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DETERMINANTS OF EXTERNAL FINANCE IN INDIAN IRON AND STEEL INDUSTRY

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ABSTRACT

In the present paper the determinants of external finance in Indian Iron and Steel Industry are being investigated in the framework of principle of increasing risk as proposed by Kalecki (1937). The explanatory variables considered for the study are flow of net debt, retained earnings, profit after tax, sales change variable and inventory investment. This paper used the data of public limited companies, which are non-governmental and non-financial, for the period 1999-2000 to 2010-11. The model has three specifications in which time series, cross section and pooled data is employed for estimation using ordinary least squares method. The results of the three above mentioned analyses, revealed the importance of external finance as a determinant of fixed investment in Indian iron and steel industry. Appropriate monetary and financial policies are thereby called for to strengthen the accessibility of finance by the companies under the industry. The influence of accelerator, profit after tax and retained earnings on fixed investment expenditures of the industry is found to be weak.

JEL classification numbers: E22, G31

KEYWORDS: *External finance, Fixed investment, Flexible accelerator*

1. INTRODUCTION

In general practice, firms retain substantial portion of the net profits for reinvestment purpose in their businesses. The firms prefer to use their internal funds to external ones on ground that the former entail less cost compared to the later. Internal funds involve less risked and the firms have less to fear on issue of loss of control which is generally the case with equity financing. However internal funds are not always sufficient to support the financial needs of the firms. Demand for external finance arises when the increase in assets is over and above what could be financed by internal funds. Taken in this sense the demand for external funds is a residual in nature and it is also expected to be inversely related to the internal flow of funds. The main components of external finance are borrowings from banks and other financial institutions, borrowings from government and semi-government bodies, equity and preference shares, deposits, debentures, bonds and paid-up capital. The external finance considered in the present study is a constructed variable

Net Debt (NDE): This is calculated as NDE = (Borrowings+ Trade dues and other current liabilities) - (Investments in foreign and Indian securities + Cash and Bank Balances).

Flow of External Finance (FNDE): It is the difference of net debt in two consecutive years:

$$FNDE_t = NDE_t - NDE_{t-1}.$$

The main determinants of external finance are fixed and inventory investment, retained earnings, sales

change, existing stock of funds, cost of funds, etc. The works of Meyer and Kuh (1957), Sastry (1966), Swamy and Rao (1975), Dhrymes and Kurz (1967) are some of the works in which the determinants of demand for external funds are identified.

For the present analysis the principle of increasing risk as proposed by Kalecki's (1937) has been adopted in the model of external financing. Kalecki views that 'the principle of increasing risk' is a crucial determinant of the level of fixed investment and not the principle of falling marginal efficiency of investment or capital. The increasing risk mentioned here is the increase of marginal risk associated with the amount of investment. According to the principle, the main factor that put a limit to investment is the increasing marginal risk. The limit to which a firm can borrow is dictated by the amount of indebtedness. The increase in outstanding debt in relation to its capital will increase the marginal risk. Borrowing is associated with a threat of bankruptcy and in the event of bankruptcy the firm is faced with the consequences of liquidating their assets or restructuring its finances and flawed credit record. Therefore risk is considered as an increasing function of outstanding debt. The more the outstanding debt in relation to capital the more the risk associated with fresh debt. Therefore the flow of debt is postulated to have inverse relationship with outstanding debt.

The stock of net debt (NDE) is usually considered as a proxy for risk factor and hence taken as one of the explanatory variable of external finance in the present study. Stock of net debt is expected to have negative relationship with external finance.

Theories have suggested that demand for external funds arises mainly on account of the constraint imposed by flow of internal funds. Therefore it is postulated that internal funds have negative relationship with external funds. In this study internal funds are represented by two variables Profit after Tax (PAT) and Gross Retained Earnings (RENT).

Another explanatory variable considered in the present study is investment. Firms which are expanding and even those which are established are expected to make huge investment in both fixed assets and inventories. Some of the projects may require long term investment which cannot be met through internal funds thus external financing may be resorted to. So both fixed (I) and inventory investments (IN) are expected to have positive relationship with external finance.

2.OBJECTIVES

- To examine the interdependence between external financing decision and investment decision in iron and steel industry in India
- To examine the determinants of external finance in iron and steel industry in India

3. METHODOLOGY

3.1. DATA

The source of data for this study is the Reserve Bank of India, Mumbai. The data is on non-government, non-financial public limited companies in the Iron and steel industry in India. It provides information on the liability and assets and also on income, expenditure and appropriation account.

3.2 .SAMPLE PERIOD

The company wise data are available from 1980-81 onwards. The data frequency is annual covering the period 1980-81 to 2010-11. The number of companies in the original data set was much higher but companies with fewer than twelve consecutive years of data are deleted from the data set. For the present study, the sample period is 1999-2000 to 2010-2011. However, for time series study the data has been classified into three groups. The rationale for segregating data into three groups A, B and C, in the case of time series study is to gain more units, that is, more companies can be included for the analysis. In group 'A', we have six companies with data from 1995-1996 to 2010-2011. In group 'B' there are 27 companies with data from 1997-98 to 2010-11. In group 'C' there are 38 companies with data from 1999-2000 to 2010-11. The choice of the study period is dictated by the availability of data and limited by the fact that only those companies with continuous data set have been selected.

3.3.MODEL SPECIFICATIONS

The models are estimated for cross-section, time-series and pooled time series cross section data. In the time-series study, the data have been classified into three groups. In group 'A' there are 6 companies having data ranging from 1995-96 to 2010-11. While in group 'B' there are 27 companies having data from 1997-1998 to 2010-11 and in group 'C' there are 38 companies having data from 1999-2000 to 2010-11.

The model specification are given below

$$FNDE_t/K_{t-1} = a + b\ RENT_t/K_{t-1} + c\ IN_t/K_{t-1} + d\ I_t/K_{t-1} + e\ NDE_t / K_{t-1} \quad \ldots (1)$$

$$FNDE_t/K_{t-1} = a + b\ PAT_t/K_{t-1} + c\ I_t/K_{t-1} + d\ IN_t/K_{t-1} + e\ NDE_{t-1} / K_{t-1} \quad \ldots (2)$$

Where a, b, c, d and e are regression coefficients of the explanatory variables respectively and

I = Gross Fixed Investment
K = Gross fixed assets.
IN = Inventory investment.
RENT = Gross retained earnings.
FNDE = Flow of net debt (External finance).
NDE = Net debt.
PAT = Profits after taxes
t = Time subscript.

3.4.ESTIMATION PROCEDURE

All the variables are in current prices. All the variables except sales change variable, are deflated by capital stock variable of the previous year. However, sales change variable is deflated by sales of the previous year. By deflating, we have converted the variables into ratios which are independent of the unit of measurement and scale and thereby help in correcting heteroscedasticity..

For analyzing the data we have used STATA software. The analysis is carried out for three cases, namely, cross-section data, time-series data and pooled data. In time series analysis, we begin the estimation process by testing the time series properties of the data. The study uses Augmented Dickey-Fuller (ADF) unit root test to investigate stationarity of each time series as proposed by Dickey and Fuller (1981), fortunately all the variables considered in the model are stationary of order I (0). Since the Durbin-Watson statistics do not indicate the presence of autocorrelation, there is no need to adopt remedial measures. The analysis is carried out for linear form for time series and cross section data. The parameters of the equation are estimated by the ordinary least squares (OLS) method.

In our study we use panel data consisting of pooled time series of cross sections in which one has repeated observations on the cross-section units (firms) over time. Initially, using the STATA software, we try both types of alternative panel data models namely, Random Effects and Fixed Effects models. The Hausman (1978) specification test for Random Effects Model and the F-test for Fixed Effects Model reject both these types of model specifications, and hence we use the OLS (ordinary least squares) method to estimate the empirical models with pooled cross section – time series data.

4. RESULTS

4.1. CROSS-SECTION ANALYSIS

The results of the specification (1) are given in Table (1). The R^2 ranges from 0.56 to 0.91. Fixed investment is significant in most cases except in one case and the relationship that it has with the dependent variable is a positive one. Inventory investment is also a significant explanatory variable being significant in most of the regressions. There is negative relationship between flow of net debt and retained earnings except in one case. This implies that as long as the internal funds are sufficient to meet investment needs, the firm will abstain from costly external borrowing. But when firms' internal funds are unable to meet the investment demand it will resort to external source of finance. Stock of net debt is provides good explanation for flow of net debt in less than half of the cases.

The estimated results for specification (2) are given in Table (2). The R^2 are above 0.56 in all cases. Both fixed and inventory investment variable are significant and positively influence the flow of net debt variable, as expected. Profit variable is significant and negatively related to the flow of net debt variable in more than half of the regressions. The results of this specification are in confirmation to the results of the previous specification.

4.2. TIME-SERIES ANALYSIS

The time-series regression was carried for the two specifications as in the cross-section analysis. The results of the specification (1) and (2) are given in Table (3) and Table (4). The models have high explanatory power where the value of R^2 is around 0.8 in all the regressions. Both inventory and fixed investment are good explanatory variable of the dependent variable. Again both profit after tax and retained earnings are significant and negatively related to the flow of net debt. Thus the internal source of funds is negatively related to external financing.net debt is significant in only one case hence can be consider as unimportant.

4.3. POOLED ANALYSIS

The results of the cross- section and time-series analysis suggest that the significant determinants of the demand for external funds are investment expenditure and flow of internal funds. These determinants are found to possess correct signs in most of the cases. The estimated models for pooled cross-section time-series are given below:

$$FNDE_t/K_{t-1} = 0.1036_{(1.21)} + 0.9752^*_{(6.23)} I_t/K_{t-1}$$
$$+ 0.5015^*_{(4.74)} IN_t/K_{t-1} - 0.1141_{(1.73)} NDE_{t-1}/K_{t-1}$$
$$-1.3720^*_{(-5.10)} RENT_t/K_{t-1}$$
$$R^2 = 0.8988, F = 76.61.$$

$$FNDE_t/K_{t-1} = 0.2111_{(1.61)} + 0.8095^*_{(7.59)} I_t/K_{t-1}$$
$$+ 0.7753^*_{(5.39)} IN_t/K_{t-1} - 0.4046^*_{(-2.74)} NDE_{t-1}/K_{t-1}$$
$$-1.9695^*_{(-5.74)} PAT_t/K_{t-1}$$
$$R^2=0.8926, F = 85.59.$$

In the pooled analysis the values of the R^2 are also very high which indicate the fact that the independent variables possess high explanatory power in the models. Inventory investment, fixed investment and net debt are important determinants of flow of net debt. While retained earnings, profit variables and net debt are statistically and negatively related to the flow of net debt. These results strengthen the ones generated from the cross-section and time-series analyses.

5. CONCLUSION

- Both fixed investment and inventory investment are important determinants of external finance with positive coefficients as expected.
- Internal finance is also another important determinant of external finance and the two are negatively associated.

The trend in iron and steel industry is such that the internally generated funds are inadequate to finance the investment needs (both fixed and inventory) forcing the firms to turn to the market and other institutions for finance. The results clearly indicate that external finance is use to make long term investment in fixed capital and also investment in inventories. However external funds are generally used to finance fixed investment but the present study reveals that it is also use for inventory investment. This may be due to the low profitability that the industry witnessed which has been caused by the downturns in the industry during 2001and 2008. Internal flow of funds is argued to be the cheaper source of funds compared with the method of borrowing externally. The study shows that low profits have necessitated the companies under the industry to resort to borrowings from banks and other institutions. The effect of outstanding debt, which is use as a proxy for risk, is not fully confirmed by the analyses but its existence cannot be rule out either. This study reveals that financial decisions of a firm do influence its investment decision.

6. TABLES, FIGURES AND REFRENCES

Dependent variable: $FNDE_t/K_{t-1}$ for all the tables

Table (1)

Year	con	I_t / K_{t-1}	IN_t / K_{t-1}	NDE_{t-1} / K_{t-1}	$RENT_{t-1} / K_{t-1}$	R^2	F	p
1999	.0116 (0.40)	.3282 *(2.37)	.6838 *(5.62)	-.0096 (- 0.38)	-.3753 *(-2.75)	0.8508	11.35	***
2000	.2021 (1.06)	.4328 *(2.05)	.7641 *(3.21)	-.6064 *(-2.87)	-.5183 *(-2.40)	0.9185	58.88	***
2001	.0845 (0.81)	1.653 *(2.07)	1.7635 *(2.10)	-1.1379 (-1.39)	.6510 (1.67)	0.7985	12.51	***
2002	.1092 (0.73)	1.328 *(3.42)	.6155 (1.30)	-.0258 (-0.34)	-.8958 *(-2.71)	0.5624	24.49	***
2003	.2135 (1.85)	.2331 (0.69)	.2647 (1.25)	-.4044 *(-3.19)	-0.2110 *(-2.91)	0.6973	26.17	***
2004	.0513 (0.69)	.9496 *(3.78)	.2851 *(2.24)	-.0257 (-0.36)	-.3250 *(-2.01)	0.7444	15.86	***
2005	.1310 (1.17)	1.378 *(6.32)	.8982 *(2.20)	-.1763 (-1.75)	-.8434 *(-2.35)	0.8263	19.84	***
2006	.0657 (0.98)	0.9295 *(3.59)	.1108 (1.06)	-0.1595 *(-2.73)	-.2113 *(-2.04)	0.7696	8.84	***
2008	.0626 (0.89)	.8017 *(4.20)	1.068 (1.66)	-1.0747 *(-2.62)	-1.224 *(-5.48)	0.8057	15.71	***
2009	.0551 (0.78)	1.754 *(4.93)	.2343 (0.76)	-.0317 (-0.55)	-1.157 *(-2.16)	0.6039	8.38	***
2010	.0956 (1.92)	.6713 *(3.04)	.6600 *(3.17)	-.5537 *(-2.80)	-.7894 *(-2.36)	0.8412	20.51	***

For p * *indicates coefficient is significant at 1% level,*
*** *indicates coefficient is significant at 10% level.*

For t * *indicates coefficient is significant at 5% level.*

Table (2)

Year	con	I_t /K_{t-1}	IN_t / K_{t-1}	NDE_{t-1} / K_{t-1}	PAT_t /K_{t-1}	R^2	F	p
1999	.0224 (0.62)	.6332 *(6.01)	.7261 *(4.98)	.3257 (1.77)	-.0343 (-0.28)	0.8674	22	***
2000	.2527 (1.14)	.5811 *(2.71)	.9323 *(3.91)	-.6067 *(-2.86)	-.3384 *(-2.23)	0.9292	59.01	***
2001	.0899 (0.87)	1.617 *(2.05)	.9575 (1.14)	.1385 (1.41)	-.1022 (-0.88)	0.5626	5.75	***
2002	.0680 (1.40)	.4821 *(3.35)	.4949 *(3.41)	-.2626 *(-2.23)	-.9693 *(-6.31)	0.9229	70.49	***
2003	.1950 (1.69)	.1854 (0.88)	.4472 (1.19)	-.2931 *(-3.05)	-.7262 (-1.81)	0.6591	6.89	***
2004	.0744 (0.96)	1.195 *(4.10)	.3136 *(2.38)	-.0197 (-0.27)	-.3774 *(-2.04)	0.7049	8.41	***
2005	.1483 (1.32)	1.479 *(6.27)	.8847 *(2.36)	.1797 (1.80)	-.8855 *(-2.54)	0.7131	20.5	***
2006	0.0435 (0.78)	0.5024 *(2.18)	0.1008 (1.07)	-.5954 *(-2.82)	-0.6457 *(-3.82)	0.7552	13.16	***
2008	.0521 (0.75)	.7795 *(4.14)	1.092 (1.72)	.2761 (1.68)	-1.222 *(-5.67)	0.7664	16.48	***
2009	.0549 (0.76)	.2455 (0.79)	1.717 *(4.84)	.0333 (0.57)	-1.048 *(-2.02)	0.6464	8.13	***
2010	.1462 *(3.29)	.2294 *(2.67)	.1186 *(2.18)	.1200 (1.62)	-.2378 *(-2.81)	0.8696	34.06	***

*For p * indicates coefficient is significant at 1% level,*
**** indicates coefficient is significant at 10% level.*
*For t * indicates coefficient is significant at 5% level.*

TIME SERIES RESULTS (OLS)

Table (3)

con	I_t /K_{t-1}	IN_t / K_{t-1}	NDE_{t-1} / K_{t-1}	$RENT_{t-1}$ / K_{t-1}	R^2	F	p	DW
A								
2.2527 *(2.78)	2.1245 *(2.47)	5.5920 *(5.38)	-2.4424 *(-2.23)	-1.3453 (-1.03)	0.8444	29.9	***	2.0325
B								
0.8554 (1.26)	0.2186 *(2.31)	2.3586 *(2.55)	-0.9499 (-1.32)	-2.5745 *(-2.58)	0.761	18.19	***	2.1035
C								
0.5372 (1.21)	0.8547 *(3.21)	0.8703 *(2.25)	-0.4508 (-1.84)	-0.8133 *(-2.03)	0.8398	20.09	***	2.0119

*For p * indicates coefficient is significant at 1% level,*
**** indicates coefficient is significant at 10% level.*
*For t * indicates coefficient is significant at 5% level.*

Table (4)

con	I_t /K_{t-1}	IN_t / K_{t-1}	NDE_{t-1} / K_{t-1}	PAT_t / K_{t-1}	R^2	F	p	DW
A								
0.4008 (1.79)	1.7209 *(3.84)	2.6987 *(4.15)	-1.3653 *(-2.49)	-0.6913 *(-2.18)	0.8975	34.7	***	1.9622
B								
0.3305 (0.54)	2.8996 *(2.27)	0.9483 (1.52)	-0.8154 (-1.21)	-0.8703 *(-2.12)	0.7432	15.1	***	2.1060
C								
0.5189 (1.67)	0.8500 *(2.22)	0.8830 *(2.12)	-0.2300 (-1.45)	-0.8627 *(-2.65)	0.8234	19.6	***	2.0528

For p * indicates coefficient is significant at 1% level,
*** indicates coefficient is significant at 10% level.
For t * indicates coefficient is significant at 5% level.

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