CHAPTER VI
FINANCING PATTERNS IN INDIAN CORPORATE SECTOR: COMPOSITE REGRESSION RESULTS

The issue of capital structure has been examined extensively in the past decades to understand the importance of various sources of finance in financing capital expenditure decisions. Modigliani and Miller (1958)\textsuperscript{188} show that when a firm is operating in perfect markets, financing policies and capital structure decisions are irrelevant in maximizing firm value; and the firm’s value-maximizing real investment decisions are independent of its financing decisions. However, the authors’ conclusion may not hold good in the current scenario as the recent literature has contended that most firms operate in incomplete or imperfect markets, and external funds are more expensive than internal funds.

As the results of existence of market imperfections, investment decisions are found not independent of financing decisions and capital structure decisions. Donaldson (1961)\textsuperscript{189} shows that managers list retained earnings, debt and outside equity in decreasing order of priority for raising funds to finance investment decisions. This financing hierarchy is popularly known as pecking order of financing choices. Various other authors including, Mayer (1988)\textsuperscript{190}, Fazzari et al. (1988)\textsuperscript{191} and Kaplan and Zingales (1997)\textsuperscript{192} have supported pecking order theory over independence of financing and investment decisions.

This chapter aims to analyze the financing pattern of Indian corporate sector for the period 1994-95 to 2008-09 in terms of usage of different sources of finance to fund the investments. One way of assessing the relationship is through correlation analysis between investment and various sources of finance whereby correlation

coefficient can be observed and interpreted. But this methodology does not consider other factors affecting investment. Moreover, correlation does not establish cause-effect relationship. Hence, a multivariate framework has been used to relate financing patterns to investment by applying panel data technique. This chapter presents empirical results based on multivariate analysis.

This chapter has been divided into six sections. Section 6.1 explains the rationale behind choice of accelerator cum cashflow model for the present study. The above mentioned model has been specified in Section 6.2. The next two sections, Section 6.3 and Section 6.4 present discussion on empirical analysis and estimation and results respectively. Section 6.5 deals with existence of U-shaped relationship between investment and cashflows. The last section, Section 6.6 summarizes the chapter.

6.1 CHOICE OF THE MODEL

A review of relevant literature suggests that theories of investments primarily revolve around accelerator model, cash flow accelerator model and Q theory. Each one of these variables has been discussed below.

Accelerator model exhibits a linear relation of current investment with current and past changes in output. It presumes that the desired capital stock at any point of time is a constant multiple of output, Y. Hence, an increase in output necessitates an increase in capital stock. The set of its limitations include the presumption of full utilization of capital stock and ignorance of lags in investment decisions and expectations formation. Nevertheless, flexible accelerator model overcomes these shortcomings by taking expected future output as the weighted average of past output to permit partial and delayed adjustment.

Accelerator-cashflow model maintains that the quantum of investment spending is dependent on the amount of profit that a firm is earning. Studies by
Grunfeld (1960)\textsuperscript{193} and Eisner (1967\textsuperscript{194}, 78\textsuperscript{195}), Bagchi (1962)\textsuperscript{196} and Sarkar (1970)\textsuperscript{197} have used profit as a determinant of investment.

Permanent income theory on the other hand rests on a significant relationship of current capital expenditures with rate of change in demand over a number of periods in the past. Alternatively, Jorgenson (1963)\textsuperscript{198} in his neo-classical model of investment explains a process of capital stock adjustment to an optimal level with prominent influence of relative factor costs. He advanced Fisher’s analysis by using marginalist approach (where marginal productivity of capital and marginal cost are in balance) and also by inclusion of depreciation, expected capital value changes and interest rates into his concept of capital. However, this model deduces that capital stock was at optimal level in the previous period. The relaxation of this assumption limits the possibility of defining lagged capital as a function of output and user cost of capital. Various other simplifying assumptions like static expectations, instantaneous capital stock adjustment, no adjustment costs and completely reversible investment decisions limit its application. In the Indian literature, this theory has been empirically tested by Dixit (1962)\textsuperscript{199}.

The securities value (Q) model however, attempts to explain investment on a financial basis in terms of portfolio balance. It is based on the premise that if the market value of a firm exceeds its replacement cost of assets, it can increase its market value by investing more in fixed capital. Conversely, if market value of a firm


is less than replacement cost of its assets it can increase the value of shareholders equity by reducing its stock of fixed assets. A number of limitations encountering this model include serial correlation and inaccurate measurement of components of Q. Moreover, the stock markets in India are not efficient in strong form which renders the measurement of accurate Q very difficult.

The present study plans to use accelerator- cashflow model as the basic model of analysis as output and internal funds seem to be the most significant factors in explaining investment in Indian corporate sector. A majority of the studies in India have used accelerator, accelerator cashflow models due to data availability constraints attached to user cost of capital concept of neoclassical model. Moreover, a large body of international literature also uses the Q-models to explain investment behavior. The Q-model claims that all required information to guide the firm’s investment decision is summarized in Q. In particular, the magnitude of internal funds known to the market should have no incremental explanatory power beyond Q. However, in an imperfect capital market, the Q model may not be a recommended framework for investment analysis. Due to the presence of asymmetric information, market expectations might not get truly reflected in the insiders’ valuations of investment opportunities. In such an environment, cash flow would be a better measure of investment opportunities than Q. Therefore, in the context of developing countries like India, where processing of information is inefficient, investment would be more sensitive to cashflow than to Q and the Q model might not add extra explanatory power over cash flow. Hence, markets in India are not efficient enough to echo the true value of firms, thereby restricting the usage of Tobin’s Q.
6.2 MODEL SPECIFICATION

To understand the significance of financing patterns in corporate investment, the model used by Clark et al (1979)\textsuperscript{200} with U.S. based data and by Gangopadhyay, Lensink and Molen (2001)\textsuperscript{201} with Indian dataset has been used in the study. In the model Clark et al integrated accelerator and internal funds as follows:

\[ I = f (\text{output, internal liquidity}) \] \hspace{1cm} 6.1

Where “I” is investment, output represents accelerator and cashflow from operating activities have been used as a proxy for internal funds.

The essential feature of this model is that it controls firms’ investment opportunities through output and studies the sensitivity of investment to internal liquidity thereby highlighting the respective importance of internal and external funds in investment decisions.

This model has been chosen considering its aptness in current Indian context. First, there is a need for integrating capital market imperfections in the analysis consequent to the period of financial sector reforms. Second, various Indian studies have stressed on the influence of capital market imperfections on financing patterns. An attempt has been made to encompass major relevant variables in Indian context influencing corporate investment and hence the choice of the model. This model will helps to understand the differential impacts of the mode of financing on investment.

Considering these features, the model (6.1) is specified as follows for the purpose of estimation in this study. Thus, for firm \( i \) at time \( t \) (measured in years), investment function is postulated as:

\[
\Delta F'_{it} = \alpha + \beta_1 \Delta Y'_{it} + \beta_2 \Delta I'_{it} + \beta_3 \text{CFO}'_{it} + \beta_4 \text{FEQ}'_{it} + \beta_5 \text{FB}'_{it} + \beta_6 \text{TC}'_{it} + \beta_7 \text{LAG}\Delta F'_{it} + \beta_8 \text{LAG}\Delta Y'_{it} + \nu_{it}; \quad \nu_{it} \sim \text{IID} (0, \sigma^2) \] \hspace{1cm} 6.2

Where


\( \Delta F'_{it} \) = Change in net fixed assets of firm I in period t
\( \Delta Y' \) = Change in output
\( \Delta I' \) = Change in inventory
CFO' = Cashflow from operating activities
FEQ' = Flow of equity
FB' = Flow of borrowings
TC' = Trade credit and Acceptances
LAG \( \Delta F' \) = Change in net fixed assets in the period t-1
LAG \( \Delta Y' \) = Change in output in the period t-1
V = Error term

The single equation model [Other authors that use such a single equation model to study corporate investment behavior include Eisner (1978)\(^{202}\), Fazzari et al. (1988)\(^{203}\), Hoshi et al. (1991)\(^{204}\), Oliner and Rudebusch (1992)\(^{205}\), and Athey and Laumas (1994)\(^{206}\)] expresses investment as a function of change in output (\( \Delta Y' \)), change in inventory (\( \Delta I' \)), cashflow from operating activities (CFO'), flow of equity (FEQ'), flow of borrowings (FB'), trade credit and acceptances (TC'), change in net fixed assets in the previous year (LAG \( \Delta F' \)) and change in output in the previous year (LAG \( \Delta Y' \)) for the period under consideration.

As discussed in the chapter on research methodology, three problems encountered during panel data analysis are auto-correlation, heteroskedasticity and multicollinearity. In the present study, autocorrelation has been estimated through D-W statistic for both composite sample and industry groups. Further, all the variables have been divided by capital stock at the beginning of the year (K). This has been done to remove the scale effects from the data and tackle the common problem of heteroskedasticity in such a heterogeneous sample. A similar practice of scaling down

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\(^{203}\) Fazzari, Hubbard and Petersen, 1988, op. cit.
the variables has been adopted by various other researchers like Fazzari et al (1988)\textsuperscript{207}, Athey and Laumas (1994)\textsuperscript{208}, Gangopadhyay, Lensink and Molen (2001)\textsuperscript{209} and so on. Multicollinearity has been analyzed through correlation matrix.

Moreover, as the study encompasses a dataset dealing with more than a decade, the inflation impact is bound to creep into the data thereby lowering the reliability of the results. This issue has been suitably addressed by adjusting all the nominal variables by 1993-1994 Wholesale Price Index (WPI) for manufacturing industries. The data for the same has been sourced from the Office of the Economic Adviser, Ministry of Commerce and Industry, Government of India.

Hence the estimation is based on the following model:

$$
\left( \frac{\Delta F}{K} \right)_{it} = \alpha + \beta_1 \left( \frac{\Delta Y}{K} \right)_{it} + \beta_2 \left( \frac{\Delta I}{K} \right)_{it} + \beta_3 \left( \frac{CFO}{K} \right)_{it} + \beta_4 \left( \frac{FEQ}{K} \right)_{it} + \beta_5 \left( \frac{FB}{K} \right)_{it} + \beta_6 \left( \frac{TC}{K} \right)_{it} + \beta_7 \left( \frac{LAG \Delta F}{K} \right)_{it} + \beta_8 \left( \frac{LAG \Delta Y}{K} \right)_{it} + \nu_{it}
$$

The same has been reproduced as,

$$
\Delta F_{it} = \alpha + \beta_1 \Delta Y_{it} + \beta_2 \Delta I_{it} + \beta_3 \text{CFO}_{it} + \beta_4 \text{FEQ}_{it} + \beta_5 \text{FB}_{it} + \beta_6 \text{TC}_{it} + \beta_7 \text{LAG}\Delta F_{it} + \beta_8 \text{LAG}\Delta Y_{it} + \nu_{it}
$$

This equation, Equation 6.4, pertains to classical regression (Panel Ordinary Least Squares). However, because the Lagrange Multiplier test statistic favors fixed/random effect model over the OLS, FEM/REM has been applied later in the analysis. Moreover, later the Hausman test statistic favors fixed effects model over random effects model. A major advantage of FEM is that it largely corrects for any potential selectivity bias arising out of sample selection. The equation for Fixed Effects Model with group dummy variable is as follows:

$$
\Delta F_{it} = (\alpha + \mu_i) + \beta_1 \Delta Y_{it} + \beta_2 \Delta I_{it} + \beta_3 \text{CFO}_{it} + \beta_4 \text{FEQ}_{it} + \beta_5 \text{FB}_{it} + \beta_6 \text{TC}_{it} + \beta_7 \text{LAG}\Delta F_{it} + \beta_8 \text{LAG}\Delta Y_{it} + \nu_{it}
$$

\textsuperscript{207} Fazzari, Hubbard and Petersen, 1988, op. cit.
\textsuperscript{208} Athey and Laumas, 1994, op. cit.
\textsuperscript{209} Gangopadhyay, Lensink and Molen, 2001, op. cit.
Furthermore, time period effects have also been introduced along with group dummy variables in FEM to verify if group dummy results hold good even after adding time/period effects. The equation with inclusion of period effects is as follows:

\[
\Delta F_{it} = \alpha + \beta_1 \Delta Y_{it} + \beta_2 \Delta I_{it} + \beta_3 CFO_{it} + \beta_4 FEQ_{it} + \beta_5 FB_{it} + \beta_6 TC_{it} + \beta_7 LAG\Delta F_{it} + \beta_8 LAG\Delta Y_{it} + \sum_{t=1997}^{2009} \delta_t T_t + v_{it}; \quad v_{it} \sim IID (0, \sigma_v^2)
\]

### 6.3 DISCUSSION OF VARIABLES USED IN THE STUDY

The study uses the data from ‘PROWESS’ which provides a comprehensive record of accounting and financial information. Since the focus of this study is on Indian Corporate Sector, the attention here is restricted to a smaller subset of firms (ET TOP 500, 2008) listed in the database. The PROWESS database reports accounting information related to large number of firms operating in the Indian Corporate Sector. From this dataset, constructing a balanced set resulted in a sample of 176 firms belonging to a divergent spectrum of fourteen different industries, namely, Food Articles, Food Products, Beverages Tobacco and Tobacco Products, Minerals, Textiles, Paper and Paper Products, Rubber and Plastic Products, Chemical and Chemical products, Non Metallic Mineral Products, Basic Metal Alloys and Metal Products, Machinery and Machine Tools, Transport Equipment and Parts, Coal Mining and Electricity. The sample set being a composite and heterogeneous mix of firms, offers considerable scope for cross sectional variation in data. In addition to the fact that the firms under consideration come from a broad spectrum of industries, this heterogeneity of the sample makes itself apparent in the spread of distribution of the firms over age and size. Since the dependent variable is net investment, derived by taking the first difference of net fixed assets, the first year of observations (1994-95) is not taken into account in the estimates. So, the final data set contain 176 firms with 14 observations.

The firm level data used for the study have both cross-section and time dimensions and therefore, the technique of panel data analysis has been found as the
appropriate choice of methodology. The explanatory variables have been constructed as follows.

6.3.1 Investment

Investment is the dependent (left hand side) variable in the regression equation set up for the study. It is defined as the change in net fixed assets of a firm from one financial year to the next (Financial year is the period starting from April 1st to March 31st of next year). The investment variable is denoted by $F_{it}$ i.e. investment (F) of the firm (i) in period t.

Net Fixed Assets have been calculated by summation of Net Land and Buildings, Net Plant and Machinery/Computers/Electrical Installations, Net Transport and Communication Equipment/Infrastructure and Net Furniture/Social Amenities/Other Fixed Assets. The data for the variables, namely, Land and Building, Cumulative Depreciation of Land and Building, Plant and Machinery/Computers/Electrical Installations, Cumulative Depreciation of Net Electrical Installations and Fittings, Transport and Communication Equipment/Infrastructure, Cumulative Depreciation of Net Transport Equipment/Vehicles, Furniture/Social Amenities/Other Fixed Assets and Cumulative Depreciation of Furniture/Social Amenities/Other Fixed Assets has been extracted from PROWESS and the relevant net figures have been calculated.

A similar definition of net investment has been preferred over gross investment by various other researchers such as Clark et al (1979)\textsuperscript{210}, Cleary (1991)\textsuperscript{211}, Gangopadhyay, Lensink and Molen (2001)\textsuperscript{212}, Athukorala and Sen (2002)\textsuperscript{213}, Bhattacharya (2007)\textsuperscript{214} and various other studies. Three of the above mentioned studies have been conducted with a sample dataset from Indian companies.

\textsuperscript{210} Clark, Greenspan and Goldfeld, 1979, op. cit.
\textsuperscript{212} Gangopadhyay, Lensink, and Molen, 2001, op. cit.
\textsuperscript{213} Athukorala, P.C. and K. Sen, "Liberalization and Business Investment in India", Australian and East Anglian universities: Research School of Pacific and Asian Studies press, 2002
6.3.2 Change in Output

Our specification of the investment function has drawn from cashflow accelerator model of investment with appropriate consideration of the structural and institutional features of Indian economy. Change in level of output is considered as a measure of accelerator. This study has taken current (t) and a year (t-1) lagged value of change in output to represent accelerator as earlier considered by Athey and Laumas (1994)\textsuperscript{215}. The lagged values have been considered to the extent of past one year as current year less two (t-2) and current year less three (t-3) lags did not show much impact on the results. Additionally, larger lags would also imply loss of degree of freedom. The value of output has been defined as sales plus changes in inventory of finished goods as supported by Jorgenson and Siebert (1968)\textsuperscript{216}. The data pertaining to sales (including industrial sales and income from non-financial services) and inventory of finished goods have been extracted from PROWESS and changes in inventory of finished goods have been calculated by taking first difference of inventory of finished goods. The use of accelerator in explaining corporate investment behavior has been earlier adopted by various researchers including Clark (1979)\textsuperscript{217}, Whited (1992)\textsuperscript{218}, Krishnamurty and Sastry (1975)\textsuperscript{219}, Athey and Laumas (1994)\textsuperscript{220}, Kumar, Sen and Vaidya (2001)\textsuperscript{221}, Gangopadhyay, Lensink and Molen (2001)\textsuperscript{222}, Nair (2004)\textsuperscript{223}, and Bhattacharyya (2007).

The theoretical justification to use change in output as an explanatory variable holds ground due to its relevance in a firm’s investment decisions. A positive change in output by a firm is intended towards serving a larger market through higher

\textsuperscript{215} Athey and Laumas, 1994, op. cit.
\textsuperscript{217} Clark, Greenspan and Goldfeld, 1979, op. cit.
\textsuperscript{219} Krishnamurty, K. and Sastry D.U., Investment and Financing in the Corporate Sector in India, Tata McGraw-Hill, New Delhi, 1975
\textsuperscript{220} Athey and Laumas, 1994, op. cit.
\textsuperscript{222} Gangopadhyay, S., Lensink, R. and Van Der Molen, R., ”Business Groups, Financing Constraints and Investment”, CCSO Quarterly Journal, Vol. 3 No. 4, 2001
\textsuperscript{223} Nair, 2004, op. cit.
production levels. This extension of the scale of production paves the way for capital expenditures i.e. investment decisions. Moreover, the accelerator theory holds that if output is growing, an increase in capital stock is required. Though the accelerator theory initially proposed by J.M.Clark had certain limitations like full utilization of capital stock, ignorance of lags and expectations formations, the theory was later modified and presented as flexible accelerator theory. In these models, the expected future output was taken as the weighted average of past output to allow for partial and delayed adjustment. The lags were expected to be of varying durations and assigned to a variety of reasons like gestational delays, planning, ordering, delivery and delays in decision making. Further the introduction of cashflow as a variable in the model gained prominence firstly, due to the signaling effect of cashflows as an indicator of robust future profitability and secondly, creation of financing hierarchy owing to market imperfections. Primarily, a significant and positive relationship of change in output (current and lagged) with investment (change in net fixed assets) has been hypothesized.

6.3.3 Change in Inventory

A company’s expansion plans are bound to show impact on two kinds of investment, namely, fixed (to increase the production capacities) and inventory (to support the increase in production capacities) investment. Both these kinds of investment are theoretically expected to have a competitive relationship. The investible funds of the company may not be solely invested in capital expenditures but may also be used in accumulation of inventories. For a manufacturing firm, capital assets alone are not sufficient as an uninterrupted flow of production processes require a consistent supply of relevant raw material, work in progress and finished stock. There are several reasons both physical and economic, for investment of funds in inventory. Among physical factors, procurement lags between orders and deliveries may be worth mentioning. The length of such lags depends on source of supply and nature of raw material and may be different for different industries. The significant economic factors include benefits of bulk buying, ordering and carrying costs depending on order size and frequency. Uncertainty in the raw material market may
influence the funds to be blocked in inventory investment. Moreover, investment may be required in work in progress in the products with long gestation periods and those involving huge amount of funds. Finally the finished goods inventory surely needs investment to facilitate the working of sales and marketing departments and it is furthermore important for products with seasonal demand. Moreover, the expansion plans of the company may push both capital and inventory investment simultaneously if the funds allow. Both the types of investment are therefore expected to be complementary in nature but are subject to the same pool of funds. Therefore, at various instances the capital expenditure plans of a company may be delayed due to blockage of funds in inventory or vice versa. It may hence be anticipated that an increase of investment in fixed assets may require a restriction or decrease in inventory investment. To obtain a precise analysis of flow of funds (internal as well as external) it is important to include change in inventory as an explanatory variable in the fixed investment equation. Even if flow of borrowings and cashflows are included in the equation, there is a need to include inventory investment because the same funds may be diverted towards inventory investment instead of total allocation towards fixed investment. In this study a negative sign for change in inventory has been postulated for the reasons stated above. This variable has been explicitly included in various studies conducted in India such as Krishnamurty and Sastry (1975)\textsuperscript{224}, Swamy and Rao (1974)\textsuperscript{225} and Rao and Mishra (1976)\textsuperscript{226}. Krishnamurty and Sastry (1975)\textsuperscript{227} also postulated as well as concluded a negative sign for this variable in their fixed investment equation.

6.3.4 Cashflow from Operating Activities

Cashflows can be defined as flow of cash in a firm over a period of one year. This variable has been incorporated in the investment equation by a large number of Indian and international studies with slight variations in its definition depending on

\textsuperscript{224} Krishnamurty and Sastry, 1975, op. cit.
\textsuperscript{227} Krishnamurty and Sastry, 1975, op. cit.
data availability. Its significance is evident from the fact that investment requires funds, and the same can be arranged either externally or through internal funds. Cashflows serve as a strong proxy for internally generated funds. The rationale behind inclusion of internal funds in the fixed investment equation relies on the fact that supply of funds dictates the investment plans of a company. Internal funds are considerably more convenient to deploy and do not pose the risk of control dilution. Cost is another important factor for raising the significance of internal funds. External funds have floatation and maintenance costs (dividend or interest) associated with them as compared to implicit cost of internal funds. Additionally, the internally generated funds are less risky than externally raised funds.

Various studies conducted in India and abroad have considered cashflows as an explanatory variable in the fixed investment equation including Clark et al (1979), McCabe (1979), Fazzari, Hubbard and Peterson (1988), Devereux and Schiantarelli (1989), Whited (1992), Calomiris and Hubbard (1995), Cleary (1999), Goergen and Renneboog (2000), Galizia and Brien (2002), Bruinshoofd (2004), Cava (2005), Gangopadhyay, Lensink and Molen (2001), and Nair (2004). Most of the studies have defined cashflows as a sum of profit after

228 Clark, Greenspan and Goldfeld, 1979, op.cit.
230 Fazzari, Hubbard and Peterson, 1988, op. cit.
234 Cleary, 1999, op. cit.
238 Cava, Gianni La, “Financial Constraints, the User Cost of Capital and Corporate Investment in Australia” Research Discussion Paper (2005-12), Economic Analysis, Reserve Bank of Australia, December 2005
240 Nair, 2004, op. cit.
tax and depreciation or retained earnings. In this study, cashflows have been defined as cashflows from operating activities which in turn has been elaborated as change in cash and cash equivalents due to operating activities of the firm. This definition of cashflows has been taken as per Accounting Standard 3 (Revised) issued by ICAI. This definition of cashflows seems to be a more accurate proxy for internally generated funds because it precisely covers the cash inflows and outflows pertaining to operating activities of a concern i.e. funds generated as surplus/deficit from operations. It not only adds back depreciation to profit after tax but considers and adjusts other non-cash expenses and receipts and gives an accurate view on cashflows. Moreover, the data for the sample companies for the said variable is readily available in the cashflow statements prepared by them.

Hence, inclusion of cashflows as an explanatory variable in capital expenditure equation has both theoretical and empirical support. In this study a positive and significant impact of cashflows on change in net fixed assets has been hypothesized.

### 6.3.5 Flow of Equity

Equity capital or common stock is broadly defined as the contribution by the shareholders or co-owners of the company. Equity has been considered as a flow variable in the study because the existing stock of equity being a permanent source would be already invested in certain assets and not available for fresh investments. It is a long-term source of finance for the company as it can be divested only at the time of winding-up of the company and has no fix predetermined fixed cost attached to it. Though prima facie, it may sound to be a favorable source of finance for the company, but it has its own share of complexities involved. Repetitive use of equity route leads to control dilution and reduction in earnings per share. These factors, therefore, render equity to be a non-preferred source for regularly raising funds. Moreover, mobilizing funds from public at large requires goodwill, competitive results and positive future prospects making it even tougher for all and sundry to tap funds through this route. Most of the previous studies revolving around investment and sources of finance have
not postulated or concluded a significant role of equity in investment decisions [McCabe (1979)\textsuperscript{241}, Pruitt and Gitman (1991)\textsuperscript{242}, Cleary (1999)\textsuperscript{243} and so on]. However, the present study cover the period of economic and structural reforms combined with a flourishing capital market. It is therefore hypothesized that flow of equity might play a significant and positive role in fixed asset financing. The study period has witnessed a booming new issue market along with milestone changes in rules and regulations governing investor safety thereby boosting the investor confidence. A large volume of funds were mobilized by the corporate sector through equity route. The positive sign of equity is postulated on the premise that any addition to the firms’ total source of funds is bound to impact the fixed investment plans in a positive way.

6.3.6 Flow of Borrowings

Flow of borrowings refers to the change in level of short-term and long-term borrowings over a period of twelve months. The data pertaining to borrowings has been collected through PROWESS and first year difference has been calculated to arrive at the flow variable. This variable has been used a proxy for external funds. Various similar international and Indian studies in the past have considered debt as a proxy for external funds and liquidity ratio separately. However the present study plans to club both long and short-term borrowings as none of the previous studies have clearly separated the use of long-term funds to finance fixed investments and short-term funds for inventory investment. Nonetheless, external source of financing has been a significant part of investment related studies in various Indian and international works including Clark et al (1979)\textsuperscript{244}, Fazzari, Hubbard and Peterson (1987), Whited (1992)\textsuperscript{245}, Oliner and Rudebusch (1992)\textsuperscript{246}, Calomiris and Hubbard

\textsuperscript{241} McCabe, 1979, op. cit.
\textsuperscript{243} Cleary, 1999, op. cit.
\textsuperscript{244} Clark, Greenspan and Goldfeld, 1979, op. cit.
\textsuperscript{245} Whited, 1992, op. cit.
Most of these studies have concluded the existence of hierarchy in sources of finance favoring the use of internal funds over external funds. The present study postulates a significantly positive impact of external funds on change in net fixed assets. The major premise behind the hypothesis is the existence of well developed financing institutions and a strong banking infrastructure making debt a preferred source of finance for those firms who either lack internally generated funds or are relatively new to raise funds from public at large on the basis of brand value.

6.3.7 Trade Credit

The only important variable affecting a firm’s pool of resources left after all the above mentioned variables is trade credit. It is defined as the amount of funds held by the company in terms of goods purchased on credit and related acceptances. In common parlance, the liquidity position of the company is affected by the level of current assets and current liabilities. All the major current assets, namely, cash, stock, debtors and bills receivables have already been covered in the above-mentioned explanatory variables like cash flow from operating activities, change the inventory and flow of borrowings respectively. Hence, the only other significant variable in current liabilities side i.e. trade credit and acceptances has been separately taken as an explanatory variable in the investment equation. Current ratio has been a part of certain researches including Cleary (1999) and Galizia and Brien (2002). The hypothesis states a positive and significant impact of this variable on the dependent variable because an increase in trade credit would imply a short-term increase in total funds available to a firm. Such funds would not be directly invested by the company

247 Calomiris and Hubbard, 1995, op. cit.
250 Cava, 2005, op. cit.
251 Krishnamurty and Sastry, 1975, op. cit.
253 Cleary, 1999, op. cit.
254 Galizia and Brien, 2001-02, op. cit.
in financial capital expenditures. However, the availability of these funds can help the firm in meeting its short term requirements thereby leaving more funds for investment in capital expenditures.

The following paragraphs present the empirical results using panel data to testify, support/refute the hypotheses established in the preceding paragraphs.

6.4 ESTIMATION AND EMPIRICAL RESULTS

The panel data regression estimation has been conducted for set of sample observations. The correlation matrix given below in Table 6.1 throws light on the status of correlation amongst two or more independent variables.

Table 6.1: Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>F</th>
<th>Y</th>
<th>CHG_I</th>
<th>CFO</th>
<th>FEQ</th>
<th>FB</th>
<th>TC</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>1</td>
<td>0.152</td>
<td>0.171</td>
<td>-0.026</td>
<td>0.282</td>
<td>0.393</td>
<td>0.142</td>
</tr>
<tr>
<td>Y</td>
<td>0.152</td>
<td>1</td>
<td>0.245</td>
<td>0.240</td>
<td>0.099</td>
<td>0.064</td>
<td>0.687</td>
</tr>
<tr>
<td>CHG_I</td>
<td>0.171</td>
<td>0.245</td>
<td>1</td>
<td>-0.077</td>
<td>0.110</td>
<td>0.400</td>
<td>0.262</td>
</tr>
<tr>
<td>CFO</td>
<td>-0.026</td>
<td>0.240</td>
<td>-0.077</td>
<td>1</td>
<td>-0.177</td>
<td>-0.25</td>
<td>0.280</td>
</tr>
<tr>
<td>FEQ</td>
<td>0.282</td>
<td>0.099</td>
<td>0.110</td>
<td>-0.177</td>
<td>1</td>
<td>0.114</td>
<td>0.027</td>
</tr>
<tr>
<td>FB</td>
<td>0.394</td>
<td>0.064</td>
<td>0.400</td>
<td>-0.252</td>
<td>0.114</td>
<td>1</td>
<td>0.039</td>
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<tr>
<td>TC</td>
<td>0.142</td>
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<td>0.261</td>
<td>0.280</td>
<td>0.027</td>
<td>0.039</td>
<td>1</td>
</tr>
</tbody>
</table>

The correlation matrix presented in Table 6.1 does not indicate high correlation amongst any of the independent variables with a cut-off correlation coefficient of 0.7 as per Bhattacharya (2007). The equation and results obtained by Ordinary Least Squares (OLS) have been discussed at first. OLS or classical regression equation (6.4) with investment as the dependant variable has been presented in the preceding paragraphs. The results obtained for the aggregate sample with the above mentioned equation have been presented in Table 6.2.

\[255\] Bhattacharyya, 2007, op. cit.
Table 6.2: Empirical Findings by OLS

<table>
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<tr>
<th>Variables</th>
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<td>-1.919***</td>
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<tr>
<td>FEQ</td>
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<tr>
<td>FB</td>
<td>0.49</td>
<td>19.984*</td>
</tr>
<tr>
<td>TC</td>
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<td>3.353*</td>
</tr>
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<td>-0.089</td>
</tr>
<tr>
<td>LAG Y</td>
<td>-0.003</td>
<td>-1.673***</td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<tbody>
<tr>
<td>R²</td>
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</tr>
<tr>
<td>Durbin-Watson Statistic</td>
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<tr>
<td>Lagrange Multiplier</td>
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</tr>
<tr>
<td>Test Statistic</td>
<td>df=2, Prob value=0.051</td>
<td></td>
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<tr>
<td>Hausman Test Statistic</td>
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<td>df=8, Prob Value=0.000</td>
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</tbody>
</table>

*, ** and *** indicate the coefficient is statistically significant at 1%, 5% and 10% significance level.

The classical regression displayed by Table 6.2 indicates that the results are quite in line with hypotheses set for the study. As hypothesized in the beginning of the study, all explanatory variables except change in inventory have a positive relationship with change in net fixed assets and are significant at different significance levels. It was stipulated earlier that change in inventory level requires a portion of firm’s total expenditure to be adjusted towards short-term inventory investment instead of capital expenditure investment only. This theoretical argument has been
lent support by empirical results as change in inventory has been found a negatively significant explanatory variable at 10 percent significance level in the investment equation as per OLS results. Apart from this, cashflow from operating activities, flow of equity, flow of borrowings and trade credit are positively significant at 1 percent level of significance. The results have been in tune with the hypotheses in terms of both significance and sign. Change in output as a proxy for sales accelerator model is significant at 10 percent level of significance with one year lag but has a negative relationship. The current year’s change in output though posing a positive relationship is found to be insignificant.

Durbin - Watson statistic of 2.0038 > du implies there is no autocorrelation amongst the explanatory variables. Further, a Lagrange Multiplier Statistic of 5.96 at 2 degrees of freedom and at 5 percent level of significance favors use of using fixed/random effects model over ordinary least squares or classical regression. As a next step to choose between fixed and random effects model, Hausman’s test has been conducted for the overall data to determine which model is appropriate for the panel data employed in the study. The test results show that fixed effect model would better serve the purpose for Indian sample as the Hausman Test statistic has been found to be highly significant. Moreover, when the effects and regressors may be correlated, a fixed effects model would generate consistent results while the random effects model would generate inconsistent results. The fixed effects results with ‘group dummy’ and ‘group dummy and period effects’ have been discussed in the following paragraphs.
The Table 6.3 displays the sample results as per fixed effects with ‘group dummy’ and ‘group dummy with time effects’ model. Though fixed effects results with ‘group dummy’ are sufficient to meet the requirements Lagrange Multiplier Statistic and Hausman Test statistic, ‘group dummy with time effects’ model have been presented just to re-affirm that group dummy results hold good even after adding time/period effects. The results show a marked improvement over OLS results and are very much as postulated in the initial hypothesis.

All major variables including change in output (Y), change in inventory (CHG_I), and cashflow from operating activities (CFO), flow of equity (FEQ), flow of borrowing (FB) and trade credit (TC) have been found highly significant at 1 percent level of significance. The signs of the coefficients are largely in line with the

<table>
<thead>
<tr>
<th>Variables</th>
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<th></th>
<th>Group Dummy and Period Effects</th>
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<td></td>
<td></td>
<td>Fixed Effects</td>
<td></td>
</tr>
<tr>
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<td>Constants</td>
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<td></td>
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<tr>
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<td>0.02</td>
<td>(5.379)*</td>
<td>(5.349)*</td>
</tr>
<tr>
<td>CHG_I</td>
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<td>-0.12</td>
<td>(-2.712)*</td>
<td>(-2.677)*</td>
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<tr>
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<td>0.09</td>
<td>(2.971)*</td>
<td>(3.059)*</td>
</tr>
<tr>
<td>FEQ</td>
<td>1.62</td>
<td>1.60</td>
<td>(12.263)*</td>
<td>(12.052)*</td>
</tr>
<tr>
<td>FB</td>
<td>0.45</td>
<td>0.45</td>
<td>(17.595)*</td>
<td>(17.342)*</td>
</tr>
<tr>
<td>TC</td>
<td>0.099</td>
<td>0.11</td>
<td>(3.159)*</td>
<td>(3.459)*</td>
</tr>
<tr>
<td>LAGF</td>
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<td>-0.01</td>
<td>(-0.244)</td>
<td>(-0.694)</td>
</tr>
<tr>
<td>LAGY</td>
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<td>-0.004</td>
<td>(-1.726)***</td>
<td>(-1.343)</td>
</tr>
<tr>
<td>R²</td>
<td>0.29</td>
<td>0.29</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*, ** and *** indicate the coefficient is statistically significant at 1%, 5% and 10% significance level.
6.4.1 **Accelerator (Change in Output)**

Accelerator represented by current and previous year’s change in output plays a determining role in firm’s fixed investment behavior. Change in output (Y) representing accelerator has found empirical support as an important factor in influencing the investment decision. As shown in Table 6.3, both changes in output (Y) and change in output in the period t-1 (LAGY) are found to be statistically significant at 1 percent and 10 percent level of significance in fixed effects results with group dummy variables. However, a look at the coefficients suggests that LAGY (-0.006) is relatively less important than Y (0.02) implying lesser impact of LAGY on investment. As Y and LAGY are the two accelerator variables in the model, the results thus suggest that the accelerator theory of investment holds true in Indian corporate sector. However, one must look at the result with caution because the coefficients are very small. Change in output in the period t-1 (LAGY) is significant at 10 percent level of significance but only when there is no time effect. The inference drawn above strengthens the theoretical foundation that changes in output due to increase in demand of the company’s product and/or expansion plans of the company is a major factor influencing a company’s capital expenditure decisions. LAGY has however been found negatively significant emphasizing that firms almost simultaneously adjust their changes in net fixed assets with the requirements as per change in output and previous year’s change in output has a dampening effect on current investment plans. In fact previous period lags have an inverse impact on current year’s change in net fixed assets. This may be attributed to the justification that any excess capacity created and underutilized (due to changes in output in period t-1) during period t-1 is optimally utilized before indulging in fresh capital expenditures.
6.4.2 Change in Net Fixed Assets in the Period t-1

The coefficient of change in net fixed assets in the period t-1 (LAGF) has not been found to be significant which in turn indicated that investments in fixed assets are not dynamically related to the level of investment in the previous period. To state it otherwise, the current level of change in net fixed assets is independent of previous year’s change in net fixed assets.

6.4.3 Change in Inventory

Except change in inventory, all the other mentioned variables are positively related to change in net fixed assets. This suggests the substitution relationship between fixed and inventory investment due to significant negative coefficient of change in inventory. This point was earlier expressed at the research methodology stage that the funds of a company may not be exclusively invested in fixed investment expenditures but may also be used in accumulation of inventories. For a manufacturing firm, effective utilization of capital assets requires a steady supply of relevant raw material. Consequently, the significance of stock in the form of raw material, work in progress and finished stock is suitably underlined. Empirical results displaying a significant and negative relationship of change in inventory with change in net fixed assets strengthen the theoretically stated argument.

6.4.4 Trade Credit

Furthermore, as the investment in inventories is usually linked with availability of short-term funds, the status of trade credit (creditors and acceptances) as an explanatory variable is worth mentioning here. Theoretically stating, an increase in level of trade credit signals an increase in availability of short term funds for a company which in turn adds to the total funds available for investment. A positive relationship is therefore postulated between capital expenditure investment and trade credit because an increase in total funds would imply a greater amount of funds for both types of investment. Empirically, the results confirm a significant positive
relation as postulated at 1 percent level of significance paving the way for acceptance of null hypothesis. Hence, the sample from Indian corporate sector confirms the theoretical justification that increase in short-term funds through better bargains with creditors and acceptances effect the change in net fixed assets in a positive and significant manner.

6.4.5 Cashflow from Operating Activities (CFO)

The next variable under discussion is the coefficient of cashflow from operating activities (CFO) which has been used as a proxy for internal funds in the study and has an empirical support of large number of relevant studies. It has been found to be highly statistically significant and positive with a coefficient of $\beta_3=0.09$ at 1 percent level of significance. This lends support to the theoretical belief that internally generated surplus funds play a noteworthy role in influencing the level of investment in net fixed assets. Interestingly, this finding also brings to light that a firm with positive change in cashflows over a year tends to signal positive expectations about future profitability and therefore indulges in fresh capital expenditures. Hence, cashflows have a signaling effect about a firm’s future prospects.

6.4.6 Flow of Equity and Flow of Borrowings

This section discusses the results obtained for two of the independent variables simultaneously because both these variables together account for external sources of funds. The coefficient of Flow of Equity (FEQ) is highly significant and positively related with the dependent variable. This implies that both internal and external sources of funds are significant in determining the investment decisions. A further comparison of the coefficients suggests, Flow of Equity (FEQ) is the dominant determining variable with the coefficient $\beta_4=1.62$ followed by Flow of Borrowings (FB) with the coefficient $\beta_5 = 0.45$. This comparison points towards greater importance of external sources of financing in Indian corporate sector. Moreover, a possible explanation for greater significance of flow of equity than flow of borrowings indicates a robust and growing economy. Various studies conducted in the past have found equity as an insignificant explanatory variable in investment equation.
paving way for external borrowings and internal funds (cashflows) to acquire prime importance. This finding of the study goes against the famous pecking order hypothesis and this may be attributed to the fact that during the study period Indian capital markets have developed rapidly. Not only in terms of turnover and market capitalization but also in terms of availability of diverse fund-raising instruments. Furthermore, the post Industrial Policy 1991 period observed a high rate of growth in the foreign capital inflow/portfolio investment. The major difference between the current and previous studies can primarily be attributed to the study period. The present study covers the period from 1994-95 to 2008-09. This period witnessed tremendous changes in Indian economic and financial scenario encompassing macroeconomic adjustments, structural changes, liberalization of licensing regulations, freer imports and exports and opening up of various industries to the private sector. Moreover, this period also observed tremendous growth in Indian financial system, specifically the securities market (including both primary and secondary markets). The liberalization, privatization and globalization regime combined with better economic performance led to an increase in investor’s confidence which in turn made equity, a preferred source of raising funds by both new and existing companies. Additionally, flow of borrowings as an explanatory variable is also positive and highly significant at 1 percent level of significance. As stated above, the period after early nineties witnessed overall growth of the economy along with increase in instruments used for raising funds.

6.4.7 Other Findings

To analyze the relationship of both internal and external sources of raising funds with change in net fixed assets, it can be stated that all the three variables (cashflows as a proxy for internal funds and flow of equity and flow of borrowings as proxy for external funds) have been found as highly significant explanatory variables in the investment equation. These results indicate that most of the firms implemented expansion plans during the study period thereby using all possible sources of finance available. Another interesting finding of the study is the apparent absence of financing constraints for the sample firms which has been cited as either a priori condition or a
study finding by various Indian and international studies. This is due to the empirical finding that both internal and external (including both debt and equity) have been found as highly significant explanatory variables at the same level of significance in the investment equation thereby making it difficult to establish a preferred hierarchy in use of various sources of finance by the sample companies. As the sample companies belonged to the “ET Top 500” list, the sample was primarily comprised of the creamy layer of the corporate sector. This list was chosen as a sample of Indian corporate sector in order to cover maximum industries including both public and private sector companies and to capture a significant share of market capitalization so as to achieve representative and reliable results. A deeper understanding regarding the same would be obtained by industry wise analysis as there may be industry specific factors affecting the existence of financing constraints for a firm.

6.5 U-SHAPED RELATIONSHIP BETWEEN INVESTMENT AND CASHFLOWS

Indeed, the relationship between cashflow and fixed investment expenditures has attracted immense attention by the researchers over the years. The contradictory results of Kaplan and Zingales (1997)\textsuperscript{256} and Cleary (1999)\textsuperscript{257} with those of Fazzari et al. (1988)\textsuperscript{258} further deepens the thought of reconcilment. This study postulates a non-monotonic relationship between these two variables because of absence of any distinction between constrained and unconstrained firms in the data set. Our study elaborates on this issue in the following paragraphs.

With reference to the results displayed in Table 6.1, it has been found that $R^2$ is 0.23 in OLS panel results and improves to 0.29 with fixed effects model. Though the AIC value close to zero indicates that the model is correctly specified, a justification for low $R^2$ is required. Equations expecting a monotonic relationship between investment and cashflow usually have poor explanatory power (low adjusted $R$ squares) because of pooling observations of positive and negative cash flow

\textsuperscript{256} Kaplan and Zingales, 1997, op. cit.
\textsuperscript{257} Cleary, 1999, op. cit.
\textsuperscript{258} Fazzari, Hubbard and Petersen, 1988, op. cit.
together. In fact, this finding takes closer to the hypothesis that fixed investments bear a U-shaped relationship with cashflows in Indian corporate sector.

To find the relationship between cashflow and investment levels, this study first takes the most instinctive way, i.e. to plot cash flow against investment in the sample. The entire sample has been first arranged by CFO/K, which is cash flow of the firm, scaled by capital, and splitting the sample into deciles of CFO/K. The mean of ∆F/K (net fixed investment of the firm scaled by capital stock at the beginning of the year) has then been calculated and plotted against the mean of CFO/K of each decile. The plot has easily envisaged the relationship between cashflow and investment of each sample in this study. Another additional plot is provided where the absolute value of ∆F/K is plotted against CFO/K. To supplement the first set of plots, this second set of plots would visualize how investment responds to cash flow levels. This would clearly indicate the sensitivity between investment and cashflow as displayed in Figure 6.1.

![Figure 6.1: Average Change in Net Fixed Assets and Average Operating Cashflow Divided in Deciles](image)

The Figure 6.1 clearly visualizes the U-shaped fixed investment curve against cashflow level ranging from negative to zero and finally turning to positive. The Average Change in Net Fixed Assets against each decile of Average Operating Cashflow has been presented in Figure 6.2 below.
Figure 6.2: Average Change in Net Fixed Assets against each Decile of Average Operating Cashflow

The Figure 6.2 depicts average change in net fixed assets against each decile of cashflow to clearly highlight the U-shape of investment curve. But this visual relationship needs to be verified with empirical results and the same has been dealt with in the following paragraphs.

In order to further dwell on this postulate, a square and a cubic term in the regression to capture the higher order relationship between cash flow and investment to empirically check for existence of U-shaped relationship between investment and cashflow. In this case the estimated equation can be re-written as follows along with the corresponding results.

For Panel OLS

\[ \Delta F_{it} = \alpha + \beta_1 \Delta Y_{it} + \beta_2 \Delta I_{it} + \beta_3 \text{CFO}_{it} + \beta_4 \text{FEQ}_{it} + \beta_5 \text{FB}_{it} + \beta_6 \text{TC}_{it} + \beta_7 \]
\[ \text{LAG}\Delta F_{it} + \beta_8 \text{LAG}\Delta Y_{it} + \beta_9 (\text{CFO}_{it})^2 + \beta_{10}(\text{CFO}_{it})^3 + \nu_{it}; \nu_{it}\sim\text{IID} (0, \sigma^2) \]

6.7

The results for the same have been presented in the below table, Table 6.4
The Table 6.4 shows the panel OLS results for aggregate sample after adding cashflow square and cashflow cube. All the other variables of the equation have been explained earlier except Cashflow from operating activities square and cube. These variables have been added to check for existence of the U-shaped relationship between investment and cashflow by focusing on the sign and significance of the coefficient of cashflows. All the three variables, namely, cashflow from operating activities (CFO), cashflow from operating activities square (CFO$^2$) and cashflow from operating activities cube (CFO$^3$) are significant at 1 percent level of significance. As postulated, CFO has a positive coefficient which turns to be negative with CFO square and finally returns to be positive with CFO cube. Hence, the U-shaped relationship between investment and cashflow has been reinstated by empirical findings.
For Fixed Effect Model (Group Dummy)

Similar results have been found for fixed effects model with both ‘group dummy’ and ‘group dummy and period effects’ taken together. The enhanced equation for ‘group dummy’ variables is given below along with the results displayed in Table 6.5.

\[
\Delta F_{it} = (\alpha + \mu_i) + \beta_1 \Delta Y_{it} + \beta_2 \Delta I_{it} + \beta_3 CFO_{it} + \beta_4 FEQ_{it} + \beta_5 FB_{it} + \beta_6 TC_{it} + \beta_7 LAG\Delta F_{it} + \beta_8 LAG\Delta Y_{it} + \beta_9 (CFO_{it})^2 + \beta_{10}(CFO_{it})^3 + \nu_{it} \; ; \; \nu_{it} \sim IID (0, \sigma^2)
\]

6.8

Table: 6.5: Fixed Effects with Group Dummy with Higher Powers of Cashflows

<table>
<thead>
<tr>
<th>Variables</th>
<th>Estimates/ Coefficients</th>
<th>t-statistic</th>
</tr>
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<tbody>
<tr>
<td>Constant</td>
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<tr>
<td>Y</td>
<td>0.029</td>
<td>5.389*</td>
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<tr>
<td>R²</td>
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</table>

*, ** and *** indicate the coefficient is statistically significant at 1%, 5% and 10% significance level.

For Fixed Effects Model (Group Dummy and Period Effects)

Lastly, the equation for Fixed Effects Model (Group Dummy and Period Effects) and its results reiterating the U-shaped relationship have been displayed below in Table 6.6.
\[ \Delta F_{it} = \alpha + \beta_1 \Delta Y_{it} + \beta_2 \Delta I_{it} + \beta_3 \text{CFO}_{it} + \beta_4 \text{FEQ}_{it} + \beta_5 \text{FB}_{it} + \beta_6 \text{TC}_{it} + \beta_7 \text{LAG}\Delta F_{it} + \beta_8 \text{LAG}\Delta Y_{it} + \beta_9 \text{CFO}_{it}^2 + \beta_{10} \text{CFO}_{it}^3 + \sum_{t=1997}^{2009} \delta_t T_t + v_{it} ; v_{it} \sim \text{IID (0, } \sigma^2_v) \]

Table: 6.6: Fixed Effects with Group Dummy and Period Effects and Higher Powers of Cashflows

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<td>CHG_I</td>
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<td>-3.038*</td>
</tr>
<tr>
<td>CFO</td>
<td>0.133</td>
<td>3.566*</td>
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<td>FEQ</td>
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<tr>
<td>R²</td>
<td></td>
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</tbody>
</table>

*, ** and *** indicate the coefficient is statistically significant at 1%, 5% and 10% significance level.

As displayed by Table 6.6, a positive and significant coefficient for cashflow, a negative and significant coefficient for cashflow square and a positive and significant coefficient for cashflow cube indicate that the relationship between investment and cashflow is non-linear and U-shaped. The U-shaped relationship between these two variables has been discussed earlier by Cleary et al (2006)\(^{259}\) and few other researchers. The evidence of the U-shaped relationship between internal


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cash flow and investment was found in different countries using international data by the above mentioned studies.

While analyzing the relationship between investment and cash flow, it may be comprehended that the relationship of the two would be a positive line starting from zero cash flow if only internal funds are available for investment. It is only possible for investment to be positive with zero or negative cash flow when firms have access to external funds. The conventional understanding of relationship between investment and cash flow does not discriminate between the positive and negative cashflows and believes that investment is linearly linked to cash flow, which means that increase in cash flow availability would allow the firms to invest greater funds in capital expenditures. However, this understanding may not be true on the negative side of cash flow. The existence of asymmetric information makes the firms with cashflows below certain levels (negative cash flow) to increase investment with future expectation of increase in cashflows. Cleary et al. (2006) present that when a firm’s cashflow is lower than a certain level, “an increase in investment improves the firm’s ability to repay its debt and also increases the investor’s payoff if the firm defaults. Other things equal, the investor can then accept a smaller promised repayment in order to break even, which reduces the risk of default for the firm.” Empirically, the paper argues that most previous literature exclude financially weak firms and thus postulate and conclude a monotonic relationship between cash flow and investment.

As the review of the literature show, the nature of the cash flow/ investment relationship is, at best, not completely clear. In this study, the major thrust is to study the relationship of investment and cash flow itself, following Cleary et al. (2006) and testing the relationship between cash flow and investment of firms directly without classifying firms into financially constrained and unconstrained firms.

While this is true for the entire panel as a consolidated one; this relationship might vary in case of smaller panels of particular industry groups. Another important thing is that inclusion of higher powers of cashflow has improved the goodness of fit, lending even more support to a non-linear relationship between investment and cashflow.

\[\text{Ibid.}\]
As Cleary et al. (2006)\textsuperscript{261} argue different dimensions of “financial constraints” would have very different implications for investment behavior. This empirical finding of U-shape curve on one hand helps to explain the previous opposing empirical results in the literature and accept the hypothesis of this study on the other.

6.6 CONCLUSION

The discussion may be summed up by noting that investment in fixed assets has tremendously increased over the study period which primarily captures the economic reforms era of Indian economy. The results have been robust and majorly in line with the pre-established hypothesis. Accelerator (change in output), cashflow from operating activities, flow of equity, flow of borrowings and trade credit have been found as highly and positively significant as postulated. At the same time as stipulated initially, change in inventory has been found as negatively significant. The analysis showed that corporate investment has exhibited impressive growth rate during the study period. As for the financing patterns from 1994-95 to 2008-09, some changes have been observed from the past studies. Both internal and external sources of finance have been found to be dynamically affecting the change in net fixed assets. The analysis reveals that flow of borrowings is highly significant variable. This might be due to the predominant role of banks and other development financial institutions in the debt market in India apart from debentures where the money is raised from public at large. The banks, in common parlance are considered to be better off in terms of access to information than common investors in the securities market. This helps in reducing the disadvantages associated with informational problems so that the companies that rely on debt do not suffer from capital market imperfections. As far as the significant impact of flow of equity is concerned, the financial sector reforms post nineties was aimed at various measures to foster economic growth. A greater emphasis was placed on development, strengthening and improving transparency in capital markets. To be precise, broadening of equity market was a primary concern by removing control over capital issues and pricing. In a response to this, changes in corporate financing pattern have been observed with a movement

\textsuperscript{261} Ibid.
towards greater equity financing. Additionally, a notable contribution of equity financing in total funds raised has been observed even during the analysis of panel data results.

The aggregate analysis of the sample has brought out some interesting results on the relationships between financing patterns and changes in capital expenditures and concluded with a positive role of accelerator and both internal and external sources of finance. Moreover, investment and cashflows have been found to have a U-shaped relationship.