1991-2021)



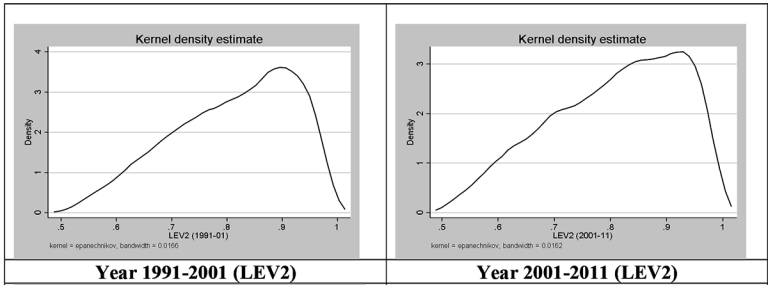
LEV1 | LEV2

Fig. 15: Kernel Density for LEV1 and LEV2 for low Tobin's q firms using data for each decade (1991-01; 2001-11; 2011-21)

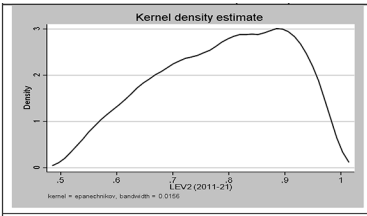


Year 1991-2001 (LEV1) | **Year 2001-2011 (LEV1)**

Year 2011-21 (LEV1)



Year 1991-2001 (LEV2) | **Year 2001-2011 (LEV2)**



Year 2011-21 (LEV2)

Although the above figures indicate the presence of bimodality in the distribution of LEV1, they do not establish bimodality unless the appropriate statistical test of the hypothesis about multimodality is performed. For this purpose, we are reporting the Silverman's test for multimodality (Silverman, 1981) along with critical bandwidth. We perform the Silverman's test for each year from 1991-2021, with the null hypothesis that there are one, two, three, four, and five modes. The results are displayed in Tables 16-20. From Table 16 we find that during the period from 1991 to 2021, we are unable to accept the null hypothesis of uni-modality in all 31 cases for LEV1, while considering all firms. Out of these 31 cases, there were bi-modality in 14 cases (from 1991 to 2003 and 2015) and the presence of 3 modes in 17 cases (from 2004 to 2014 and from 2016 to 2021). Similarly, for LEV2, there is bi-modality for most of the cases. A similar interpretation holds for the other tables. It appears that 2 or more modes are there for LEV1 for the majority of the cases for all these different groups of firms' viz., BG firms, stand-alone firms, high Tobin's q firms, and low Tobin's q firms. For LEV2 also 2 or more modes are present in most of the cases. Therefore, Silverman's tests reveal the presence of multimodality in many cases, apart from bi-modality in some cases, for both LEV1 and LEV2 during the 31-year periods from 1991-2021 in the Indian corporate firms.

Table 16: Silverman's Test for All Firms for LEV1 and LEV2

	All Firms: LEV1			All Firms; LEV2	
Year	Critical Bandwidth	Modes	Year	Critical Bandwidth	Modes
1991	0.044	2	1991	0.041	2
1992	0.044	2	1992	0.043	2
1993	0.042	2	1993	0.042	2
1994	0.04	2	1994	0.044	2
1995	0.037	2	1995	0.033	2
1996	0.037	2	1996	0.031	2
1997	0.038	2	1997	0.028	2
1998	0.04	2	1998	0.026	2
1999	0.042	2	1999	0.028	2
2000	0.042	2	2000	0.038	3
2001	0.044	2	2001	0.029	3
2002	0.042	2	2002	0.030	3
2003	0.042	2	2003	0.027	3
2004	0.042	3	2004	0.036	3
2005	0.041	3	2005	0.039	2
2006	0.04	3	2006	0.043	2
2007	0.041	3	2007	0.041	2
2008	0.04	3	2008	0.041	2
2009	0.04	3	2009	0.032	2
2010	0.04	3	2010	0.040	2
2011	0.039	3	2011	0.040	2
2012	0.039	3	2012	0.041	2
2013	0.039	3	2013	0.041	2
2014	0.039	3	2014	0.044	2
2015	0.039	2	2015	0.047	2
2016	0.039	3	2016	0.045	2
2017	0.039	3	2017	0.044	2
2018	0.039	3	2018	0.042	2
2019	0.039	3	2019	0.042	2
2020	0.037	3	2020	0.041	2
2021	0.038	3	2021	0.043	2

Table 17: Silverman's Test for Business Group Firms for LEV1 and LEV2

Business Group Firms: LEV1			Business Group Firms: LEV2		
Year	Critical Bandwidth	Modes	Year	Critical Bandwidth	Modes
1991	0.049	2	1991	0.045	2
1992	0.048	2	1992	0.047	2
1993	0.048	2	1993	0.046	2
1994	0.047	2	1994	0.051	2
1995	0.045	2	1995	0.042	2
1996	0.043	2	1996	0.044	2
1997	0.044	2	1997	0.036	2
1998	0.046	2	1998	0.033	2
1999	0.050	2	1999	0.040	2
2000	0.050	1	2000	0.046	3
2001	0.052	1	2001	0.037	3
2002	0.050	1	2002	0.038	3
2003	0.050	1	2003	0.035	3
2004	0.051	1	2004	0.051	3
2005	0.048	2	2005	0.048	2
2006	0.047	2	2006	0.053	2
2007	0.048	2	2007	0.054	2
2008	0.048	2	2008	0.053	2
2009	0.049	2	2009	0.041	2
2010	0.049	2	2010	0.050	2
2011	0.047	2	2011	0.051	2
2012	0.046	2	2012	0.052	2
2013	0.046	2	2013	0.053	2
2014	0.047	2	2014	0.055	2
2015	0.048	2	2015	0.059	1
2016	0.048	2	2016	0.057	1
2017	0.046	2	2017	0.056	1
2018	0.046	3	2018	0.057	1
2019	0.046	3	2019	0.058	1
2020	0.045	3	2020	0.055	1
2021	0.047	3	2021	0.059	1

Table 18: Silverman's Test for Stand-alone Firms for LEV1 and LEV2

Stand-alone Firms: LEV1			Stand-alone Firms: LEV2		
Year	Critical Bandwidth	Modes	Year	Critical Bandwidth	Modes
1991	0.054	1	1991	0.041	3
1992	0.053	1	1992	0.054	3
1993	0.050	1	1993	0.053	3
1994	0.046	1	1994	0.051	3
1995	0.041	2	1995	0.036	2
1996	0.041	2	1996	0.03	2
1997	0.042	2	1997	0.03	2
1998	0.045	2	1998	0.026	2
1999	0.047	2	1999	0.03	2
2000	0.047	2	2000	0.041	3
2001	0.048	2	2001	0.032	3
2002	0.047	2	2002	0.032	3
2003	0.047	2	2003	0.028	3
2004	0.047	2	2004	0.035	3
2005	0.045	2	2005	0.044	1
2006	0.044	2	2006	0.047	1
2007	0.044	2	2007	0.044	1
2008	0.047	2	2008	0.043	1
2009	0.044	2	2009	0.033	2
2010	0.043	3	2010	0.042	2
2011	0.042	3	2011	0.043	2
2012	0.043	3	2012	0.044	2
2013	0.043	3	2013	0.044	2
2014	0.043	3	2014	0.049	2
2015	0.042	3	2015	0.052	2
2016	0.042	3	2016	0.049	2
2017	0.042	3	2017	0.048	2
2018	0.042	2	2018	0.045	2
2019	0.040	2	2019	0.044	2
2020	0.040	2	2020	0.043	2
2021	0.041	2	2021	0.045	1

Table 19: Silverman's Test for High Tobin's q Firms for LEV1 and LEV2

High Tobin-Q Firms: LEV1			High Tobin-Q Firms: LEV2		
Year	Critical Bandwidth	Modes	Year	Critical Bandwidth	Modes
1991	0.051	2	1991	0.041	1
1992	0.043	2	1992	0.036	1
1993	0.048	2	1993	0.042	1
1994	0.043	2	1994	0.038	1
1995	0.041	2	1995	0.028	1
1996	0.05	2	1996	0.041	1
1997	0.054	2	1997	0.042	1
1998	0.056	2	1998	0.056	1
1999	0.056	2	1999	0.068	1
2000	0.057	1	2000	0.06	1
2001	0.06	1	2001	0.065	1
2002	0.057	1	2002	0.067	1
2003	0.056	1	2003	0.068	1
2004	0.054	1	2004	0.059	1
2005	0.049	1	2005	0.039	1
2006	0.046	1	2006	0.041	1
2007	0.048	1	2007	0.04	1
2008	0.048	1	2008	0.037	1
2009	0.054	1	2009	0.053	1
2010	0.049	2	2010	0.042	1
2011	0.049	2	2011	0.041	1
2012	0.05	2	2012	0.046	1
2013	0.051	2	2013	0.049	1
2014	0.05	2	2014	0.049	1
2015	0.047	2	2015	0.045	1
2016	0.046	2	2016	0.042	1
2017	0.044	2	2017	0.037	1
2018	0.044	2	2018	0.036	1
2019	0.045	2	2019	0.036	1
2020	0.051	2	2020	0.045	1
2021	0.047	2	2021	0.04	1

Table 20: Silverman's Test for Low Tobin's q Firms for LEV1 and LEV2

Low Tobin-Q Firms: LEV1			Low Tobin-Q Firms: LEV2		
Year	Critical Bandwidth	Modes	Year	Critical Bandwidth	Modes
11991	0.047	1	1991	0.028	4
1992	0.06	1	1992	0.042	2
1993	0.047	1	1993	0.024	4
1994	0.051	2	1994	0.025	4
1995	0.044	2	1995	0.023	4
1996	0.038	2	1996	0.02	4
1997	0.039	2	1997	0.02	8
1998	0.041	2	1998	0.018	8
1999	0.043	2	1999	0.02	8
2000	0.043	3	2000	0.022	8
2001	0.045	3	2001	0.021	8
2002	0.043	3	2002	0.021	7
2003	0.044	3	2003	0.021	6
2004	0.045	3	2004	0.023	6
2005	0.043	2	2005	0.024	5
2006	0.043	3	2006	0.024	5
2007	0.042	2	2007	0.022	5
2008	0.042	2	2008	0.023	5
2009	0.04	2	2009	0.022	5
2010	0.042	3	2010	0.023	4
2011	0.04	3	2011	0.022	4
2012	0.04	3	2012	0.023	4
2013	0.04	3	2013	0.022	4
2014	0.041	3	2014	0.023	5
2015	0.042	3	2015	0.025	5
2016	0.043	3	2016	0.025	4
2017	0.044	3	2017	0.026	4
2018	0.043	3	2018	0.026	5
2019	0.04	3	2019	0.025	5
2020	0.037	3	2020	0.024	5
2021	0.04	3	2021	0.025	4

Allen et. al. (2012) show that the major sources of finance for listed firms in India were internal sources, equity, and finally debt during 1990-91 to 2003-04. But analysing 31-year data during the post-reform period, we observe that in the distribution of leverage, there is bi-modality (or multimodality in certain cases), which supports the presence of “twin peaks”. It indicates that a straightforward conclusion cannot be drawn regarding the behavioural dynamics of leverage. Our findings question the conclusions drawn by Allen et. al. (2012). Within each group of firms, the formation of two “clubs” is observed: one club with low leverage and the other with high leverage. This is true not only for all listed firms in our sample but also for business group-affiliated firms, stand-alone firms, good-performing firms, and bad-performing firms. Thus the commonplace observation that one group of firms has higher leverage than the other, does not hold good for the Indian corporate firms. Therefore, each category of firms has a mixed group viz., one group goes for more equity financing while the other group prefers debt financing. We argue that the latter group consists of small firms that have limited access to the stock market. Our conjecture is supported by Figs. 16 and 19 which show a negatively sloped fitted line for the relationship between leverage (LEV1) and firm size, measured by log sales, for the years 1991 and 2021. As the argument goes, informational asymmetries between insiders in a firm and the capital markets are higher for small firms (Harris and Raviv, 1991). It has been observed by several studies that information disclosure is higher by large firms as compared to smaller firms (Fama and Jensen, 1983; Rajan and Zingales, 1995). Larger firms are required to submit information to the stock exchange and are monitored by financial analysts regularly, whereas small firms only report an annual statement once a year and are rarely monitored by analysts. Credit rating agencies also monitor the solvency of large firms and reduce information asymmetries between the firm and outside investors (Gonzalez et. al., 2011). The negative relationship between size and leverage has been

supported by several studies which include Titman and Wessels (1988), Erickson and Trevino (1994), Rajan and Zingales (1995), Bevan and Danbolt (2002), Fama and French (2002), Lemmon and Zender (2004), Faulkender and Petersen (2006), Delcoure (2007) and Handoo and Sharma (2014), among others. Thus, although the stock market was flourishing in India during the post-reform period, a section of corporate firms did not have much access to that market. Loans from banks and financial institutions are the source of finance for this group of firms. Our findings suggest that access to the stock market is largely limited to the relatively larger firms in all categories of firms studied in this analysis. Limited access to the stock market by relatively smaller firms is partly due to the weak regulatory framework for the operation of the stock market which fails to disclose effective information to the investors.

Many studies observe that the leverage of business group firms is different from that of stand-alone firms (Chakraborty, 2013; Manos et. al., 2007; Wang et. al., 2019 among others). However, such an observation regarding the conditional mean of leverage is misleading. These studies estimate the average effect which might mask the heterogeneous effects along the distribution of leverage. We observe that both business group-affiliated firms and stand-alone firms have “twin peaks” in leverage distribution during the post-reform India, which is quite revealing. Similarly, our finding that good-performing firms and bad- performing firms both have “twin peaks” in leverage distribution raises questions about the proposition of Fama and French (2002).

Fig. 16: Relationship between leverage and firm size in 1991 for all firms

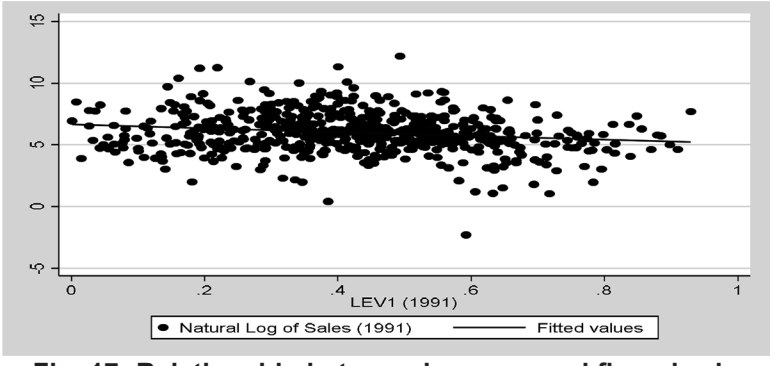


Fig. 17: Relationship between leverage and firm size in 2001 for all firms

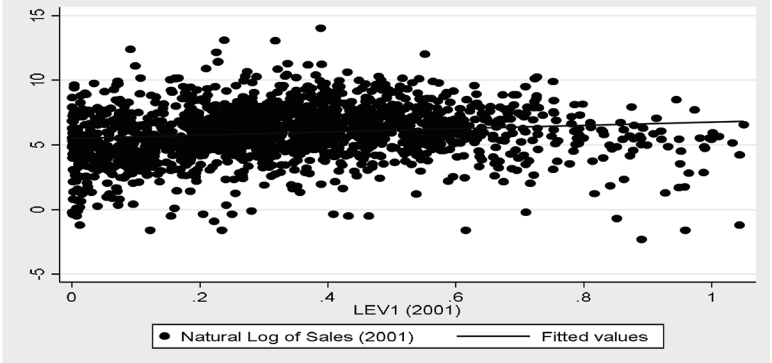


Fig. 18: Relationship between leverage and firm size in 2011 for all firms

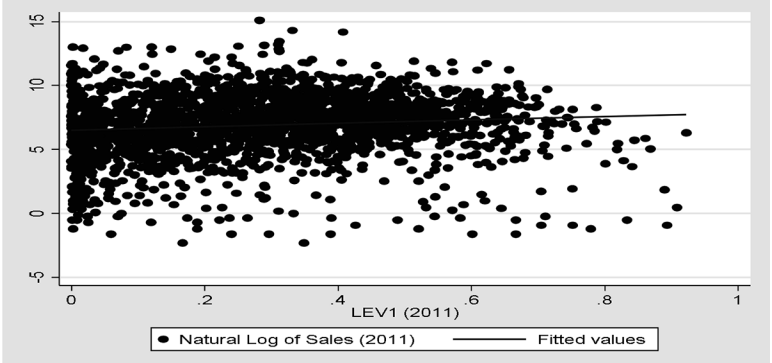


Fig. 19: Relationship between leverage and firm size in 2021 for all firms

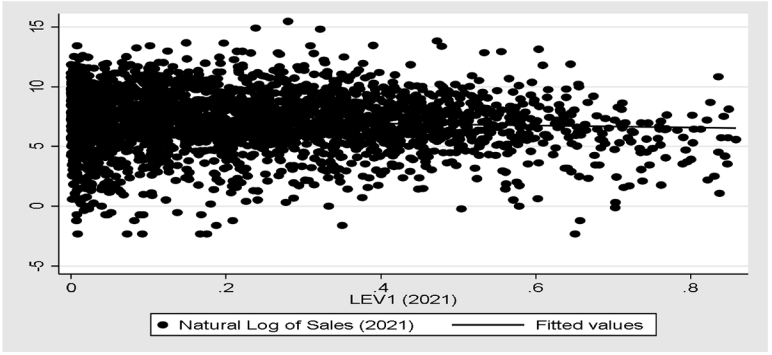


Table 21: Classification of firms according to leverage and % of net fixed assets to total assets for all firms

Leverage level	Net fixed asset as a percentage of total fixed asset							
	1991		2001		2011		2021	
	mean	median	mean	median	mean	median	mean	median
LEV1								
Low	28.11	26.10	32.09	30.81	27.20	22.75	22.48	18.70
High	40.89	39.16	43.85	43.32	34.01	33.73	29.58	28.18
LEV2								
Low	36.92	33.04	36.05	34.53	27.01	24.00	23.59	20.40
High	35.84	33.98	41.04	40.00	31.79	31.04	26.47	23.70

It has been argued that firms with a higher percentage of fixed assets to total assets should have a lower risk of financial distress because fixed assets can be used as collateral and hence taking debt would be less risky (Titman and Wessels, 1988; Mishra and McConoughy, 1999). This is because the tangible assets constitute collateral for the debt in case of bankruptcy. We get support for this proposition from our data. Table 21 shows that both the mean and median values of the percentage of net fixed assets to total assets were higher for high-leverage firms for all the years viz., 1991, 2001, 2011, and 2021 for both the measures of leverage viz. LEV1 and LEV2[4]. These are some

4. Firms having leverage higher than or equal to the median value of leverage is categorised as high-leverage firms, The opposite is true for low-leverage firms.

of the explanations we provide for the formation of “clubs” in the distribution of leverage in Indian corporate firms during the post-reform period.

We have already stated that NPAs in Indian public sector banks increased largely during 2015-2018, which raised serious concerns over bank profitability and financial stability. The problem of deteriorating NPAs was particularly aggravated by a weak bankruptcy law. To address the problem of burgeoning NPAs and other structural inefficiencies (especially with non-bank financial institutions), the government has introduced the Insolvency and Bankruptcy Code 2016 (IBC-2016). The law aims at strengthening the bargaining position of creditors and thus shifting the pendulum away from borrowers to the creditors in the process of liquidation[5]. Some recent work established a relationship between higher creditor protection and lower bad loans and showed that the former forces underperforming borrowers to behave efficiently to avoid bankruptcy (Nini, Smith, and Sufi, 2012).

Strong creditor rights discourage borrowers from defaulting through the threat of liquidation. Even in case of defaults, lenders can easily seize and liquidate collateral to recover their dues through the application of strong creditor rights. Thus strengthening of creditor rights leads to a higher supply of credit (e.g. La Porta et al, 1998; Djankov et al, 2007) which is accompanied by a decrease in interest rates and collateral requirements (Quian and Strahan, 2007; Davydanko and Franks, 2008; Arajua et. al, 2012 among others). However, the effect of strengthening creditor rights on credit demand is rather complicated and is determined by two opposing effects

5. Under IBC, a creditor with just 1 lakh default can roll the company into liquidation. The IBC provides a 180-time frame for recovering insolvent firms with creditors enjoying the discretion of whether to restructure the loan or sell the firm’s assets to recover the amount.

viz. income effect and substitution effect (Vig, 2013). Decreases in interest rates and collateral requirements increase the debt capacity of borrowers due to the income effect, which leads to higher credit demand. On the other hand, the substitution effect suggests that strengthening creditor rights increases the threat of liquidation from lenders which in turn increases the expected deadweight costs of bankruptcy (Hart and Moore, 1994). Hence, the borrowers move from debt to other instruments which pose a low risk of liquidation, resulting in decreased credit demand (Rajan and Zingales, 1995; Acharya et. al., 2011). Therefore, the effect of the strength of creditor rights on leverage depends on whether the income effect or the substitution effect dominates in a given country. We observe from our findings in Tables 1-5 that leverage decreased substantially during the period 2011-2021. We argue that this decrease in leverage was partly due to the substitution effect which was operating after the implementation of IBC -2016. Our findings also corroborate Vig (2013) which shows that leverage decreased after IBC-2016 in India.

6. Conclusion

This paper investigates the evolution of leverage ratio in Indian corporate firms over the 31-year period from 1991 to 2021 i.e. the entire post-reform period. In this study, we use kernel density estimation techniques to analyse the distribution of leverage across firms in India in detail. In particular, we are interested to see if there exists more than one peak in the distribution of leverage in India considering all firms. We find that most of the estimated densities exhibit bimodal distribution (multimodality in certain cases too) while considering all firms. We also observe the existence of two separate 'clubs' in all other categories of firms, viz., group-affiliated, stand-alone, good-performing, and bad-performing firms. Bimodal distribution was observed when we considered decadal data from 1991-2001, 2001-2011, and 2011-2021 for all categories of firms. We also show that there exists intra-distribution dynamics and the persistence of leverage.

To explain the reasons for the formation of two “clubs” in the distribution of leverage in post-reform India, we argue that although the stock market was flourishing in India during the post-reform period, small firms did not have much access to that market due to higher informational asymmetries between insiders in these firms and the capital markets. Moreover, we observe that firms with a higher percentage of fixed assets to total assets have higher leverage because fixed assets can be used as collateral and hence taking debt would be less risky. Thus, two “clubs” with high and low leverage co-existed in the Indian corporate firms in the post-reform period, which is quite revealing. Our findings raise questions about the conventional wisdom which states that the leverage of business group firms is different from that of the stand-alone firms and that firms with high profitability should be less leveraged. Such findings arise from observing the conditional mean of leverage which is quite misleading. Our observations reveal that these average effects mask the heterogeneous effects along the distribution of leverage.

Our findings have several policy implications for the managers of the companies and the regulators of the Indian stock markets. The findings of this study substantiate that institutional factors, such as capital market regulations, firm size and financial risk, affect the financing policy of Indian companies. With the fluctuation in the interest rates and stock markets growing in recent years in India, this study will be helpful for Indian corporate firms to determine what factors should be relevant for them to make financing decisions.

Our study contributes to emerging market finance research in several ways. First, we extend the empirical research on the capital structure by incorporating the approach of distribution dynamics following Quah (1993, 1996, 1997, 2001), which helps us to uncover empirical phenomena such as persistence and

the formation of “clubs”. Second, our study implies that the policymakers should focus on developing a strong regulatory framework for the operation of the Indian stock markets so that effective information is disclosed to the investors and small firms could also have greater access to the stock markets. Finally, this study contributes to the existing literature with its insights on both capital structure decisions and their evolution over time for Indian firms over the last three decades.

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