Determinants of Private Corporate Sector Investment in India

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Reserve Bank of India

2010

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This paper analyses the trends in corporate finance in India, and uses a panel data model for empirically identifying the factors which influence corporate investment decisions, during the period 2000-01 to 2008-09. The findings revealed that firm level factors such as firm size, dividend payout ratio, effective cost of borrowing, cash flow ratio and growth in value of production are significant in determining corporate investment decisions. At macro level, capital market developments and real effective exchange rate are significant in influencing corporate investment decisions, whereas, inflation and non-food credit growth are not significant in predicting corporate investment decisions. The results of the study generally support existing literature on the impact of macroeconomic variables and certain firm level factors on corporate investment decisions. The main value of this paper is to consider broad based approach to analysing the determinants of corporate investment decisions from emerging market context.

Introduction

Corporate investment refers to the amount of capital spent on increasing the total assets of a firm. New investment in a firm consists of addition to its existing assets for the purpose of producing more output. These investments could be financed either by internal sources of funds, such as, accumulated profits in the form of various reserves, depreciation provision, etc., or by external sources of funds, such as, borrowed capital, fresh capital raised, etc. At micro level, private corporate behaviour is characterized by three main decisions, namely,

investment, financing and profit allocation. Firms have scarce resources that must be allocated among competing uses. Hence firms in the private corporate sector must decide the way in which they should allocate resources and the manner in which it would be wise for them to invest. The private corporate sector should provide the framework for its constituent firms to make the above decisions wisely. Accordingly, the investment decision of a firm is defined to include not only those investments that create revenues and profit, but also those that save money by reducing expenditure.

Investment decisions though mainly taken at the Board level, these have been influenced by financial performance, financing pattern and economic conditions prevailing in the country and also the global developments to some extent. In the past few years there has been an increasing interest in the role that firm specific factors play in corporate investment decisions along with the economic conditions. This interest stems from the effect that financial performance of the corporate sector had on shaping the most recent economic cycle. Recent theoretical developments have also shown that cash flows and the structure of a firm's balance sheet may have an important influence on investment decisions.

The potential link between investment and financial performance implies that some of the changes in the performance indicators of the private corporate sector in the past decade could have altered the dynamics of the investment cycle in India. Establishing a link between cash flows, leverage and investment may also provide insights into the way in which monetary policy and cyclical factors more generally influence the corporate sector. If cash flows are an important determinant of investment, changes in monetary policy (by changing some interest rates) will influence investment of indebted firms through a cash flow effect as well as through altering the rate at which the returns to investment are discounted. If this is the case, the higher leverage of the corporate sector implies, other things being equal, that monetary policy may have a larger impact on investment than in the past. Moreover, it implies that changes in monetary policy may not be transmitted evenly across the corporate sector. The cash flows of highly geared firms will be more sensitive to changes in interest rates than cash flows of firms with lower leverage.

Ascertaining a link between investment and financial conditions imply that changes in the structure of corporate balance sheets would significantly alter the dynamics of the investment in India. Smaller firms are generally considered to be more sensitive to changes in financial conditions. External funding tends to be relatively more expensive for them because providers of finance have less information about their creditworthiness. Smaller firms also have limited access to securities or equity markets and are thus more reliant on intermediated funding as a source of external finance. Cash flows are a significant source of funding for them. Economic shocks that alter cash flows or change the lending behaviour of intermediaries are thus likely to have a more significant influence on the investment decisions of smaller firms.

This paper intends to explore the linkage between financial factors and investment in a sample of non-Government non-financial Indian firms spanning the period 2000-01 to 2008-09. First, it will attempt to see if these factors are important generally. Next, it will consider whether the importance varies across firms depending on their financial structure, size or dividend payout policies. The paper finds evidence that financial factors do have a significant influence on investment. Investment is positively related to cash flows and the stock of financial assets and negatively related to leverage. Moreover, it appears that investment of firms with higher leverage and smaller firms are more sensitive to financial factors than that of other firms. This implies that they could be more sensitive to economic conditions and changes in monetary policy than other firms.

The specific aspects of behavior that are analysed in this study are determinants of investment by firms in the private corporate sector in India. Decisions regarding external finance, the role of demand, financial factors and macro economic conditions are considered in the analysis. The rest of the paper is organized as follows: In section 2, the literature on investment behavior of the private corporate sector is reviewed. Section 3 analyses trends in corporate finance, Section 4 deals with choice of the Model, Section 5 empirically analyses the interest rate and its impact on investment and profits. Section 6 handles description of data and construction of variables, Section 7 provides

the empirical analysis and Section 8 draws the conclusions of the entire analysis.

2. Literature Review

Modigliani and Miller (1958) assumed that firms' financing and real investment decisions are taken independent of each other. Moreover, this theory says that the investment of a firm should be based only on those factors that will increase the profitability, cash flow or net worth of a firm and there is no relationship between financial markets and corporate real investment decisions. However, this proposition will be valid only if the perfect market assumptions underlying the analysis are satisfied. Corporate finance theory suggests that market imperfections such as underdeveloped financial system may constrain firms' ability to fund investments and will invariably affect firms' investment decisions. The theory indicates that the development of financial markets and instruments result in a reduction in transaction and information costs, influencing saving rates and investment decisions.

Fazzari et al (1988) had argued that firms facing financing constraints should exhibit high investment-to-cash flow sensitivities, reflecting the wedge between costs of external and internal funds which is consistent with Myers and Majluf (1984). But Kaplan and Zingales (1997) contradicted the findings of Fazzari et al (1988). They rather suggested that corporate investment decisions of the least financially constrained firms are the most sensitive to the availability of cash flow (see also Cleary1999). Recently, Cleary et al (2007) documented that, capital expenditure exhibits a U-shape with respect to the availability of internal funds. In the Indian context, Rajakumar (2005) verified empirically the relationship between corporate financing and investment behaviour for the period 1988-89 to 1998-99. To understand the implications of financing practices on investment behaviour, the firms were segregated according to their mode of financing, equity and debt. It was found at the aggregate level that the higher the debt, the greater the investment. They also found that debt financing was better than equity financing.

Denizer et al (2000) have indicated that risk management and information processing by banks might be particularly important in reducing investment volatility. Acemoglu and Zilibotti (1997) noted the role that diversification plays in reducing risk when they linked financial market development to volatility. They concluded that as financial market development helps in wealth creation, diversification becomes possible, investment increases and investment risk and volatility is reduced. Aghion et al (2000) confirmed that, volatility is most likely to occur in open economies with intermediate levels of financial development.

At the macro level, considerable research has focused on investigating the relationship between macroeconomic development and corporate investment decisions largely because of global financial integration. Nucci and Pozzolo (2001) found significant relationship between exchange rates and investment for Italian manufacturing firms. Ferris and Makhija (1988) examined the effect of inflation on the capital investment for the US firms and found that, given various provisions of the US tax code, the effect of inflation on capital investment over the period 1962-1981 has varied with the response and circumstances of the firm. Adelegan and Ariyo (2008) investigated the impact of capital market imperfections on corporate investment behavior using panel data for Nigerian manufacturing firms from 1984 to 2000 and found that financial factors have a significant effect on the investment behavior.

3. Trends in Corporate Finance

There are various sources from which firms can mobilize funds. The relative share of each source in total sources of funds reveals the importance attached to a particular source of funds and thus determines the financing pattern. The structure of corporate financing has been examined using Reserve Bank of India's (RBI) study of finances of public limited companies, which provides valuable information on various sources of funds. It follows a broad classification of internal (own) and external (other than own) sources. Internal sources comprise use of paid-up capital, reserves and surplus, and provisions. And,

external sources include fresh issue of capital, capital receipts, borrowings, trade dues and other current liabilities and miscellaneous non-current liabilities.

Using the broad classification of sources of funds into internal and external, and comparing their constituents' share in total sources of funds is presented in Table 1. It may be seen from Table 1 that internal sources of funds contributed on an average a little more than one third of total sources of funds during 1980s and 1990s. Though, firms relied more on internal source of finance during 2000-01 to 2004-05, their reliance on external finance has been increasing since 2005-06. During 2008-09, external sources contributed more than two-thirds of total sources of funds.

Looking at the disaggregated data on various internal sources of funds, it is seen that provisions constituted the major component of internal funds till 2004-05 and reserves and surplus constituted the major component thereafter. A further disaggregated analysis showed

Table 1: Trends in Corporate Finance

(Per cent)

SOURCES OF FUNDS	1980s	1990s	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
INTERNAL SOURCES	33.1	35.6	40.3	59.6	65.3	64.9	53.5	55.5	42.6	35.9	35.5	31.6
A. Paid-up capital	2.1	1.1	0.5	0.7	0.4	-1.7	0.4	0.8	3.7	0.8	0.4	0.1
B. Reserves and Surplus	7.2	12.4	9.1	10.5	-18.8	10.3	20.0	26.6	23.2	24.8	23.1	21.3
C. Provisions	23.7	22.2	30.7	48.4	83.8	56.3	33.1	28.1	15.7	10.3	12.1	10.2
EXTERNAL SOURCES	66.9	64.4	59.7	40.4	34.7	35.1	46.5	44.5	57.4	64.1	64.5	68.4
D. Paid-up capital	5.5	16.0	21.9	10.3	10.5	6.2	8.6	10.5	15.1	11.8	17.7	14.1
E. Capital receipts	0.3	0.3	0.5	0.7	1.1	0.4	0.7	0.3	0.2	0.1	0.1	0.2
F. Borrowings	37.4	31.7	20.1	10.7	8.8	1.4	17.0	15.3	25.5	32.4	27.6	36.3
(a) From banks	12.6	9.6	8.4	6.9	21.5	27.7	21.4	15.2	24.3	22.4	20.7	23.4
G. Trade dues and other current liabilities	23.7	16.4	17.3	18.7	14.3	27.1	20.3	18.5	16.5	19.9	19.1	17.7
H. Miscellaneous non-current liabilities	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

that bulk of provisions was contributed by depreciation provision resulting from various fiscal incentives provided to improve investment climate in the country. The decline in the share of provisions largely accounted for the overall decline in internal sources from the year 2005-06. At the same time, reserves and surplus has sharply increased its shares to 23.2 per cent of total funds from 10.3 per cent during 2002-03. This, however, could not arrest the declining importance of internal sources of funds.

The rise in the share of external funds in total funds is largely due to borrowings in the 1980s, and borrowings along with fresh issues of capital in the 1990s. Borrowing is, however, the major component of external sources in the 1980s and 1990s. During early 2000s, the reliance on borrowings showed drastically declining trend by registering its share in total funds to 1.4 per cent in 2003, however, the same started increasing significantly thereafter. Borrowings contributed more than one-third of total sources of funds during 2008-09.

While the above analysis has shown a shift in the pattern of financing from external to internal and then to external, what ultimately matters to a firm is the proportion of owned (equity) to borrowed capital (debt) or the capital structure.

4. Choice of the Model

A review of literature related to theories of investment highlights four main strands of thoughts, namely, accelerator theory of investment behaviour, neoclassical theory of investment behaviour, Q-theory of investment behaviour and liquidity theory of investment behaviour. They have been briefly discussed below.

The accelerator theory states that firms have a desired level of capital stock and undertake investment to achieve this level. This theory maintains that firms adjust their capital stock in response to demand so that investment has a direct relationship with output. In essence, investment is proportional to output so that the rate of expected output becomes the prime determinant of investment behaviour in this model.

The basic idea of the neoclassical theory of investment behavior relates to the cost function, which tells how cost affects the stock of capital and how the rental cost of capital affects total investment in the private corporate sector.

According to the Q-theory of investment behavior, the stock market plays a significant role in determining the behavior of private corporate sector. The market valuation is the going market price for exchanging existing assets, whereas the book value is the replacement cost or reproduction cost indicating prices in the market for newly produced assets. The excess of market valuation over replacement cost encourages investment, that is, investment will be undertaken if market value is greater than book value. This model assumes the existence of a perfect capital market.

The liquidity theory of investment behaviour on the other hand is based on the assumption that there are imperfections in the capital market arising mainly due to asymmetric information between firms and suppliers of funds. This creates a wedge between cost of external and internal financing so that external financing becomes a constraint on the firms' investment. To smoothen this, the firms take recourse to internal liquidity. Under this, the firms limit their investment activities to availability of internal funds. The outcome as predicted by this model is that, under capital market imperfection, the firms' investment behaviour becomes sensitive to internal liquidity [Fazzari et al (1988)].

5. Interest rate and its impact on Investment and Profits

The weighted average lending rate of scheduled commercial banks (published in the Statistical Tables Relating to Banks in India) can be considered as the cost of borrowing from banks, the most prevalent mode of raising debt (referred to as bank lending rate in future). Another measure considered was the effective borrowing cost of select companies from all sources (measured as interest payments as a percentage of average outstanding borrowing during the year). These rates since 2001-02 are presented in Table 2.

Table 2: Effective Borrowing Cost vis-à-vis Bank Lending Rate

(Per cent)

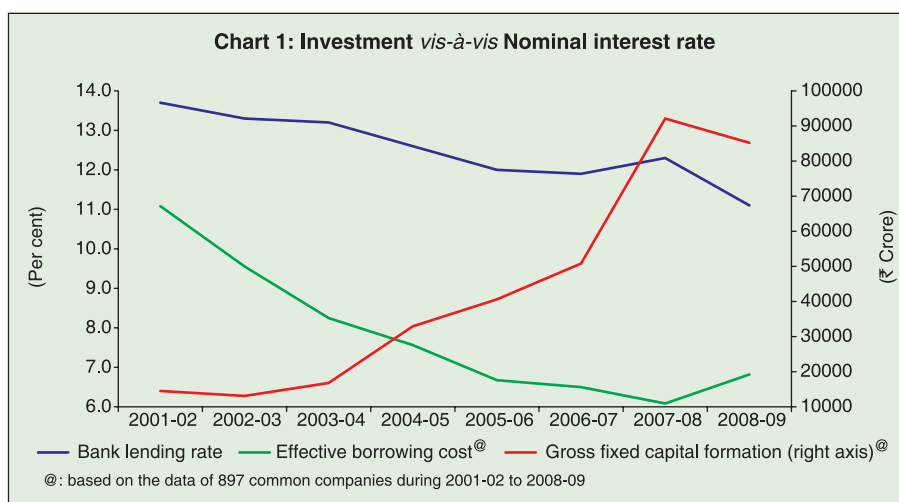|		2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
Weighted Average Lending Rate of Scheduled Commercial Banks*		13.7	13.3	13.2	12.6	12.0	11.9	12.3	11.1
Effective Borrowing cost of corporates@	All companies	11.1	9.6	8.2	7.6	6.7	6.5	6.1	6.8
	PUC 50 crore and above	10.4	8.8	7.8	7.4	6.3	6.2	5.3	6.0
	PUC 10 crore and above but less than 50 crore	12.4	11.0	9.0	7.6	7.2	7.0	7.6	8.3
	PUC less than 10 crore	13.9	12.0	10.2	8.8	8.2	8.0	8.4	9.9

Source: * Statistical Tables Relating to Banks in India.
@ Based on the data of 897 common companies from 2001-02 to 2008-09

The effective borrowing cost of select companies declined continuously from 11.1 per cent in 2001-02 to 6.1 per cent in 2007-08 before rising marginally to 6.8 per cent in 2008-09. The bank lending rate remained always higher than the effective borrowing cost, but still declined continuously over the period though at a moderate pace. This may be an indication that corporates have got access to funds at cheaper rates from non-bank sources within India and also from abroad during the above period. The analysis is based on both bank lending rate and effective borrowing cost. It may also be observed that effective borrowing cost of small companies, though lower than the bank lending rate, is significantly higher than those of the medium and large companies.

5.1 Interest Rate and Investment

Gross fixed capital formation of select companies and nominal interest rates are presented in Chart 1(also in Table 3). It may be observed from the chart that both bank lending rate and effective borrowing cost are inversely related to the gross fixed capital formation of 897 common companies. The correlation coefficients between bank lending rate and gross fixed capital formation (-0.80) and that between effective borrowing cost and gross fixed capital formation (-0.77) also suggest that there is a strong negative relationship between interest rate and the investment. Thus, it may be concluded that the lower

Chart 1: Investment *vis-à-vis* Nominal interest rate

— Bank lending rate   — Effective borrowing cost[@]   — Gross fixed capital formation (right axis)[@]

@: based on the data of 897 common companies during 2001-02 to 2008-09

interest rate regime in the past decade has helped in higher fixed capital formation in the corporate sector.
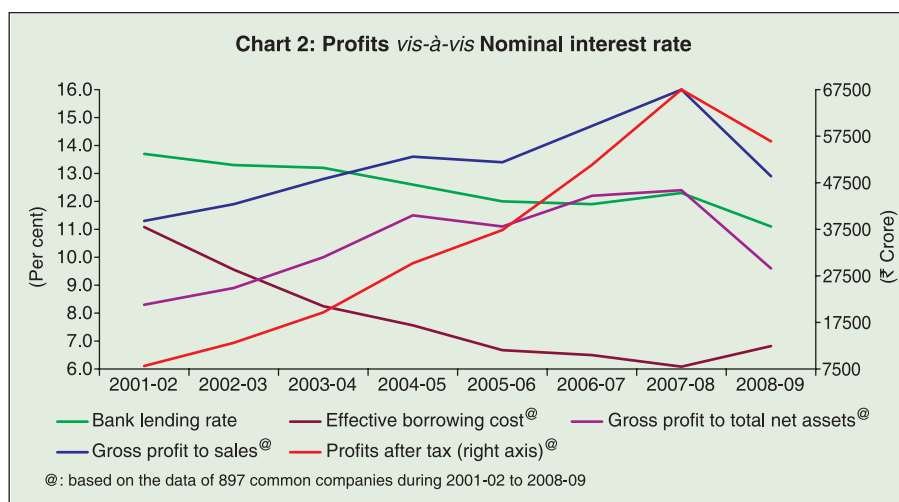
5.2 Interest Rate and Profits

The effect of lower interest rates on profitability of the selected common companies is presented in Table 3 and Chart 2. It may be

Table 3: Nominal Interest Rate and Select Financial Indicators of the Common Companies

(Per cent)

Year	Bank Lending Rate	Based on the data of 897 common companies						
		Effective Borrowing cost	Return on Equity*	Gross profit to total net assets	Gross profit to sales	Interest expenses to total expenditure	Profits After Tax (₹ Crore)	Gross fixed capital formation (₹ Crore)
2001-02	13.7	11.1	6.9	8.3	11.3	5.8	8147	14518
2002-03	13.3	9.6	10.5	8.9	11.9	4.6	13122	13097
2003-04	13.2	8.2	14.0	10.0	12.8	3.7	19655	16796
2004-05	12.6	7.6	17.8	11.5	13.6	2.9	30212	32940
2005-06	12.0	6.7	17.4	11.1	13.4	2.5	37338	40614
2006-07	11.9	6.5	18.4	12.2	14.7	2.4	51339	50827
2007-08	12.3	6.1	19.3	12.4	16.0	2.3	67508	92113
2008-09	11.1	6.8	13.4	9.6	12.9	2.7	56396	85203

* Profits after tax as a percentage of net worth.

Chart 2: Profits *vis-à-vis* Nominal interest rate

Legend: Bank lending rate — Effective borrowing cost[@] — Gross profit to total net assets[@] — Gross profit to sales[@] — Profits after tax (right axis)[@]

@: based on the data of 897 common companies during 2001-02 to 2008-09

observed that two most commonly used measures of profitability viz, gross profit margin (measured as ratio of gross profit to sales) and return on assets (measured as gross profit to total net assets) are negatively related with the bank lending rate as well as effective borrowing cost. The correlation coefficient between bank lending rate and profit after tax (-0.84) and between effective borrowing cost and profit after tax (-0.89) also suggest that there is a strong negative relationhip between interest rate and the profits. It may be seen that the ratio of interest expenses to total expenditure have steadily declined over the years from 5.8 per cent in 2001-02 to 2.7 per cent in 2008-09. Relevant data for various size classes according to Paid-up capital (PUC) are also given in the Annex.

6. Data and Variables Construction

6.1 Data

The data set used in this study is firm-level data, for the period 2000-01 to 2008-09, from Company Finances Studies of the Reserve Bank of India (RBI). The RBI collects annual data from audited annual accounts of private sector companies operating in India. From the standpoint of coverage, the RBI collects data on nearly 3000

companies, representing approximately 30 per cent in terms of the population paid-up capital. The sample under study is a balanced panel on 897 firms for which a continuous data set exists over the sample period. In aggregate, we have 8073 observations. Firms which operate in the financial sector are not included in this analysis since their balance sheets have a different structure from those of the non-financial companies. Further, the analysis is restricted to public limited companies only, as private limited companies are not required to disclose profit and loss account to the public.

6.2 Variables construction

In line with the existing empirical research, the level of *investment* is considered as endogenous variable. Investment is normalized by the level of gross fixed assets to account for differences across firms. Therefore it is measured as the ratio of gross fixed investment of a firm during the year to the gross fixed assets at the beginning of the year.

Firm size is measured by the natural logarithm of total assets. Total assets were divided by 1,00,000 before the logarithm transformation. A priori, we expect that larger firms should have better access to external capital sources and hence have flexibility in timing their investments resulting into positive relationship with financial performance.

Dividend payout ratio, which is measured as the dividends paid as a percentage of profits after tax, can be used as the proxy for the severity of external financing constraints (Fazzari et al., 1998). The underlying argument is that the dividend payout ratio is a good indicator of whether a firm has surplus internal funds. Thus, firms with low dividend payouts are identified as being financially constrained. Previous empirical research findings suggest that investment is higher in financially constrained firms, whereas, financially unconstrained firms display a lower investment.

Growth in Value of Production (VOP), which is measured as the percentage change in VOP over the previous year, is considered as a measure of accelerator. According to the accelerator theory of investment behavior, change in VOP is a demand side factor that plays an important role in determining private corporate investment. The theory was introduced essentially to explain variations in investment over the business cycle. The principle of acceleration states that if demand for consumer goods increases, there will be an increase in the demand for production, and the demand for capital and machinery and hence a positive relationship is expected.

Cost of borrowing is measured as the ratio of interest payments to total outstanding borrowings of the firm. The investments can be funded through either equity or debt. Depending on the market condition, especially that relating to interest rate, firms may undertake new investments when the interest rates are lower. On the other hand, firms may defer their investment proposals when the interest rates are higher.

Modigliani and Miller (1958) argued that the investment of a firm should be based only on those factors that will increase the profitability, cash flow or net worth of a firm. This proposition will be valid only if the perfect market assumptions underlying their analysis are satisfied. One of the main issues in corporate finance is whether financial leverage has any effects on investment decisions. This proposition will be tested empirically, by considering leverage ratio as one of the explanatory variable. *Debt to asset ratio* has been used to test the Modigliani and Miller proposition. Higher levels of debt result in an increased probability of financial distress and the demand for higher returns by potential suppliers of funds. Hence a negative relationship is expected, if exists.

Cash flow measured as the total earnings before extraordinary items, interest and depreciation. Cash flow of firms is an important determinant for growth opportunities. If firms have enough cash inflows it can be utilized in investment activities. It also provides

evidence that investment is related to the availability of internal funds. Cash flow may be termed as the amount of money in excess of that needed to finance all positive net present value projects. The purpose of allocating money to projects is to generate a cash flow in the future, significantly greater than the amount invested. That is the objective of investment to create shareholders wealth. In order to eliminate any size effect, the measure was normalized by the book value of assets.

Besides the endogenous variables discussed above, a number of exogenous variables (macro economic factors) also influence the investment decisions of the firms. Thus, the macro-economic variables like Real effective exchange rate (REER), Inflation, Non-food credit growth and Capital market developments have also been taken into consideration in the model. *Monetary policy transmission* could take place either by interest rate channel or by credit channel. To measure the effect by interest rate channel, effective cost of borrowing is used in the model, and to measure the effect by credit channel *non-food credit growth rate* is considered.

6.3 Trends and Basic statistical properties

The trends of these variables at aggregate level are presented in Table 4. It may be observed that the investment ratio is increased from 7.2 per cent in 2001-02 to 22.7 per cent in 2007-08 and then moderated

Table 4: Trends at the aggregate level

(Per cent)

	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
Investment ratio	7.2	5.9	7.1	13.0	14.1	14.4	22.7	17.1
Firm size	1.1	1.1	1.3	1.4	1.6	1.8	2.0	2.2
Dividend payout ratio	55.0	38.4	37.1	27.0	30.2	23.9	23.7	24.8
Debt to asset ratio	25.6	22.5	21.4	19.3	18.3	18.7	17.1	16.3
Effective cost of borrowings	11.0	9.5	8.0	7.3	6.2	5.8	5.5	6.0
Growth in value of production	-4.2	11.0	13.9	26.9	18.4	25.9	17.0	16.1
Cash flow ratio	4.2	4.8	6.2	7.7	7.6	9.0	9.6	6.9

to 17.1 per cent in 2008-09. Firm size steadily increased over time from 1.1 in 2001-02 to 2.2 in 2008-09. Dividend payout ratio, though higher in 2001-02, was steadily decreased and stood at 24.8 per cent in 2008-09. Debt to asset ratio observed to be decreasing over the study period. Effective cost of borrowings was declined to 5.5 per cent in 2007-08 from 11.0 per cent in 2001-02 before it inches up to 6.0 per cent in 2008-09.

The basic statistical properties of the variables used in the model are presented in Table 5. The mean value of the investment ratio is increased from 7.1 per cent in 2001-02 to 17.5 per cent in 2006-07 and then moderated to 12.3 per cent in 2008-09. Average firm size steadily increased over time from 1.94 in 2001-02 to 2.67 in 2008-09. Average debt to asset ratio, though increased steeply up to 25.3 per cent in 2002-03, it was stabilized around 15 per cent in recent years. Cash flow ratio steadily increased from 2.16 per cent in 2001-02 to 6.23 per cent in 2007-08 before it droped to 4.75 per cent in 2008-09.

Table 5: Statistical Properties of the Variables

	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
Investment ratio	7.10 (0.20)	7.41 (0.35)	8.69 (0.21)	10.99 (0.30)	14.21 (0.37)	17.47 (0.52)	14.47 (0.26)	12.27 (0.27)
Firm size	1.94 (1.64)	1.97 (1.65)	2.04 (1.67)	2.14 (1.71)	2.28 (1.75)	2.45 (1.80)	2.60 (1.86)	2.67 (1.90)
Dividend payout ratio	19.14 (2.09)	18.04 (0.32)	20.60 (0.46)	16.71 (1.30)	16.22 (1.13)	17.28 (0.58)	13.78 (5.11)	68.54 (15.26)
Debt to asset ratio	19.01 (0.43)	25.26 (2.59)	16.10 (0.21)	15.93 (0.20)	15.81 (0.19)	15.82 (0.21)	14.49 (0.17)	14.63 (0.17)
Effective cost of borrowings	29.95 (2.87)	24.20 (2.08)	165.34 (43.66)	19.40 (1.67)	12.73 (0.57)	17.39 (1.73)	16.47 (1.40)	62.07 (10.21)
Growth in value of production	5.55 (0.41)	11.52 (0.35)	23.87 (1.68)	25.32 (0.56)	19.90 (0.85)	28.39 (0.84)	21.68 (0.59)	18.73 (1.56)
Cash flow ratio	2.16 (0.10)	2.74 (0.09)	3.30 (0.13)	4.32 (0.14)	5.60 (0.12)	6.20 (0.14)	6.23 (0.14)	4.75 (0.16)

Note: Mean values are presented in the table along with standard deviation in parenthesis.

7. Empirical Analysis

7.1 Model

The literature review suggests that various firm specific factors and macro-economic conditions in the country may influence the corporate investment decisions. A linear relationship between corporate investment decisions and its determinants is assumed. Therefore, a model of the following form is estimated:

$$INVR_{it} = \sum_{k=1}^{K} \beta_k X_{kit} + \mu_i + \varepsilon_{it}$$

Where, INVR = investment ratio, firms are represented by subscript i=1,2,…,n and time by t=1,2,…,T.

K represents the number of explanatory variables.

X's represents the explanatory variables.

μ_i = firm specific effects,

and ε_{it} = disturbance term having the properties, $E(\varepsilon_{it}) = 0$ and $Var(\varepsilon_{it}) = \sigma^2$.

7.2 Estimation

Panel-data models are usually estimated using either fixed or random effects techniques. These two techniques have been developed to handle the systematic tendency of individual specific components to be higher for some units than for others - the random effects estimator is used if the individual specific component is assumed to be random with respect to the explanatory variables. The fixed effects estimator is used if the individual specific component is not independent with respect to the explanatory variables.

Hausman (1978) provides a test for discriminating between the fixed effects and random effects estimators. The test is based on comparing the difference between the two estimates of the coefficient vectors, where the random effects estimator is efficient and consistent

under the null hypothesis and inconsistent under the alternative hypothesis, and the fixed effects estimator is consistent under both the null and the alternative hypothesis. If the null hypothesis is true, the difference between the estimators should be close to zero. The calculation of the test statistic (distributed χ^2) requires the computation of the covariance matrix of b1 - b2. In the limit the covariance matrix simplifies to Var(b1) - Var(b2), where b1 is the fixed effects estimator. The computed Hausman statistic in our model is 11.58 indicated that the null hypothesis could not be rejected at the 5 per cent level of significance. Hence, random effects model has been used in our empirical analysis.

7.3 Empirical results

Table 6 reports the regression results displaying the marginal contribution (coefficients) of the independent variable to investment decisions. The strengths of the relationship between the dependent and explanatory variables are also reported in the form P-values. It may be observed that investment decisions are positively associated with firm size, leverage ratio, cash flow ratio and growth in value of production, whereas, negatively associated with dividend payout ratio and effective cost of borrowings, as expected.

Table 6: Results of the panel regression model

	Coefficient	Robust Standard Error	P-Value
Firm size	0.028109	0.002650	0.000
Dividend payout ratio	-0.000280	0.000058	0.000
Debt to asset ratio	0.002518	0.002338	0.281
Effective cost of borrowings	-0.000112	0.000035	0.001
Cash flow ratio	0.211257	0.052787	0.000
Growth in value of production	0.018448	0.008405	0.028
Real effective exchange rate	-0.004002	0.001923	0.037
Inflation	-0.452320	0.433567	0.297
Non-food credit growth	0.087583	0.059282	0.140
Capital market development	0.100268	0.022185	0.000
Constant	0.376435	0.192029	0.050

Size variable positively influences current investment and it is statistically significant. The results portray that, the larger the firm, the more investment it will make in fixed assets. Statistically significant relationship could not be found between financial leverage (measured by debt to asset ratio) and investment decisions. Negative relationship has been observed between dividend payout ratio and investment decisions and is statistically significant. Effective cost of borrowing is negatively related with investment decisions and is statistically significant. Cash flow ratio has significant positive relationship with investment decisions.

Real Effective Exchange Rate (REER) negatively influences the corporate investment decisions and is statistically significant at 5 per cent level. There is a negative and statistically insignificant relationship between inflation and corporate investment decisions. Non-food credit growth used as proxy for monetary policy action, though positively influences the corporate investment decision; it is statistically significant only at 15 per cent level. Capital market development positively influence corporate investment decisions and is statistically significant at 1 per cent level.

It is empirically evident that firm size, dividend payout ratio, effective cost of borrowing, cash flow ratio and growth in value of production are the major determinants of corporate investment decisions at firm level during the period 2000-01 to 2008-09. Capital market development and real effective exchange rate also can influence the firm's investment decisions.

8. Summary and Conclusions

In this study the determinants of private corporate investment in India have been studied using a panel regression model. Firm level data covering the period from 2000-01 to 2008-09 of public limited companies, which contribute to the major proportion of corporate investment in India have been used. Corporate investment is the amount of capital spent on increasing its assets. Therefore it could be financed by either internal sources of funds or external sources of

funds. Higher level of investment is desirable for nation's economic growth as fresh investment could produce additional output and is able to generate employment. Corporate investment decisions, generally taken at the Board level, however, these were influenced by the firm specific factors, such as financial position of the firm and macro economic conditions of the economy.

It was evident from the data on sources of finance that Indian firms depended more on the external finance during 1980s and 1990s. Though Indian firms depended more on internal finance in the early 2000s but external finance was dominant since 2006 and is accounted for 68 per cent in 2009. This increased dependence on external finance was evidenced in the form borrowings raised by the firms. On the other hand, internal accruals and provisions were declining in the internal sources of finance.

The effective borrowing cost of the select companies declined continuously from 11.1 per cent in early 2000s to 6.8 per cent in 2008-09. Further, it was observed that bank lending rate is always higher than the effective borrowing cost, which indicates that corporates have got access to cheaper funds from non-bank sources within India and abroad. The analysis also revealed that smaller companies' effective borrowing cost is higher than that of the larger companies, however, it is lower than the bank lending rate. Corporate investment is negatively related with the lending rate of banks.

Model used has two alternative specifications depending upon their error structure, fixed effects model or random effects model. The Hausman specification test is the classical test to know whether the fixed or random effects model should be used. The results of the test suggested that random effects model is consistent and efficient for our data, hence the random effects model has been used.

The empirical results of the panel regression model showed that firm size, debt to asset ratio, cash flow ratio and growth in value of production are positively associated, whereas, dividend payout ratio and effective cost of borrowing are negatively associated with

investment of the firm. Real effective exchange rate (REER) and inflation at the macro level are negatively related with the corporate investment and non food credit growth and capital market developments are positively related. Further, it is evident from the empirical results that appreciation in the real effective exchange rate will pull down the investment activity of the corporates, whereas, capital market developments will boost the corporate investment. Firm specific factors such as firm size, dividend payout ratio, effective cost of borrowing, cash flow ratio and growth in value of production appear to be the major determinants of corporate investment decisions during the period 2000-01 to 2008-09.

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Annex

(Per cent)

	Effective Borrowing cost	Return on Equity	Gross profit to total net assets	Gross profit to sales	Interest expenses to total expenditure	Profits After Tax (₹ Crore)	Gross fixed capital formation (₹ Crore)
PUC less than 10 crore (459 companies)							
2001-02	13.9	2.6	6.1	6.3	5.0	202	724
2002-03	12.0	5.0	6.8	6.9	4.3	393	859
2003-04	10.2	12.5	8.3	8.0	3.5	1079	1221
2004-05	8.8	17.4	9.7	8.9	2.8	1759	1620
2005-06	8.2	17.7	10.7	9.7	2.5	2131	2266
2006-07	8.0	18.2	11.0	10.4	2.3	2839	3001
2007-08	8.4	19.6	10.7	10.7	2.5	3678	3900
2008-09	9.9	12.2	10.1	10.1	3.2	2570	3163
PUC 10 crore and above but less than 50 crore (332 companies)							
2001-02	12.4	5.7	7.7	9.1	5.3	1560	2575
2002-03	11.0	8.5	8.5	9.8	4.4	2438	2342
2003-04	9.0	12.8	9.4	10.1	3.2	4092	3710
2004-05	7.6	15.2	10.5	10.6	2.5	5555	5901
2005-06	7.2	17.2	10.9	12.0	2.4	7828	10920
2006-07	7.0	18.9	12.0	13.2	2.5	10845	16942
2007-08	7.6	17.3	11.4	13.6	2.8	12943	19444
2008-09	8.3	12.6	9.7	11.6	3.3	10442	19345
PUC 50 crore and above (106 companies)							
2001-02	10.4	7.7	8.7	13.1	6.2	6385	11219
2002-03	8.8	11.7	9.3	13.5	4.8	10291	9896
2003-04	7.8	14.6	10.4	14.7	4.0	14484	11865
2004-05	7.4	18.6	12.0	15.4	3.1	22898	25418
2005-06	6.3	17.4	11.2	14.5	2.5	27378	27428
2006-07	6.2	18.3	12.4	15.9	2.3	37655	30884
2007-08	5.3	19.8	12.9	17.6	2.1	50887	68769
2008-09	6.0	13.7	9.5	13.7	2.5	43383	62695