



## Does financial liberalisation reduce credit constraints:

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*The study analyses the determinants of investment of the private corporate manufacturing sector in India in the context of financial liberalization. Though financial liberalization is still on the way, based on the theoretical argument of financial liberalization and its limitations in the context of asymmetric information and market imperfections, such an analysis assumes significance. Because, in imperfect financial markets with asymmetric information, external funds are more expensive than internal funds and firms have to follow a hierarchy in which cheaper funds are preferable to more expensive ones and internal funds are the most preferred ones. We tested the hypothesis that whether financial liberalization had an impact on firms' investment decisions with respect to cash flow and debt. The study found that small firms are facing financial market imperfections in the form of liquidity constraints since it is seen that credit constraints were not eliminated or relaxed for these firms. Against this, one surprising result is the positive and significant coefficient of debt-to-capital ratio for large firms irrespective of the financial liberalisation effect. From further enquiry we found that the positive and significant impact of debt on investment for large firms has changed once we estimate the model for large firms according other categories based on group and export orientation. It is seen that the positive and significant impact of debt does not hold for large non-group and non-exporting firms. On the other hand, the positive effect of debt remains the same for large group and exporting firms. To conclude, market imperfections exist in the financial markets that prevent an economy wide efficiency in the post liberalisation period.*

*Keywords: Information Asymmetry; Market Imperfection; Investment; Financing Pattern, Corporate Sector*

*JEL Codes: D82, D92, G3, G38*

### 1 The context

The broad objective of financial sector liberalisation in India in 1991 was to ensure that the market oriented financial sector contribute positively to economic growth by providing access to external funds<sup>1</sup> and by channelling investment towards growing profitable industries and firms. In the new milieu of financial reforms, market forces

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<sup>1</sup> A firm can mobilise resources mainly from two sources viz., internal and external. While internal sources are retained earnings and depreciation, external sources include borrowings (Banks and Development Financial Institutions) and equity capital.

increasingly govern the allocation of funds and this has implications for the availability, cost and quantum of funds, which *ceteris paribus* will enable the private corporate sector (hereafter corporate sector)<sup>2</sup> to make an optimum combination of sources of funds for industrial investment and its pace. Financial sector liberalization, it was expected, will alter the parameters of investment functions because of the relaxation of credit constraints and influence of reduced borrowing costs on investment decisions (Guncavdi et al. 1998).

However, an analysis of financing pattern of Indian private corporate sector<sup>3</sup> reveals certain disturbing results. One of the most striking aspects of Indian private corporate financing is the increasing dependence of firms on internal funds after reforms rather than external funds. It is seen that a booming stock market has not witnessed any significant increase in money raised by firms from the capital market. Though there was boom in the new issues market in the initial years of reforms, the number of issues and amount raised by the corporate sector met with wide fluctuations in the later period of reforms. The number of issue of capital had gone up from 86 in 1992 to 577 in 1995 and then registered a decline to 22 in 2004. Even with this low performance, the average BSE Sensex has increased tremendously. The Bombay Sensex rose from 3,727 on March 3, 2003 to 5,054 on July 22, 2004, and then on to 6,017 on November 17, 2004, 7,077 on June 21, 2005, 8,272 on September 2, 2005 and 10,113 on February 15, 2006. The implied price increase of more than 100 per cent over a 19-month period and 33 per cent over the last few years is indeed remarkable. The increase in new capital issues raised grew only at a lower rate than the BSE Sensex (SEBI 2007). To conclude the jigsaw puzzle, even the regime of low interest rates and, more intriguingly, even in the phase of a booming stock market, firms in the corporate sector have a clear preference for retained earnings over external sources (borrowed funds in terms of debt and equity). This pattern supports the pecking order theory<sup>4</sup> and the existence of information asymmetry even after financial liberalization. Against this dismal performance, it is to be analysed that in spite of a substantial decline in interest rates and stock market liberalisation, why is the Indian corporate sector depending more on internal resources than on external resources from financial markets? Relying on recent theoretical studies on the link between financial market imperfections and real activity, we will examine whether the deregulation of the financial sector has resulted in any relaxation of financial constraints that firms face in their investment behaviour.

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2 In this study, the corporate sector is defined as non-financial, non-government joint stock companies. The corporate sector consists of closely held (private limited) and publicly held (public limited) companies, with approximately 6.19 lakh registered companies as of June 2003, about slightly less than half of them are engaged in manufacturing. As a percentage of GDP, the estimated paid-up capital of the non-government companies constitute 12.1 per cent (Government of India 2003)

3 We have made use of data on sources of finance obtained from 'Hand Book of Statistics on the Indian Securities Market' provided by Securities and Exchange Board of India (SEBI, 2007).

4 The reason for questioning the role of financial liberalization in the recent empirical literature is due to the emergence of 'financing hierarchy hypothesis' or 'pecking order hypothesis'. The hypothesis says that firms prefer internal funds to external funds because external funds are more expensive.

## 2 Financing patterns and investment: the theory

According to the neoclassical theory of firm investment, since financial markets are perfect, there is neither transaction nor information costs, internal and external funds are perfect substitutes in terms of financing investment, and, firms have access to unlimited sources of funds. In other words, financial structure of firms does not matter in investment decisions and firm investment should not be constrained by any lack of funds (Modigliani and Miller 1958). However, M-M theorem fails to explain the firm's investment decisions, if there is asymmetric information in the market. Financial markets, especially those of developing countries are imperfect in nature in the sense that the suppliers of funds have less information about the profitability and risks of investment projects than firms have.<sup>5</sup>

The financial structure of firms affects investment when there exists a wedge between the costs of external and internal finance in an imperfect financial market. First, market participants have different access to information. Myers and Majluf (1984) demonstrate that the cost of external funds is higher than that of internal funds owing to information asymmetry between lenders and borrowers. Second, managerial agency problems arise when managers who are not owners pursue their own interests (Jensen and Meckling 1976). The firm is required to pay a premium for external financing if outside investors suspect the managers who are not owners pursue the interests of shareholders. Finally, transaction costs associated with the issuance of debt and equity might raise the cost of external financing. Under such financial constraints, investment decisions depend on the availability of internal funds. Furthermore, the heterogeneity of firms implies that investment of financially constrained firms' is more likely to be affected by the availability of internal funds. With credit market imperfections, borrower's investment decisions will be "excessively sensitive" to current cash flow. The external finance premium and credit rationing and other imperfections suggest that investment is sensitive to its internal funds.

Accordingly, the financial structure (debt-equity structure) of a firm will influence its investment decision and shocks to the balance sheet will alter the evolution of investment over time. If the financial markets are segmented as in the case of most developing countries, the access of financial resources may differ for firms according to their market status, group, age, size etc. There will be a situation where some group of firms will be more dependent on internally generated funds for investment. These firms may sometimes have to forgo some investment levels due to extreme financial constraints in the financial system. In this type of situation, we expect the investment to be positively associated with cash flow or retained earnings of the firm.

The empirical works generally adopted a framework to identify an a priori proxy for the degree of financial constraints and then used this proxy to sort the firms in question in to categories of different degrees of financial constraints. Fazzari et al. (1988) pointed out that there are differences in access to external finance by firms

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5 The need for perfect information arises from the fact that in firm financing, though the firms receive finance today returns will be provided to suppliers of capital only in the future.

according to relative maturity. They found that less matured firms have inferior accesses to external finance. They also concluded that cash flow, as a measure of liquidity is an important determinant of investment. Utilising the dividend-payout ratio as a measure of financial constraint faced by firms, they had demonstrated that investments of financially constrained firms respond more sensitively to changes in cash flow. Since then, it has become a basic research methodology to examine the difference in sensitiveness of investment to cash flow between a priori segmented firms. Fazzari et al. (2000) also strongly believe that the *a priori* firm classification approach is feasible to be used in investigating financial constraints facing firms. Existing empirical studies have used various segmenting variables to identify unobservable financial constraints, for example, group affiliation in Hoshi et al. (1991), firm size in Devereux and Schiantarelli (1989), issuing commercial paper and bond ratings and exchange listing in Oliner et al. (1992). A large number of studies considered the investment behaviour between firms having different age structure. Regarding age, it is generally opined that banks should have better information about older and more matured firms due to longer relationships and repeated contracts. Having explained the theoretical views we empirically estimate investment equations for various groups of firms in the Indian private Corporate Manufacturing Sector to analyse whether credit constraints has reduced after financial liberalisation.

### 3 Empirical model, data and construction of variables

#### 3.1 The model

We carried out our empirical analysis by estimating an unrestricted investment equation of the lagged augmented accelerator model. An advantage of the augmented accelerator model<sup>6</sup> is that it consists of variables that are observable. The output term ( $\Delta Y_{it}/K_{i,t-1}$ ) forms the basic variable in the model. The general specification for our regression Equation is:

$$I_{it}/K_{i,t-1} = \alpha + \beta_1 (I_{t-1}/K_{t-2}) + \beta_2 (\Delta Y_{it}/K_{i,t-1}) + \beta_3 (S_{it}/K_{i,t-1}) + \beta_4 (D_{it}/K_{i,t-1}) + u_{it}$$

where, I = Investment; K= Capital Stock; Y = Output; S = Cash Flow; D = Stock of outstanding debt;  $\beta_1, \beta_2, \beta_3$  and  $\beta_4$  are parameters and  $u_{it}$  is the disturbance term.

$u_{it} = \varepsilon_{it} + \lambda_i$  in which  $\lambda_i$  is the firm specific fixed effect, and  $\varepsilon_{it}$  is a random error term.

6 Although this model is fairly standard in the investment literature, it is subject to criticism. It is argued that the simultaneous inclusion of cashflow and debt may reduce their explanatory powers. For instance, if firms with higher cash flows are more profitable, their investment would be positively responsive to cash flows, even though they encounter no financial constraints. Despite these criticisms, a number of empirical studies have used the level of cash flows as a proxy for the change in net worth (from internal funds) because cash flows are virtually the only measure available for many firms. In fact, the augmented accelerator model is among the most successful empirical ones in the sense that it better explains the behaviour of firm investment (Fazzari et al,1988).

### 3.2 Data and variables used for the study

The data used is the centre for Monitoring Indian Economy's (CMIE) manufacturing firm level data available from the electronic database PROWESS. The sample consists of 19852 observations on 2269 firms. The period of analysis is 1993/94 to 2003/2004. The variables used for study are as follows.

*Change in Output ( $\Delta Y_{it}/K_{i,t-1}$ ):* The inclusion of change in output will enable us to capture the expected change in demand for the firm's product. This forms the basis of accelerator theory. We take the ratio of value of change in output to capital stock ( $\Delta Y_{i,t}/K_{i,t-1}$ ) as a measure of output since there may be lags either in the investment decisions and/or in the implementation of these decisions.

*Lagged value of Investment (INV (-1)):* Regarding the effects on investment we included the lagged value of investment-to-capital ratio ( $I_{i,t-1}/K_{i,t-2}$ ). This is because the importance of the previous investment level may some times determine the present investment decision of firms.

*Cash Flow (CASHFLOW):* We use the ratio of gross cash flow before interest and a tax to capital ( $S_t/K_{t-1}$ , gross operating surplus) to capture the liquidity position of the firm. Specifically, the positive and significant coefficient of cash flow is indicative of no finance constraint.

*Debt to Capital Ratio (DEBT):* Another regressor used is Debt to Capital ratio (leverage ratio) ( $D_t/K_{t-1}$ ). We have taken debt as the sum of both short-term (banks) and long-term (development financial institutions) borrowings of firms. A better functioning of financial system would imply investment is less determined by the firm's internal resources and less negatively affected by leverage, which, in turn, would imply significant and non-negative magnitude on the coefficient DEBT (Fazzari et al. 1988).

*Financial Liberalization Index (FLIN):* Financial Liberalisation Index through dummies as we assigned, takes value zero, one, two or three, depending on whether the financial sector is fully repressed, partially repressed, largely liberalized or fully liberalized along each of the dimensions of financial sector liberalisation in each year. These dimensions include (a) interest rate liberalisation, (b) reduction in reserve requirements, (c) money market reforms, (d) pro-competition measures, (e) capital market reforms, (f) legal reforms, (g) international financial liberalisation etc. The basic methodology followed for this purpose is from Bandiera et al. (2000) and Abiad and Modi (2003). We have used the method of principal component analysis (PCA) to reduce a large set of variables to a small set that still contains most of the information in the large set.<sup>7</sup>

The summary measures of variables used in the model are given in Table 1.

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7 The Dummies assigned, principal components and trends in financial liberalisation index etc can be obtained from the author on request.

Table 1.  
Summary Measures of Variables

Variable	Mean	Standard Deviation
I/K	0.201	0.252
Y/K	0.312	0.395
S/K	0.243	2.246
D/K	0.375	0.2986
Number of firms	2269	
Number of observations	19910	

Source: Data Collected from Prowess Database, CMIE

## 4 Estimation and results

### 4.1 Issues in estimation

In the case of panel data, the estimation of the model using the ordinary least squares (OLS) may yield unsatisfactory results, because dynamic investment models are likely to suffer from endogeneity problem. The endogeneity problem arises mainly due to two reasons. First, in a dynamic investment model, there is the presence of lagged dependent variable. The presence of lagged dependent variable makes the estimates inconsistent. Second, there is the problem of correlation of error term with output and cash flow. Suppose there is a technology shock in terms of increase in productivity, then investment will increase and as a result output and cash flow will be higher. Since the error term captures a technology shock to the profit function, it may be correlated with explanatory variables such as output and cash flow. In order to overcome these problems, the Generalized Method of Moments (GMM) estimation is widely used for dynamic panel data models.

The investment equations in our empirical analysis have been estimated in first differences to eliminate the fixed effects in the model. This will help us to control for the firm specific effects. We have used the Generalised method of Moments to allow for the potential endogeneity of the independent variables. The appropriate lagged values of the right hand side variables are used as instruments. We have used full instruments of second lag onwards in the models estimated. The consistency of the GMM estimator depends on whether the lagged values of the micro variables are valid instruments in the regression procedure. A necessary condition for the validity of such instruments is that the error term be serially uncorrelated. If the model has been transformed to first difference as we do in our estimation, first order serial correlations are to be expected but not second order. In the absence of higher-order

serial correlation, the GMM estimator provides consistent estimates of the parameters.

To address these issues, we present two specification tests suggested by Arellano and Bond (1991). The first is the Sargan test of over-identifying restrictions, which tests for the overall validity of the instruments by analyzing the sample analog of the moment conditions used in the estimation process. The second test examines the hypothesis that the error term differentiated regression is not-second order serially correlated, which implies that the error term in the level regression is not serially correlated. The failure to reject the null hypotheses in all cases provides support to model estimation. From the Regression, we report m1 test of the existence of first-order serial correlation, m2 test of the second order serial correlation, and a robust Sargan test of the over identifying restrictions that the estimator exploits. For the estimation of our unbalanced panel data on Indian private corporate manufacturing firms we have used the Dynamic Panel Data (DPD) technique<sup>8</sup>. The estimation is carried out using the OX Package.

## 4.2 Results and discussion

In our empirical analysis, our central question is that, what are the variables that are most likely to determine a firm's decision to invest? In order to carry out the empirical investigation we have to capture the importance of market segmentation. We try to estimate investment levels as determined by cash flow (expected profitability) and debt-to-capital ratio (the degree of financial leverage). The theoretical considerations suggest that, while profitability should have a positive effect, degree of financial leverage should have a negative effect on the level of investment under market imperfections due to asymmetric information. In a perfect financial market world, since the costs of internal and external funds are the same and the firm is supposed to have access to an unlimited amount of external funds, the investment of the firm is not sensitive to internal funds. If the financial market is imperfect, the additional cost of external funds increases at an ever-increasing rate. Therefore, an increase (decrease) in internal funds will lower (raise) the cost of funds that the firm uses to invest, thereby increasing (decreasing) its investment. This means that investment of the firm is positively correlated with its internal funds. Moreover, if the measure of cash flow has a positive impact on investment; it means the existence of constrained access to credit markets. Because in the absence of constrained access to resources, firms would borrow as much as needed to maximise profits, and cash flow would not be constraining.

The results of the model 1 and model 2 estimated by assuming the condition that the slope coefficients are same for all firms are given in Table 2. We start with the coefficient of lagged investment in the model. The coefficient on lagged investment (INV (-1)) had shown a positive and highly significant coefficient means that investment rates show inertia. That is, overtime, they are serially correlated even after

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8 The program DPD (Dynamic panel data) has been used in the estimation. See Arellano and Bond (1988, 1991) for specification of Dynamic Panel data.

controlling for all relevant variables. This implies that the effects of a change in a given investment decision will fully realise only after a number of years. Thus for the entire period considered, we observe a significant dynamic component represented by the lag of the investment to capital ratio. As in the case of lagged investment, the estimated coefficient for the output is also positive and significant. In other words, an increase in output leads to an increase investment. It indicates a determining role of accelerator (demand) and investment opportunities in determining investment.

Table 2.  
Estimation Results of Financial Liberalisation and Investment–All Firms

Dependent Variable ( $I_t/K_{t-1}$ )	All Firms	
	Model 1	Model 2
Constant	-0.146* (-5.53)	-0.056* (-4.32)
INV (-1)	0.002** (2.03)	0.005** (1.89)
OUTPUT	0.019** (2.82)	0.036* (3.99)
CASH FLOW	0.062* (3.25)	0.105** (2.49)
DEBT	0.171** (2.32)	0.235* (4.91)
FLIN*CASH FLOW	-	-0.332** (2.08)
FLIN*DEBT	-	0.403* (4.99)
m1	-2.306 [0.000]	-2.167 [0.000]
m2	-1.096 [0.173]	-0.1280 [0.230]
Sargan Test	139.2 [0.538]	207.6 [0.469]
Number of Firms	2269	
Observations	19852	

Note: \* and \*\* shows significance levels at 1 percent, and 5 percent  
Given in Parentheses are t - statistics except for m1, m2 and Sargan test.  
m1 is the test for first order serial correlation  
m2 is the test for second order serial correlation  
Sargan test gives the over identifying restrictions  $X^2(p)$

It is seen from model 1 that the coefficient of cash flow is positive and highly significant. The positive and significant coefficient of the cash flow (0.062) variable indicates that cash flow strongly affect investment. This result is consistent with the existence of a financing hierarchy. Cash flow provides the only source of finance for those firms that are liquidity constrained, and for those firms that do have access to external market, cash flow provides a relatively cheaper form of finance (Mills et al. 1994). It is also seen that the sign of the coefficient on the debt to capital ratio (leverage) is positive (0.171) and significant at 5 per cent level, which means that accumulation of debt does not hinder outside financing. This goes against the basic theoretical understanding of its negative association with investment based on agency-cost arguments in the presence of asymmetric information. Because it is often pointed out that, higher levels of debt result in an increased probability of financial distress and the demand for higher returns by potential suppliers of funds. If external financing costs increase with the degree of leverage, the leverage ratio should be



negatively associated with investment. But the result of debt ratio in our model for all firms does not support the argument that it will impede investment<sup>9</sup>.

#### 4.2.1 Financial liberalisation and credit constraints

Up to this, we were discussing the investment behaviour for the entire period considered for the study. Now our question is, does this behaviour changes with financial deregulation? To investigate this, we now analyse how firms' behaviour has been affected by the deregulation in financial markets. The main emphasis of the study is on the response to liberalisation in financial markets and hence of the coefficients of cash flow and debt variables. To test whether financial liberalization has affected the financing constraints of firms, the variables cash flow and debt are interacted with financial liberalization index (FLIN).

In model 2, estimates of the interaction terms (CASHFLOW\*FLIN and DEBT\*FLIN) for all firms are given. We estimate the coefficients of cash flow and debt ratio to analyse how the financing behaviour of sample firms have changed with financial liberalisation. From model 2, it is seen that when we interact with FLIN, the coefficient of cash flow has come down and became negative and significant (-0.332) showing less importance for internal resources in financing investment. This means that financial liberalisation has led to a significant reduction in financing constraints. In the case of debt ratio, the coefficient of debt has increased with financial liberalization indicating a larger role for debt in financing investment after liberalisation of financial markets. This suggests that with financial liberalisation credit constraints has reduced. The overall conclusion is that the measures of deregulation in financial markets have had its impact of mitigating resource constraints in terms of external finance for investment. However, the positive and significant debt ratio even after liberalization for all firms tends us to make further analysis in the light of our theory suggesting a negative association between debt and investment under financial market imperfections. In other words, we now turn to estimate investment functions to examine whether credit constraints has reduced for all types of firms as a result of financial liberalization.

#### 4.2.2 Impact across size categories

To cast light on the source of the positive sign of debt on investment for all firms, we try to experiment the estimation for different size categories of firms. For the analytical purpose we use size as a base to identify firms that should be more likely to face information-based liquidity constraints in resource mobilization.

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9 Harris et al. (1994) find a negative association between investment and the debt-to-capital ratio for Indonesian firms.

Table 3.  
Estimation Results for Liberalisation on Investment- Size groups

Variables	Model 3 Small Firms	Model 4 Large Firms
Constant	-0.295** (-2.92)	-0.509* (-3.86)
INV (-1)	0.038** (2.19)	0.008** (2.52)
OUTPUT	0.012** (1.95)	0.114** (2.05)
CASH FLOW	0.166 ** (2.98)	0.072 (1.58)
DEBT	0.139* (3.28)	0.214** (2.88)
CASH FLOW*FLIN	0.237** (2.36)	-
DEBT *FLIN	-0.019** (2.12)	-
CASH FLOW*FLIN		0.108** (2.29)
Debt*FLIN		0.389** (1.99)
m1	-0.113 [0.000]	-0.365 [0.000]
m2	-2.125 [0.169]	-2.824 [0.156]
Sargan Test	63.45 [0.188]	115.74 [0.298]
Number of firms	819	1450

Note: \* and \*\* shows significance levels at 1 per cent, and 5 per cent  
Given in Parentheses are t - statistics except for m1, m2 and Sargan test.  
m1 is the test for first order serial correlation  
m2 is the test for second order serial correlation  
Sargan test gives the over identifying restrictions  $X^2(p)$

In models 3 and 4 of Table 3 we differentiate between small and large firms respectively to analyse whether investment behaviour and finance constraints differ across different firm sizes. We have considered firms having value of gross fixed assets below 50 million Rs as small firms and firms having value of gross fixed assets above 50 million Rs following Government of India (2003). We specifically examine the effect of cash flow and debt variables on investment with financial liberalization for small and large firms.

The picture obtained from model 3 seems very interesting. We find that financial liberalization has not reduced or relaxed the dependence of small firms on internal funds. The estimated coefficient of cash flow on investment has increased from 0.186 before financial liberalization to 0.237 when we interact with financial liberalization index. Evidence also suggests that, with financial liberalisation, investment remains to be negatively affected by the debt-to-capital ratio (-0.019) at 5 per cent level significance. These results support the hypothesis that they were dependent on internal funds to finance their investment even after financial reforms. They also faced an increasing cost of external funds as their leverage increased, as suggested by the negative and significant sign of the leverage coefficient. This suggests that small firms are still credit constrained and liberalisation has not made any significant improvement in smaller firms' access to external finance.

Now if we consider large firms' investment behaviour in model 4, it is noted that changes in financial markets does not seem to have similar effects on large firms' financing behaviour. For large firms internal funds or profit was less important in augmenting investment. However, the positive coefficient of cash flow which was relatively small and insignificant for large firms (0.072) before liberalisation has increased (0.108) and became highly

statistically significant when we interact with financial liberalization index.<sup>10</sup> On the other hand, the debt-to capital ratio coefficient is significantly positive for large firms even after considering the effect of financial liberalisation. The result seems to suggest that for larger firms, having a higher degree of leverage increase their capability to mobilize external funds. In other words, unlike small firms, large firms were not credit constrained irrespective of financial liberalisation policies<sup>11</sup>. One possible explanation for this is that, having obtained debt in the past may act as a signal to financial intermediaries like banks and other institutions about the firm's credit worthiness. From the estimated coefficients of cash flow and debt ratio, it can be concluded that while cash flow exerts a positive influence, debt is negatively affecting investment of small firms. On the other hand, for large firms debt shows positive and significant coefficient. To summarise, the results lend credence to the fact that the financial liberalization reduced financing constraints mainly confining to large firms.

#### 4.2.3 Testing for other attributes – group and export orientation

The above result of positive and significant coefficient of debt for large firms in both periods poses a question for further enquiry. The question is that, what are the factors that can explain this result? We may have to think that, there are attributes other than firm's size that affects the investment behaviour. We would hypothesise that being in a group (business house) or in export oriented firms help firms to have better access to various sources of external finance.<sup>12</sup> Our attempt is to shed light on the question, why the coefficient on the degree of leverage is positive for large firms? For this in Table 4, we allow the debt (degree of leverage) to differ between larger firms that belong to a business house (group) and those which do not belong to a business house (non business house or non- group) in model 5. We also made estimation by allowing the coefficient of the degree of leverage of the larger firms to differ between those who are exporting and domestic market oriented firms (non-exporting) in model 6. The select coefficients on cash flow and debt are given in Table 4.

In model 5 and 6 of Table 4, the behaviour of the cash flow remains the same as in the case of previous models.<sup>13</sup> But the debt variable for group and export firms gives

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10 It will be worth mentioning in this context the study by Devereux and Schiantarelli (1989) on Italian firms. In their study they showed that large firms are more sensitive to cash flow than small firms. They argued that large firms have a lower relative cash flow, and the agency costs are higher due to the complex ownership structure.

11 In the pre liberalisation period, large firms often tend to corner a significant chunk of the preferential credit by virtue of political economy considerations, which tends to disappear once liberalisation begins to take effect, when commercial considerations assumed importance. However, our analysis tends to suggest that even after financial liberalisation small firms continued to be credit constrained.

12 It is generally argued that large firms are quite often belongs to group firms (business houses) or export-oriented firms. Thus the positive and significant relationship between debt and investment for large firms may be the impact of firms association with foreign markets. This association mainly comes from the export orientation. If firms are export oriented, they may be less sensitive to foreign exchange risk and therefore have a better position to borrow in the cheaper foreign markets. One plausible explanation is in the way a group's head office assigns its borrowings to establishments that belong to the group or business houses. (Harris et al. 1992).

13 Since our primary interest is on debt coefficients we have not reported all the results including coefficients on cash flow. Cash flow coefficients for all the categories remain the same as similar for large firms in model 4, except small difference in magnitudes.

an interesting pattern. Following the theoretical links, in a world of asymmetric information and agency cost, the leverage coefficient is expected to be negative.

While large group and exporting firms shows a positive and significant debt ratio coefficient in both pre and post liberalisation periods, in the case of non-group (individual) and domestic oriented (non-exporting) firms, the coefficient on debt to capital ratio was significantly negative in both periods. What emerges from this is that the positive and significant relationship between the leverage and investment for large firms does not hold for non-group and non-exporting large firms. It is negative and significant for both individual firms and non-exporting firms indicating the presence of credit constraints for them. One may conclude that the positive and significant debt to capital coefficient for large firms is due to the advantages derived by them being a group or an exporting firm.<sup>14</sup> The only difference in result between large group and large exporting firms is in the magnitude of the coefficient and not the sign of the coefficient. The basic investment behaviour is that being an export firm or belonging to a group firm helps them to accrue the benefits of financial liberalization.

Table 4.

Estimated Results of Debt for Large Firms according to Market Orientation and Group-Select Coefficients

Dependent Variable ( $I_t/K_{t-1}$ )	Large Firms Model 5
DEBT*Export	0.220** (1.83)
DEBT*Export* FLIN	0.132** (2.34)
DEBT*Non-Export	-0.169* -(3.55)
DEBT*Non-Export, FLIN	-0.010** (0.220)
m1	-0.868 [0.000]
m2	-1.023 [0.451]
Sargan Test	160.81 [0.532]
Dependent Variable ( $I_t/K_{t-1}$ )	Large Firms Model 6
DEBT*Group	0.158** (2.22)
DEBT*Group*FLIN	0.196** (2.98)
DEBT*Non-Group	-0.056* -(2.98)
DEBT*Non-Group* FLIN	-0.006** -(1.82)
m1	-0.145 [0.000]
m2	-1.310 [0.756]
Sargan Test	206.4 [0.452]

Note: \* and \*\* shows significance levels at 1 percent, and 5 per cent

T-statistics are given in parantheses

M1 is the test for first order serial correlation, n (0,1)

M2 is the test for second order serial correlation

Sargan test gives the overidentifying restrictions  $X^2$  (p)

14 To put in another way, the positive and significant relationship between debt and investment for large firms may be the impact of firms association with foreign markets. This association mainly comes from the export orientation. If firms are export oriented, they may be less sensitive to foreign exchange risk and therefore have a better position to borrow in the cheaper foreign markets.

## 5 Conclusion

The theory implicitly assumes that asymmetric information and market imperfections in the credit and capital markets prevent the efficient mobilisation of resources, which hinder an economy wide efficiency. The econometric evidences in our study provide qualified support for these theories. At the aggregate level, the result suggests that with financial liberalisation credit constraints have reduced. We have analysed whether this result is true for different size firms. It was found without doubt that small firms are facing financial market imperfections in the form of liquidity constraints. This implies that financial liberalisation has not improved the access to external finance for small firms. However, one surprising result is the positive and significant coefficient of debt-to capital ratio for large firms irrespective of the financial liberalization effect. This goes against the basic theoretical understanding of a negative association. It means that financial liberalisation has helped the large firms to access debt after financial liberalisation. From further enquiry we found that the positive and significant impact of debt on investment for large firms has changed once we estimate the model for large firms belongs to various categories. It is seen that the positive and significant impact of debt does not hold for large non-group and non-exporting firms. On the other hand, the positive effect of debt remains the same for large group and exporting firms. This implies that being in a group or having export orientation helped them to have access to credit markets. Thus it is concluded that the financial liberalisation reduced the financial constraints basically for large group and exporting firms. The differences in the results on the determinants of investment across different sized firms in the Indian context suggest that the impact of financial liberalisation on investment is influenced by the differences in the financial structure of firms. The study questions the efficacy of financial liberalization process by stating that market imperfections exists in the financial markets even after the reforms that prevent an economy wide efficiency.

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