CAPITAL STRUCTURE BEHAVIOUR: ANALYSIS OF SIX DECADES WITH SPECIAL REFERENCE TO TATA STEEL

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Abstract

Capital structure has remained an area of financial quest over a period of time. Different theories have been developed over a period of time. Some of the theories are found to be contradicting to each other. This paper attempts to examine the behaviour of capital structure over a period of 59 years from 1956 – 2014 taking various indicators like, debt to net worth ratio, each source of finance to total capital, each source of finance to net block and the increment in each source of finance to incremental gross block for Tata steel which is having the global presence

Key Words: *capital Structure, Regression Analysis with Dummy Variable*

JEL Classification: *G320*

Introduction

Capital structure has remained an area of financial quest over a period of time. Different theories have been discussed over a period of time. Some of the theories are found to be contradicting to each other. It has turned out to be an unending quest trying to find out how the capital structure behaves, how it changes over a period of time or what are its behavioural specialties with reference to industry or with reference to size or with reference to profitability etc. Attempts are being made in India and abroad to examine and analyze this quest.

The Static trade off theory of capital structure predicts that firm will choose their mix of debt and equity financing to balance the cost and benefits of debt. On the other hand, the major prediction of the Pecking Order Model is that firms will not have a target optimal capital structure, but will instead follow a Pecking Order of incremental financing choices that place internally generated funds at the top of the order followed by debt issues and finally only when the firm reached its "debt capacity" new equity financing.[1]

I.   Literature Review

There is a huge literature available on capital structure analysis. In this article very few are presented as a part of literature review.

Titman and Wessels[2] (1988) examined a broader set of capital structure theories in detail. They carried out a study of 469 companies over a period of 9 years. Moreover, they took the

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measures of debt in segregated manner and not on aggregated manner *viz.* short term, long term and convertible debt. Moreover, by applying factor analytic technique they also concluded that transaction costs may be an important determinant of capital structure. Short term debt ratios were shown to be negatively related to firm size.

Kakani[3] (1999), provides an empirical examination to the widely held existing theories of determinants of corporate capital structure with reference to India. The measures of short term and long term debt are analyzed separately. They selected 5 years pre-liberalization period and 4 years as post liberalization period covering total period of 1985-95 for BSE listed 100 companies. The study also examines empirically, implication of liberalization of the Indian economy on the determinants of capital structure of the firm. The study found that profitability and capital intensity were the most significant factors in deciding the capital structure. Moreover, they also concluded that the liberalization of the Indian economy appears to have affected the determinants of capital structure. Profitability, capital intensity and non debt tax shield seem to be the important determinants of capital structure of the firm.

Bhattacharyya and Benerjee[4] (2001) examined the explanatory powers of various factors falling in three broad categories, *viz.* tax factors, contracting costs factors and information cost factors by selecting 147 companies over a period of 10 years [1988-89 to 1998-99]. The study revealed that the latter two have more telling effect than the tax factors in determination of the firm's debt policy. The study confirmed that firms with more growth options use less debt, contrary to the suggestion of the pecking order hypothesis. On the other hand, it is also observed that firms with higher liquid disposable funds use less debt-a finding in favour of pecking order hypothesis.

Ozkan[5] (2001) has carried out the study on determinants of capital structure and adjustment to long run target using UK data for 390 companies over 13 years by applying panel data analysis. The study observed that the firms have target capital structure ratio and the firms adjust to the target capital structure ratio very fast. Their results provided evidence that profitability, liquidity and growth opportunities of the firm exert a negative effect on the capital structure choice of the firms. Their findings also supported the prediction of the theory about the inverse relationship between NDTS and borrowing ratio of the firm.

Bhaduri[6] (2002) carried out study taking 363 Indian companies scattered over number of industries taking the time span of 6 years. Three measures are selected as indicators of the capital structure, *viz.* TB/TA, LTB/TA and STB/TA. Number of independent/ explanatory variables have been selected, viz. LB/TA, PM/TA, Inventories/TA, Non Debt Tax Shield, Size, probability of financial distress, growth of total assets, profitability as indicated by cash flow/TA and CF/ sales, signaling and uniqueness. Small firms are more dependent on short term debt, growth opportunities add value the firm and hence increase long term debt taking capacity. Firm with high selling expense and R & D expenses are the ones with less leverage.

Baral[7] (2004) carried out the study of 40 companies listed on the Nepalese stock exchange during July 2003. He took Total debt / total asset as a measure of leverage as a dependent variable and size of the business firm, business risk, growth rate, earning rate and dividend payout were selected as independent variable. The study revealed that the size, growth, earning rate, dividend payout and debt service capacity had a significant effect on leverage.

Rafique, Iqubal and Atique[8] (2008), carried out the study on determinants of capital structure of chemical industry in Pakistan. Taking 26 firms listed on the Karachi Stock exchange for a period of 10 years they applied pooled regression in panel data analysis. They applied firm size, tangibility of assets, profitability, growth, NDTS and income variation as independent variables and leverage as the dependent variable. Their study found that the regressors explain more than 90% variation in capital structure except firm's tangibility.

II. The Rationale Of The Study

In the present study an attempt is made to examine the movements in the capital structure of one of the steel giant, *viz*. Tata steel. As Ratan Tata gave his comments for the steel industry as Chairman of Tata Steel '*Steel has been and will be the basic foundation material for national growth and the industry will continue to be an important ingredient in the global economic recovery' [Annual report of 2009-10]*. Tata steel is termed to be world's 10th largest steel company and world's 2nd most geographically diversified steel producer. It has a balance global presence in over 50 markets and manufacturing operations in 26 countries. It is considered to be one of world's lowest cost producers of steel. Having share holder base of over 8,00,000 people and an employee strength of over 81000 across 5 continents. Tata steel contributes to the industries like construction, automobile, aerospace, consumer goods, material handling, energy and power, rail, ship building, security, defence etc. *[Annual report of 2009-10]*.

Generally the studies are being carried out taking more number of companies over a period of 5 years/ 10 years or so. During the literature review also it is observed that the study period ranges from one to thirteen years and the sample size varies from 26 to 469. It is interesting to note that for the selected company the data on few variables were available for the life span of 1956 to 2014 i.e. 59 years. It is very difficult to find any study were over such a long period of time the movements in the capital structure are analyzed. Thus, it turned out to be very interesting to examine the movements in the capital structure ratios over a period of 59 years for a single company, which is one of the steel giants in India having the global presence.

In the light of this, the present study is divided in to six sections. Sections I, II and III related to introduction, literature review and rationale of the study and the subsequent sections relate to methodology, findings and conclusions.

III. Data Collection & Methodology

Data collection: The annual reports of Tata Steel provide the information about 'Financial statistics' in its annual report for number of past years. By compiling details from annual reports from 1996-97 to 2013-14 the series of 59 years data could be completed, *i.e* from 1955-56 to 2013-14. Information is available for selected financial indicators only.

Methodology: For the purpose of the analysis, absolute figures can be taken and the relative values can also be taken. As observed for various studies generally it is the relative values, *i.e.* the ratios are taken. For the present study also it was more appropriate to take the ratios as this nullifies the effect of the price level changes. Here, the period of study is very long and the size of the balance sheet has grown substantially over a period of time. Taking ratios nullifies this effect and makes it possible to compare the ratios over a period of time.

Selection of Ratios

As indicators of the capital structure mostly it is the debt equity ratio and/or debt ratio are examined. As the data were not available for the total assets over the selected span, debt ratio, *viz* long term debt to total assets and short term debt to total asset was not possible to compute. Moreover, the disaggregated details of short term debt and long term debt are also not available for such a long time. Under the circumstances, based on the available data, debt equity ratio was selected as one of the indicators of capital structure. In the next stage, the proportion of each source of capital to total capital is examined. For this, debt to total capital, Equity to total capital, Reserves & Surplus to total capital and net worth to total capital are examined. As a third step, to know about the management's policy regarding funding of assets, debt to net block, equity to net block, reserves and surplus to net block, net worth to net block and total capital to net block are also derived. In the fourth step, to examine minutely at firm level, how the increase in gross block is being funded, increase in each source of financing is examined with reference to increase in gross block. It may be noted that, when the data are taken from the published data sources and when more companies are being handled, such kind of analysis is rare to find. Thus, the ratios selected in this context are: increase in Equity to increase in Gross block, increase in R/s to increase in Gross block and increase in Net worth to increase in Gross block, increase in debt to increase in gross block, increase in Total capital to increase in Gross block. These ratios indicate how the management is managing the funding of gross block each year.

Discrete Statistics: Before moving to any time trend analysis, it was considered important to find the average/ mean ratio. Therefore, for all above ratios arithmetic mean is derived.

Time Trend Analysis: To know about the movement in the ratio over a period of time, time trend is examined over a period of 59 years.

India has under gone drastic economic reforms during this period. Hence, to examine the trend behaviour over a period of time, both the discrete statistics as well the trend projections are divided in to three blocks, 20 years, 20 years and 19 years. Moreover, to observe the

impact of economic reforms, if any, the period is also divided in to the pre liberalization era and the post liberalization era. For ratios derived in initial three steps mentioned above, pre liberalization period covers 1956-1991 and post liberalization period covers 1992- 2014.

However, when incremental ratios are taken one can start only from the second year. Therefore, instead of 59 observations it would result in to 58 observations. Hence, the years are divided in to 20 years, 20 years and 18 years. Here pre liberalization period it is taken as 1957-1992 and post liberalization period is taken as 1993- 2014.

To examine shift, if any, with time, in intercept or slope regression analysis is carried out with the help of dummy variable also. Elaborations on the same are made with the respective discussion.

The next section presents the findings.

IV.   Findings

A.   Based On Discrete Statistics:

Debt-Net worth ratio: On examining the behaviour of the debt equity ratio for the study period debt is found to be lower than equity at about 83% of the equity. However, when the behaviour is examined over various time period for the period 1956-75 it was only 63% of equity whereas for the period 1976-95 it was higher than even equity and thereafter it is meeting with the overall average. The debt to net worth ratio was found to be highest in 1983-84 at 1.63 and the lowest for the year 2005-06 at 0.2579 [please note that the debt is total debt, i.e. long term as well as short term]

On dividing the study period in to pre liberalization and post liberalization era, quite lower average is found for pre liberalization era as compared to post liberalization era. This may be attributed to the flexibility of the financial market to raise funds through innovative instruments during post liberalization era. [Table:1]

Debt to total capital: On examining the proportion of debt to total capital it is observed that throughout the period the proportion of debt in the total capital is less than 50%. However, it is observed that during the period 1956-75 it was very low at 36.69%. This was highest in 1983-84 at 82% and the lowest for the year 2005-06 at 20.50%. Similar to debt to net worth ratio here also the proportion of debt in total capital has increased in the post- liberalization era. [Table:1]

Equity to total capital: On examining the proportion of equity to total capital it is observed that on an average it is 17% of the total capital. This seems to be quite a good ratio. When this ratio is observed for various years it is found to be highest for the year 1955-56 at 0.3892. When it is divided in to different blocks of the period it is observed that it was highest for the company for the first block of 20 years at 0.3114. After this, for the next block of 20 years the average has reduced and this has gone down to 0.0509 for the last block of 1996-2014. For

the pre liberalization period it is found to be quite high as compared to post liberalization era. The gap in average ratio between these two periods is substantially high. [Table:1]

Reserve & Surplus to total capital: On examining the proportion of Reserve & Surplus to total capital it is observed that on an average it is 40% of the total capital. This seems to be quite high ratio. When this ratio is observed for various years it is found to be highest for the year 2005-06 at 0.7498. When it is divided in to different blocks of the period it is observed that it was highest for the company for the last block of 19 years at 52%. For the first block it is lowest at 32% which increased to 37% in the middle block. For the pre liberalization period again it is found to be lower as compared to post liberalization era. [Table:1]

Thus, as the company has grown older the reserves and surplus has build up and therefore, its proportion to total capital is consistently increasing.

Net Worth to total capital: On examining the proportion of Net worth to total capital, on an average it is found to be 57%. The two components of the Net worth *viz.* equity and reserves & Surplus had differing behaviour. The net worth is observed to behave in the same direction as that of Equity as the rate of fall of equity to total capital is high as compared to rise in rate of increase in reserves and surplus to total capital [Table:1]

Next in line are the ratios computed to examine the proportion of various sources to net block of the company of the respective year.

Equity to net block: It is observed that on the whole very low proportion of equity is used for the financing of the net block. For the entire period under study it is observed to be low at 24%. For the first block of 20 years of the period under study it is found to be around 41%, for the next 20 years it went down at about 21% and further it went down to about 11% for the last block of 19 years. When segregated between pre liberalization and post liberalization era it is observed to be 33.57% and 10.47% respectively. This necessarily indicates that the proportion of equity for funding net block has remained very low throughout the period of 59 years, however, in the post liberalization era this proportion has gone down drastically. [Table:2]

Reserves and Surplus to net block: Reasonably high proportion of reserves and surplus exist as proportion of the net block. Average for the period of 59 years is little higher than the debt to net block. For the first 40 years it is lower than debt /net block. However, for the last 19 years the average R/s to Net block is observed to be substantially higher than debt/net block ratio. From the pre liberalization to post liberalization period both, debt/ net block as well as R/s to net block have increased. However, in the post liberalization period r/s to net block is higher than debt/ net block [Table:2]. The ratio is found to be lowest at 0.20 in 1958-59 and the highest at 2.62 for the year 2010-11.

Net worth to net block: This is the combined output of above two ratios *viz. Equity to net block and Reserves and surplus to net block.* This combined ratio is higher than debt/net

block for all the selected period on an average. However, the gap was very thin for the period 1976-95, during which debt/net block had increased and equity/NB had fallen substantially. During the period 1996-2014 also equity/NB has fallen. However, the R/S to NB has improved and hence combined ratio has improved. When the analysis is carried out with reference to pre and post liberalization era the ratio has improved beyond 1, in post liberalization era, indicating that the owners' funds were higher than the net amount invested in the fixed assets. [Table:2]

Debt to net block: Based on the ratio computed for each year the average is derived. For the ratio debt to net block it is observed that on an average about 66 percent of the net block is funded by debt. It was observed to be very low at just 47% during first 20 years [1956-1975], then it rose to about 68% during 1976-1995 and for the last 19 years it rose to 85%. When examined for pre liberalization and post liberalization era again it is observed that it was at 56% only in pre liberalization era and it rose to about 82% in post liberalization era. This again supports that preference for debt as source of funding fixed asset has gone up in the post liberalization era [Table:2]. The ratio was the highest at 1.86 for the year 2008-09.

Total capital to net block: When *Debt +Equity+ Reserves and surplus i.e.* all the funds are taken together to examine its proportion to net block for all selected periods on an average the ratio is found to be more than net block. This is a healthy sign for the organization even though the break up for the short term debt and the long term debt is not available. This indicates that the funds available with the company are far in excess of its net block. [Table:2]

Table 1: Average for Capital structure ratios

Time Span	Debt to Net worth ratio	Debt to Total capital	Equity to Total capital	Reserves & surplus to Total capital	Net worth to Total capital
1956-2014	0.8153	0.4277	0.1720	0.4002	0.5723
1956-1975	0.6304	0.3669	0.3114	0.3217	0.6331
1976-1995	1.0056	0.4871	0.1476	0.3653	0.5129
1996-2014	0.8098	0.4292	0.0509	0.5199	0.5708
1956-1991 Pre liberalization	0.7550	0.4100	0.2486	0.3414	0.5900
1992-2014 Post liberalization	0.9098	0.4555	0.05201	0.4925	0.5445

Source : Author's calculations

Table 2: Average Proportion of Each Source of Finance to Net block

Time Span	Equity to Net block	R/s to Net block	Net worth to Net block	Debt to Net block	Total capital to Net block
1956-2014	0.2456	0.6729	0.9185	0.6631	1.5816
1956-1975	0.4104	0.4294	0.8398	0.4721	1.3119
1976-1995	0.2078	0.5150	0.7229	0.6781	1.4009
1996-2014	0.1120	1.0953	1.2073	0.8483	2.0556
1956-1991 [Pre]	0.3357	0.4756	0.8113	0.5603	1.3716
1992-2014 [Post]	0.1047	0.9817	1.0864	0.8239	1.9103

Source: Author's calculations

Financing The Gross Block:

After examining proportion of each source of finance to Net block, an attempt is made to examine financing for increase in gross block. As the analysis takes in to consideration incremental aspects first year cannot be taken for observation. Hence, the number of observations is reduced to 58 for 59 years. Taking this single steel giant an attempt is made to examine from where the funding for the increase in the gross fixed asset is made. Some interesting observations are made:

For the purpose of detailed analysis the share of equity, reserves & surplus and debt to gross block are taken separately and further to analyze the funding from share holder's funds, equity and R/s are taken together and to examine the total funding, e+ r/s +debt are taken together. The findings show that on an average the highest funding for the addition to gross block is made from incremental Reserves & Surplus, followed by debt and further followed by equity. When analysis is divided in to sub periods, during the period 1957-76, the debt to Gblk average ratio is negative. This is on account of decrease in debt over a period of time. Whereas incremental equity to incremental Gross block has remained positive at about 12%. When next sub period of 20 years from 1977-1996 is taken, financing from Reserve & surplus highest. This is followed by debt followed by equity. For the period 1997-2014 increase in reserves & surplus was higher than the increase in Gross block. However, the additional debt is raised and the equity is also raised marginally. When analyzed for the pre and post liberalization era, in both, r/s to Gross block is highest but in pre liberalization era debt/gblk is marginally higher than e/gblk. However, in the post liberalization era the order is maintained very clearly. This supports strongly Pecking order theory i.e. incremental r/s to incremental gross block is highest, followed by incremental debt/ incremental gross block and further followed by incremental equity to incremental gross block. [Table:3]

Table 3: Average Incremental Source of Finance to Incremental Gross Block

Time Span	Incremental Equity to Incremental GB	Incremental R/s to Incremental GB	Incremental Net worth to Incremental GB	Incremental Debt to Incremental GB	Incremental Total capital to Incremental GB
1957-2014	0.0833	0.5912	0.6745	0.2747	0.9473
1957-1976	0.1108	0.2417	0.3585	-0.1428	0.2156
1977-1996	0.0676	0.4613	0.5289	0.4346	0.9635
1997-2014	0.0703	1.1172	1.1875	0.5546	1.7421
1957-1992 [Pre]	0.0946	0.3002	0.3948	0.1074	0.5021
1993-2014 [Post]	0.0649	1.0674	1.1323	0.5433	1.6756

Source : Author's calculations

B. Findings Based On Regression Results:

As mentioned in the methodology to examine the trend over a period of time regression is run on time. Regressions are carried out for all selected ratios. To start with simple regression is run on time where it is $Y = \beta_0 + \beta_1 t + \mu t$. Here Y is dependent variable, i.e. selected ratio, β_0 is intercept and β_1 is the rate of change in selected variable per year during the period under consideration.

Debt-to net worth ratio: On examining trend over 59 years it is observed that there is no linear trend. When the total period is divided in to three parts for all three period trend is found to be significant with different signs. For the period 1956-1975 a decreasing trend is observed. For the period 1976-95 an increasing trend is observed for the period 1996-2014 the ratio has again shown a significant decreasing trend. When examined the trend for pre and post liberalization era, it is observed that during pre liberalization era there is no significant trend. However, during post liberalization era a significant decreasing trend is observed. This rise and fall are mainly governed by external factors, like favourable policies for issue of equity shares or raising debt. [Table:4]

In the next stage trend of each component of capital to total capital is examined over a period of time.

Debt to total capital ratio: On examining trend in this ratio, exactly same results as of debt to net worth are observed. Thus, for total period of 59 years and pre-liberalization era no significant trend is observed but negative significant trend is observed for a period 1956-75, 1996-2014 and post liberalization era and positive significant trend is observed for 1976-95. [Table:5]

Equity to total capital: On examining the total period of 59 years, significant negative trend is observed indicating that over a period of time equity proportion in total capital has declined. The same negative trend is also observed for the time period 1976-95 and pre liberalization period. [Table:6]

Reserves & Surplus to total capital: On examining trend over a period of time it is observed to have positive significant trend. Moreover, when period of 59 years is divided in to 20, 20, and 19 years or in to pre liberalization and post liberalization era, for all time slots it has positive significant trend except for the time-block of 1976-95. [Table:7]

Table: Time trend of capital structure ratios

Table 4					Table 5			
Time trend of DEBT to Net Worth Ratio					Time trend of DEBT to Total Capital			
PERIOD	R^2	Intercept (t- value)	B[Slope] (t- value)		PERIOD	R^2	Intercept (t- value)	B[Slope] (t- value)
1956-2014	0.0185	0.7289 (7.5974)*	0.0029 (1.0362)		1956-2014	0.0230	0.3985 (13.7466)*	0.0010 (1.1593)
1956-1975	0.3156	0.9567 (7.4041)*	-0.0311 (-2.8810)*		1956-1975	0.3147	0.4712 (11.3852)*	-0.0099 (-2.8748)**
1976-1995	0.3194	-0.0043 (-0.0123)	0.0331 (2.9063)*		1976-1995	0.3557	0.2178 (2.5055)**	0.0088 (3.1523)*
1996-2014	0.5130	2.9096 (5.8290)*	-0.042 (-4.2319)*		1996-2014	0.4769	1.0858 (6.4710)*	-.0131 (-3.9364)*
1956-1991	0.0583	0.6069 (5.1862)*	0.0080 (1.4514)		1956-1991	0.0802	0.3573 (10.1707)*	0.0029 (1.7213)
1992-2014	0.6752	3.0864 (9.2800)*	-0.0453 (-6.6067)*		1992-2014	0.6134	1.0834 (9.8665)*	-0.0131 (-5.7727)*

Source : Author's calculations

Table 6					Table 7			
Time trend of Equity to Total Capital					**Time trend of Reserves & surplus to Total Capital**			
PERIOD	R^2	Intercept (t- value)	B[Slope] (t- value)		PERIOD	R^2	Intercept (t- value)	B[Slope] (t- value)
1956-2014	0.8057	0.3629 (25.4135)*	-0.0064 (-15.3732)*		1956-2014	0.5980	0.2386 (11.8165)*	0.0054 9.2073*
1956-1975	0.0068	0.3052 (15.1865)*	0.0006 0.3507		1956-1975	0.4947	0.2236 (8.3871)*	0.0093 4.1982*
1976-1995	0.8473	0.5450 (13.4694)*	-0.013 (-9.9946)*		1976-1995	0.1758	0.2372 (3.5665)*	0.0042 1.9592
1996-2014	8.8 E-05	0.0486 (0.8151)	4.6 E-05 0.0386		1996-2014	0.4295	-0.1344 (-0.7305)	0.0131 3.5777*
1956-1991	0.6292	0.3784 (19.3163)*	-0.007* -7.60		1956-1991	0.3355	0.2644 (12.4020)*	0.0041 4.1433*
1992-2014	0.004	0.0632 (1.6217)	-0.0002 -0.2903		1992-2014	0.5788	-0.1466 (-1.2205)	0.0133 5.3718*

Source : Author's calculations

Table 8			
Time trend of Net worth to Total Capital			
PERIOD	R^2	Intercept (t- value)	B[Slope] (t- value)
1956-2014	0.0230	0.6015 (20.7496)*	-0.0010 (-1.1593)
1956-1975	0.3147	0.5288 (12.7781)*	0.010 (2.8747)**
1976-1995	0.3557	0.7822 (8.9966)*	-0.0088 (-3.1523)*
1996-2014	0.4768	-0.0858 (-0.5113)	0.0131 (3.9364)*
1956-1991	0.0801	0.6427 (18.2974)*	-0.0029 (-1.7213)
1992-2014	0.6134	-0.0834 (-0.7593)	0.0131 (5.7726)*
'*' indicates significance at 1% '**' indicates significance at 5%			

Source : Author's calculations

Net worth to total Capital: This ratio indicates the combined effect of Equity and Reserves & Surplus to total capital. Hence, it is observed that for the time blocks where e/ttl cap and R.s/ ttl cap have contradicting significant trend it has nullified the trend of the combined variables [1956-2014 and 1956-1991]. However, whenever a single ratio has a significant trend it has continued in the combined trend [1956-75, 1976-95, 1996-2014 and 1992-2014] [Table:8].

In the next stage trends in proportion of various items of sources of funding to net block is examined.

Debt to Net block: When trend is examined over a period of 59 years, significant positive trend is observed at 1% level of significance indicating that the proportion of debt to net block has increased over a period of 59 years. When this is divided in to three time slots of 20 years, 20 years and 19 years it is observed that for 1956-75 significant decreasing trend is observed. For pre liberalization time period significant positive trend is observed. For the remaining time blocks no significant trend is observed. [Table:9]

Equity to Net Block: On examining equity to Net Block trend over a period of time negative trend is observed. From this it can be inferred that over a period of 59 years the proportion of equity to net block has gone down. When trend is examined dividing the entire study period in the slabs, for the time slab of 1976-95, negative significant trend is observed over a period of time. For the first slot of 20 years and last slot of 19 years trend is positive but insignificant. When examined for pre and post liberalization period reverse trend is observed. For pre liberalization period it has gone down significantly and for the post liberalization period no clear cut trend could be observed. [Table:10]

Reserves and Surplus to Net Block: One very interesting point observed for this ratio is that there is no trend reversal. When entire period of 59 years is examined it has shown a rising trend over a period of time, at 1% level of significance. When divided in the slots of 20 years, for the period of 1956-75 positive trend is observed, during the period 1976-95 no trend is observed and for the period 1996-2014 again positive significant trend is observed. When trend is examined for pre and post liberalization era, significant positive trend is observed. This indicates that R/S has been consistently increasing component to Net block [Table:11].

Net worth to Net Block: On examining the trend of the said ratio over a period of 59 years positive significant trend is observed, in spite of contradictory trends of Equity and Reserves & Surplus. For the first 20 years (1956-75) both components had exhibited positive (one significant and other non significant) trend and therefore when both are taken together significant positive trend is observed. Between 1976-1995 equity had shown a significant negative trend

[64]

Table: Time trend of proportion of each source of finance to net block

Table 9					Table 10			
Time trend of DEBT TO NET BLOCK					**Time trend of EQUITY TO NET BLOCK**			
PERIOD	R^2	Intercept (t- value)	B[Slope] (t- value)		PERIOD	R^2	Intercept (t- value)	B[Slope] (t- value)
1956-2014	0.2918	0.3729 (5.4171)*	0.0097 (4.8465)*		1956-2014	0.5459	0.4576 (15.5402)*	-0.0071 (-8.2784)*
1956-1975	0.2158	0.5512 (13.5942)*	-0.0075 -(2.2254)**		1956-1975	0.1139	0.3663 (11.0738)*	0.0042 (1.5210)
1976-1995	0.1920	0.4121 (3.1492)*	0.0087 (2.0681)		1976-1995	0.8605	0.7744 (14.1508)*	-0.0186 (-10.5361)*
1996-2014	0.1852	-0.8759 (-0.9926)	0.0345 (1.9657)		1996-2014	0.1021	-0.2452 (-0.9490)	0.0071 (1.3907)
1956-1991	0.3248	0.4107 (9.6812)*	0.0081 (4.0446)*		1956-1991	0.4681	0.4829 (15.6421)*	-0.0080 (-5.4703)*
1992-2014	0.1647	-0.3581 (-0.6107)	0.0246 (2.0347)		1992-2014	0.1081	-0.1628 (-0.9619)	0.0056 (1.5955)
Table 11					**Table 12**			
Time trend of R/S TO NET BLOCK					**Time trend of Net worth TO NET BLOCK**			
PERIOD	R^2	Intercept (t- value)	B[Slope] (t- value)		PERIOD	R^2	Intercept (t- value)	B[Slope] (t- value)
1956-2014	0.4310	0.1076 (1.0874)	0.0188 (6.5707)*		1956-2014	0.1730	0.5652 (14.8044)*	0.0118 (3.4530)*
1956-1975	0.5055	0.2652 (6.0717)*	0.0156 (4.2894)*		1956-1975	0.3826	0.6315 (8.8751)*	0.020 (3.3401)*
1976-1995	0.0444	0.3753 (2.4135)**	0.0046 (0.9150)		1976-1995	0.2405	1.1496 (16.3191)*	-0.014 (-2.3872)**
1996-2014	0.6345	-3.7356 (-4.1757)*	0.0966 (5.4324)*		1996-2014	0.6126	-3.9808 (-3.9546)*	0.1038 (5.1848)*
1956-1991	0.3974	0.3185 (8.3755)*	0.0085 (4.4375)*		1956-1991	0.0010	0.8015 (13.4774)*	0.0005 (0.1885)
1992-2014	0.6439	-2.8080 (-4.5228)*	0.0790 (6.1620)*		1992-2014	0.6225	-2.9707 (-4.2699)*	0.0845 (5.8840)*

Source : Author's calculations

Table 13			
Time trend of Total capital TO NET BLOCK			
PERIOD	R^2	Intercept (t- value)	B[Slope] (t- value)
1956-2014	0.2550	0.9381 (5.6011)*	0.0215 (4.4174)*
1956-1975	0.4422	1.1827 (30.2983)*	0.0123 (3.7772)*
1976-1995	0.0357	1.5618 (7.7912)*	-0.0053 (-0.8165)
1996-2014	0.4589	-4.8566 (-2.6518)**	0.1382 (3.7968)*
1956-1991	0.3892	1.2121 (30.8655)*	0.0086 (4.6543)*
1992-2014	0.4629	-3.3289 (-2.6775)**	0.1092 (4.2540)*
'*' indicates significance at 1% '**' indicates significance at 5%			

Source : Author's calculations

where as trend for R/s to Nblk being insignificant, for NW/ NBLK significant negative trend is observed. For the time slot 1996-2014 both the components had positive trend (one significant and other insignificant) this is reflected in significant positive trend of Equity plus Reserves and Surplus to Net Block. When pre liberalization era is examined for trend, both have exhibited opposite trend and that has nullified the trend effect when both are taken together. However, when post liberalization era is taken again positive significant trend is observed [Table:12].

Total Capital to Net Block: As this is the cumulative component in the numerator by which the most of the fixed assets are being financed significant positive trend is observed for all periods except the slot of 1976-95. This indicates that the proportion of total capital to Net block has increased during 1956-2014, 1956-75, 1996-2014, 1956-91 and 1992-2014. One can equally infer from this that the increase in total capital is faster than increase in Net block [Table:13].

Use of the Dummy Variables: ***For time slot of 20 years, 20 years and 19 years***: As

different signs were observed for one after the other block on the time line, for the purpose of testing whether there are significant shifts during these time blocks, use of dummy variable is made. An attempt is made to examine the shifts with reference to intercept as well as with reference to the slope. To examine significant change if any, during 1976-95 as compared to the previous time interval i.e. 1956-75, D1=1 is put and for all other years D1=0 is put. Similarly, to examine significant change, if any, during 1996-2014 as compared to the base time interval i.e. 1956-75, D2=1 is put and for all other years D2=0 is put. The regression equation thus framed is

$$Y = ß0 + ß1D1 + ß2D2 + ß3t + ß4D1t + ß5D2t + \mu t$$

The results for the above 10 ratios are presented in Table 14.

Debt-to net worth ratio : From the table it can be observed that the intercept has declined significantly moving to negative during the time period 1976-95 and it has moved up significantly becoming positive for the time period 1996-2014. For the slope, for the time period 1976-95 it has increased significantly which indicates that the rate at which the ratio is rising has increased whereas for the time period 1996-2014 even though the slope has reduced but it is insignificant. This shows that the rate of increase in the ratio is almost same as for the time period 1956-75.(Table :14)

Debt to total capital ratio: On running the regression using dummy variable it is observed that there is a significant downward change in the intercept for the time period 1976-95 and significant upward shift in the intercept for the time period 1996-2014 as compared to the base time-interval *i.e.* 1956-75. For the base period of 20 years 1956-75 the slope is found to be significantly negative. For the time slot 1976-1995 with ß4 >ß3, positive significant trend is observed for 1976-95. For the last time slot of 19 years no significant change in trend is observed as compared to base year. (Table 14)

Equity to total capital: On running the regression using dummy variable it is observed that for the base period the trend is not found to be significant. However, for the time slot of 1976-95 the intercept has moved upward significantly and the slope has turned out to be significantly negative. For the time slot 1996-2014 intercept has shifted downward significantly where as there is no significant change in the slope coefficient during 1996-2014 as compared to the base time-interval. As the slope coefficient is not significant for the time intervals i.e.1956-75 and 1996-2014 one can say that the ratio has remained more or less constant. (Table 14)

Reserves & Surplus to total capital: When time trend is examined using dummy variable it is

observed that there is a significant shift in the intercept during 1996-2014. The trend is positive for the base period and no significant shift in slope is observed for the other two time slots indicating that the ratio has continued to have rising trend at almost the same rate over the entire period. (Table 14)

Net worth to total capital: On using the dummy variable for this ratio, it is observed that there is a significant upward shift in the intercept for the time slot 1976-95 and significant down ward fall in the slope for the same period as compared to the base time-interval. However, significant downward shift is observed in the intercept for the period 1996-2014 with no significant change in the slope as compared to the base year. (Table 14)

Debt to Net block: On using the dummy variable for this ratio, it is observed that there is a significant downward shift in the intercept for the period 1996-2014 and significant upward change in the slope for the same period. This indicates that the ratio and the rate of change in the ratio has remained same for 1976-95. (Table 14)

Equity to Net Block: When time trend is examined using dummy variable it is observed that there is a significant upward shift in the intercept during 1976-95 and a downward change in slope for the same period. However, a significant downward shift in the intercept is observed during 1996-2014 with no significant change in the slope for the same period. (Table 14)

Reserves and Surplus to Net Block: When time trend is examined using dummy variable it is observed that for the base period there is no significant slope. However, during the time slot 1996-2014, ß2 is significant and negative indicating a downward shift in the intercept and ß5 being positive and significant indicates a upward change in the slope. (Table 14)

Net worth to Net Block: When time trend is examined using dummy variable for this ratio it is observed that there is no significant shift in the intercept for the time slot 1976-95, however, there is reversal in the direction of slope from rising to falling. During the time slot 1996-2014 the intercept has shifted significantly downward where as the slope has become positive from the negative. (Table 14)

Total Capital to Net Block: It is interesting to note that on running regression with the use of dummy variable only two coefficients ß2 and ß5 are found to be significant. This when interpreted in line with the regression results for all 59 years and with time slot of 20, 20 and 19 years, it can be inferred that for the time slot 1996-2014 the intercept has significantly shifted down ward and the slope has changed significantly upward. (Table 14)

Table 14: Regression of above variables on time with Dummy

Ratio	Adj.R^2	Intercept (t- value)	β1D1 (t- value)	β2D2 (t-value)	β3t (t-value)	β4D1t (t-value)	β5D2t (t-value)
D/Net worth	0.4446	0.9567 (7.5917)*	-0.9611 (-2.7457)*	1.9529 (3.3366)*	-0.0311 (-2.9540)*	0.0642 (4.3143)*	-0.0109 -0.7052
D/ Total capital	0.4650	0.4712 (12.5789)*	-0.2534 (-2.4352)**	0.6146 (3.5331)*	-0.0099 (-3.1762)*	0.0188 (4.2425)*	-0.0032 (-0.6953)
E/ Total capital	0.9139	0.3052 (18.3924)*	0.2397 (5.2012)*	-0.2566 (-3.3298)*	0.0006 (0.4247)	-0.0136 (-6.9498)*	-0.0005 (-0.2661)
R.s/ Total capital	0.6789	0.2236 (7.0959)*	0.0136 (0.1555)	-0.3580 (-2.4463)**	0.0093 (3.5519)*	-0.0052 (-1.3831)	0.0037 (0.9666)
Net worth/ Total capital	0.4650	0.5288 (14.1179)*	0.2533 (2.4352)**	-0.6146 (-3.5331)*	0.0099 (3.1762)*	-0.0188 (-4.2426)*	0.0032 (0.6953)
D/Nblk	0.3351	0.5512 (4.7319)*	-0.1390 (-0.4298)	-1.4270 (-2.6381)**	-0.0075 (-0.7746)	0.0163 (1.1818)	0.0420 (2.9356)*
E/Nblk	0.7315	0.3663 (9.2630)*	0.4081 (3.7156)*	-0.6115 (-3.3294)*	0.0042 (1.2723)	-0.0228 (-4.8785)*	0.0029 (0.6056)
R.s/Nblk	0.7264	0.2652 (2.2138)**	0.1101 (0.3308)	-4.0008 (-7.1911)*	0.0156 (1.5640)	-0.0111 (-0.7818)	0.0810 (5.5012)*
Net worth /Nblk	0.6239	0.6315 (4.5581)*	0.5181 (1.3465)	-4.6122 (-7.1682)*	0.0198 (1.7154)	-0.0338 (-2.0685)**	0.0839 (4.9296)*
Total capital /Nblk	0.5223	1.1827 (5.0495)*	0.3791 (0.5828)	-6.0393 (-5.5521)*	0.0123 (0.6295)	-0.0176 (-0.6358)	0.1259 (4.3759)*
'*' indicates significance at 1%, '**' indicates significance at 5%							

Source : Author's calculations

Use of the Dummy Variables: *For Pre liberalization and post liberalization period*:

As differences were observed for intercept and/or slope for pre and post liberalization period, for the purpose of testing whether there are significant shifts during these period, use of dummy variable is made. An attempt is made to examine the shifts with reference to intercept as well as with reference to the slope. To examine significant change, if any, during post liberalization era *viz*. 1992-2014 D1=1 is put and for pre-liberalization period D1=0 is put. The regression equation thus framed is:

$$Y = ß_0 + ß_1 D_1 + ß_2 t + ß_3 D1t + \mu t$$

The results are presented in Table 15.

Debt-to net worth ratio : From the table it can be observed that the intercept has shifted significantly upward during the time period 1992-2014 and the slope has declined significantly resulting from rising to down ward trend in the post liberalization era indicating that the proportion of debt to net worth has declined. (Table :15)

Debt to total capital ratio: On running the regression using dummy variable it is observed that there is a significant upward shift in the intercept for the time period 1992-2014 and significant downward turn in slope for this post liberalization period. [Table 15]

Equity to total capital: On running the regression using dummy variable it is observed that for the pre liberalization period the trend is found to be negative and significant. In the post liberalization period intercept has moved down significantly and for the slope, rate of fall has reduced significantly [â3 being positive but less than â2] (Table 15)

Reserves & Surplus to total capital When time trend is examined using dummy variable it is observed that there is a significant downward shift in the intercept during post liberalization period and it has become negative (from positive in pre liberalization period). The trend is positive for the pre liberalization period and this has further increased significantly in the post liberalization period. (Table 15)

Net worth to total capital: On using the dummy variable for this ratio, no significant trend is observed in the pre liberalization period. However, during the post liberalization period there is a significant downward shift in the intercept (becoming negative) and the slope has shown significant upward trend. (Table 15)

Debt to Net block: On using the dummy variable for this ratio, no significant trend is observed in the pre liberalization period and for the post liberalization period. This indicates that the ratio has remained stable over a period of time. (Table 15)

Equity to Net Block: When time trend is examined using dummy variable it is observed that the slope was negative and significant during pre liberalization period. During the post liberalization period there is a significant downward shift in the intercept (whereby intercept becoming negative) and a significant upward change in slope for the post liberalization period turning negative (falling) trend to positive (rising) trend. (Table 15)

Table 15: Regression of above variables on time with Dummy
[Pre – Post liberalization]

Ratio	Adj.R^2	Intercept (t- value)	β1D1 (t- value)	β2t (t- value)	β3D1t (t- value)
D/Net worth	0.3113	0.6069 (5.9018)*	2.4796 (5.2589)*	0.0080 (1.6517)	-0.0534 (-5.0042)*
D/ Total capital	0.2951	0.3573 (11.3392)*	0.7261 (5.0262)*	0.0029 (1.9191)	-0.0159 (-4.8769)*
E/Total capital	0.8451	0.3784 (23.1917)*	-0.3152 (-4.2129)*	-0.0070 (-9.1196)*	0.0068 (4.0076)*
R.s/ Total capital	0.6652	0.2644 (11.2120)*	-0.4110 (-3.8012)*	0.0042 (3.7458)*	0.0092 (3.7437)*
Net worth/ Total capital	0.2951	0.6427 (20.3999)*	-0.7261 (-5.0262)*	-0.0029 (-1.9191)	0.0159 (4.8769)*
D/Nblk	0.2999	0.4107 (4.689)*	-0.7688 (-1.9145)	0.081 (1.9589)	0.0165 (1.8214)
E/Nblk	0.6370	0.4829 (14.355)*	-0.6457 (-4.1796)*	-0.0080 (-5.0125)*	0.0135 (3.8736)*
R.s/Nblk	0.7072	0.3185 (3.5082)*	-3.1265 (-7.5098)*	0.0085 (1.9835)	0.070 (7.4850)*
Net worth /Nblk	0.5831	0.8015 (7.4983)*	-3.7722 (-7.6969)*	0.0005 (0.1049)	0.0840 (7.5794)*
Total capital /Nblk	0.5065	1.2122 (6.9489)*	-4.5411 (-5.6775)*	0.0086 (1.0479)	0.1005 (5.5588)*
'*' indicates significance at 1%, '**' indicates significance at 5%					

Source : Author's calculations

Reserves and Surplus to Net Block: When time trend is examined using dummy variable it is observed that for the pre liberalization period there is no significant slope. However, during the post liberalization period, ß1 is significant and negative indicating a downward shift in the intercept and ß3 being positive and significant, indicates an upward change in the slope. (Table 15)

Net worth to Net Block: When time trend is examined using dummy variable it is observed that for the pre liberalization period there is no significant slope. However, during the post liberalization period, ß1 is significant and negative indicating a downward shift in the intercept and ß3 being positive and significant, indicates an upward change in the slope. (Table 15)

Total Capital to Net Block : When time trend is examined using dummy variable it is observed that for the pre liberalization period there is no significant slope. However, during the post liberalization period, ß1 is significant and negative indicating a downward shift in the intercept and ß3 being positive and significant indicates an upward change in the slope. (Table 15)

Financing Of Gross Block:

Debt, equity and Reserves and surplus are the important components for funding the gross block. For this purpose the proportion of increase in individual component to increase in gross block is derived and the mean for the same is discussed in the preceding para. To examine the trend in the funding behaviour, regression is run on time for the selected ratios. As here the change over the previous year is taken, there is loss of one observation. Therefore, the period under study will be 1957-2014. The results are presented in the following lines:

Incremental Debt to Incremental Gross block: When this ratio is examined over the time line, for the total period of 1957-2014 positive significant trend is observed at 5% level of significance. This implies that financing through debt has increased over a period of time. When entire period is divided in to three parts of 20, 20 and 18 years no significant trend is found for any block of period. However, when the time period is divided into pre liberalization and post liberalization era, positive significant trend is observed for the pre liberalization era. This indicates that over a period of 1957-92, the financing proportion from debt to gross block has increased significantly. [Table:16]

Incremental Equity to Incremental Gross block: When this ratio is examined over a period of time no trend is observed for the entire period or for any of the sub periods. [Table:17]

Incremental Reserves and Surplus to Incremental Gross block: On the other hand, examining this ratio, significant positive trend at 1% level of significance is observed when the total period from 1957-2014 is considered. Moreover, when the sub-periods are taken in to consideration, for the period 1977-1996 the trend is found to be positive and significant at 5% level of significance. This indicates that the financing is mainly coming from the R/S and this supports the Pecking order theory. [Table:18]

Incremental Net worth to Incremental Gross block: On examining this ratio, significant positive trend at 5% level of significance is observed for the total period from 1957-2014. However, no significant trend is observed for any of the sub periods. This indicates that incremental net worth has consistently increased to finance incremental gross block, even though in shorter period it does not show any significant change. [Table:19]

Incremental Total capital to Incremental Gross block: When trend in this ratio is examined, positive significant trend is observed for the total period of 1957-2014. On examining trends during sub periods, for the period 1977-96 and Pre liberalization period positive significant trend is observed. [Table:20]

Table: Time trend of Financing of Incremental Gross
Block from incremental sources of finance

Table 16					Table 17			
Financing of Incremental Gross Block from incremental Debt					**Financing of Incremental Gross Block from incremental Equity**			
PERIOD	R^2	Intercept (t- value)	B[Slope] (t- value)		PERIOD	R^2	Intercept (t- value)	B[Slope] (t- value)
1957-2014	0.1114	-0.3326 (-1.2766)	0.0198 (2.6508)**		1957-2014	0.0044	0.1400 (1.0766)	-0.0019 (-0.4972)
1957-1976	0.052	-0.4944 (1.2492)	0.0306 (0.9936)		1957-1976	0.1291	0.3304 (2.1963)**	-0.0191 (-1.6332)
1977-1996	0.0077	-0.2165 (-0.4024)	0.0207 (1.2300)		1977-1996	0.0332	0.2194 (1.1181)	-0.0048 -(0.7863)
1997-2014	0.0380	-2.145 (-0.6284)	0.0535 (0.7950)		1997-2014	0.0002	-0.0464 (-0.0250)	0.0023 (0.0631)
1957-1992	0.2094	-0.5049 -2.1842)**	0.0314 (3.0010)*		1957-1992	0.0468	0.1984 (2.1805)**	-0.0053 (-1.2927)
1993-2014	0.0242	-0.9891 (-0.4505)	0.0316 (0.7039)		1993-2014	0.0005	-0.056 (-0.0472)	-0.0025 (-0.1028)

Table 18					Table 19			
Financing of Incremental Gross Block from incremental R/S					**Financing of Incremental Gross Block from incremental Net worth**			
PERIOD	R^2	Intercept (t- value)	B[Slope] (t- value)		PERIOD	R^2	Intercept (t- value)	B[Slope] (t- value)
1957-2014	0.1535	-0.1874 (-0.6724)	0.0255 (3.1862)*		1957-2014	0.1095	-0.0474 (-0.1511)	0.0237 (2.6247)**
1957-1976	0.0015	0.2860 (1.1112)	-0.0033 (-0.1664)		1957-1976	0.0567	0.6164 (2.2221)**	-0.0224 (-1.0400)
1977-1996	0.2446	-1.0432 (-1.6467)	0.0478 (2.4142)*		1977-1996	0.1888	-0.8238 (-1.2262)	0.0429 (2.0469)
1997-2014	0.1903	-5.9848 (-1.6256)	0.1406 (1.9392)		1997-2014	0.1557	-6.0312 (1.4277)	0.1429 (1.7178)
1957-1992	0.0311	0.1486 (0.9040)	0.0078 (1.0452)		1957-1992	0.0026	0.3470 (1.9205)	0.0025 (0.2998)
1993-2014	0.1384	-3.3657 (-1.3494)	0.0914 (1.7925)		1993-2014	0.1168	-3.4217 (-1.2116)	0.0939 (1.6262)

Table 20			
Financing of Incremental Gross Block from incremental Total capital			
PERIOD	R^2	Intercept (t-value)	B[Slope] (t- value)
1957-2014	0.1628	-0.3800 (0.8284)	0.0435 (3.3005)*
1957-1976	0.0050	0.1220 (0.3517)	0.0081 (0.3020)
1977-1996	0.2270	-1.0404 (1.1742)	0.0636 (2.2992)**
1997-2014	0.1277	-8.1762 (-1.2551)	0.1964 (1.5305)
1957-1992	0.2245	-0.1580 (-0.6626)	0.0339 (3.1373)*
1993-2014	0.0927	-4.4108 (-1.0274)	0.1255 (1.4297)
'*' indicates significance at 1% '**' indicates significance at 5%			

Source : Author's calculations

Use of the Dummy Variables: *For time slot of 20 years, 20 years and 18 years*: As differences were observed for trend between various time slots, for the purpose of testing whether there are significant shifts during these time blocks, use of dummy variable is made on similar lines as of the preceding para. The regression equation thus framed is

$$Y = ß_0 + ß_1 D_1 + ß_2 D_2 + ß_3 t + ß_4 D_1 t + ß_5 D_2 t + \mu t$$

The results are presented in Table 21.

It may be noted from the table that none of the values are found to be significant, indicating that during these time slots the intercept and slope have remained consistent and there is no major change.

Table 21: Regression of above variables on time with Dummy

Ratio	Adj.R^2	Intercept (t- value)	β1D1 (t- value)	β2D2 (t- value)	β3t (t- value)	β4D1t (t- value)	β5D2t (t- value)
Incre. Debt/ incre. G blk	0.0508	-0.3959 (-0.7864)	0.4858 (0.3794)	-1.2576 (-0.5928)	0.0183 (0.4457)	-0.0066 (-0.1182)	0.0260 (0.4484)
Incre. equity/ incre. G blk	-0.0722	0.3403 (1.3486)	-0.1583 (-0.2467)	-0.3701 (-0.3480)	-0.0203 (-0.9903)	0.0165 (0.5888)	0.0223 (0.7691)
Incre. Res sur / incre. G blk	0.1587	0.2673 (0.5144)	-0.6539 (-0.4948)	-4.1325 (-1.8878)	-0.0010 (-0.0234)	0.0252 (0.4366)	0.1019 (1.7039)
Incre. Ntworth / incre. G blk	0.1138	0.6076 (1.0383)	-0.8122 (-0.5457)	-4.5025 (-1.8262)	-0.0213 (-0.4478)	0.0416 (0.6415)	0.1242 (1.8445)
Incre. ttlcap/ incre. G blk	0.1271	0.2117 (0.2417)	-0.3264 (-0.1465)	-5.7601 (-1.5611)	-0.0031 (-0.0430)	0.0350 (0.3607)	0.1502 (1.4903)

Source : Author's calculations

Use of the Dummy Variables: *For time Pre liberalization and Post liberalization period*: For the purpose of testing whether there are significant shifts in slope and/or intercept between pre and post liberalization period use of dummy variable is made. An attempt is made to examine the shifts with reference to intercept as well as with reference to the slope. To examine significant change, if any, during post liberalization era *viz*. 1992-2014 D_1=1 is put and for pre-liberalization period D_1=0 is put. The regression equation thus framed is:

Y= ß$_0$+ ß$_1$D$_1$+ ß$_2$t+ß$_3$D$_1$t +µt

The results are presented in Table 22.

It may be noted from the table that only for Incremental R. S / Incremental Gross block and Incremental Net worth / Incremental Gross block, significant downward shift is observed in the intercept and significant upward shift is observed in the slope during the post liberalization period even though the trend during pre liberalization period was not significant.

Table 22: Regression of above variables on time with Dummy

Ratio	Adj.R^2	Intercept (t- value)	β1D1 (t- value)	β2t (t- value)	β3D1t (t- value)
Incre. Debt/ incre. G blk	0.0753	-0.5050 (-1.4524)	-0.2151 (0.1424)	0.0314 1.9435)	-0.0050 (-0.1449)
Incre. equity/ incre. G blk	-0.0451	0.1983 (1.1376)	-0.2747 (-0.3626)	-0.0053 (- 0.6563)	0.0082 (0.4758)
Incre. Res sur / incre. G blk	0.1860	0.1254 (0.3507)	-3.4485 (-2.2191)**	0.0095 (0.5725)	0.0811 (2.2929)**
Incre. Ntworth / incre. G blk	0.1399	0.3237 (0.8025)	-3.7232 (-2.1238)**	0.0042 (0.2238)	0.0893 (2.2382)**
Incre. ttlcap/ incre. G blk	0.1517	-0.1813 (-0.3002)	-3.9383 (-1.5002)	0.0356 (1.2682)	0.0843 (1.4112)
'**' indicates significance at 5%					

Source : Author's calculations

Conclusions

Following main conclusions can be drawn from the above discussion:

1. D/Net Worth has been substantially high; however, overall average is less than 1. Even when the period of 59 years is divided into sub periods, only for the block of 1976-95 it is greater than 1. This implies that on an average debt is lower than the Net worth. Thus the company is conservative in the use of Debt.

2. When the proportion of each source of funds to total capital is examined, equity/ total capital is found to be the lowest. Next is reserves & surplus and the highest proportion is found that of debt. However, when examined for various time slots, for time period 1996-2014 and post liberalization era, R.s to total capital is found to be higher than debt to total capital. For all the time periods the proportion of net worth to total capital is higher than debt to total capital indicating that the company has conservative approach towards debt.

3. When proportion of each source of finance to net block is examined debt is found to have the highest proportion during 1956-1975 and 1976-1995 and the pre liberalization period. R/s is having highest proportion of the net block when total study period is examined. For the post liberalization period also R/s is having highest proportion of the net block.

4. When financing of the gross block is examined except for incremental equity to incremental Gross Block, all ratios have shown positive trend. This when interpreted in line with discrete statistics for entire study period incremental Reserves & Surplus to incremental Gross Block is 59%, incremental debt to incremental Gross Block is 27% and incremental equity to incremental Gross Block is 8%, this exactly meets the Pecking order of Retained earnings $\rightarrow$ Debt $\rightarrow$ and $\rightarrow$ Equity.

Thus Tata Steel has followed PECKING ORDER THEORY of capital structure

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