PANKAJ KUMAR GUPTA

Centre for Management Studies, JMI University, India, pkg123@eth.net

JASJIT BHATIA

Centre for Management Studies, JMI University, India, jasjit.arora@gmail.com

INVESTMENT BEHAVIOR IN POST-CRISIS PERIOD – COMPARISON OF INDIAN PUBLICS AND PRIVATE FIRMS

Abstract:

Corporate investment in capital assets plays an important role in the total capital investment in the country particularly in the developing nations like India. The policy emphasis on corporate investment in India has undergone a major change in the last decade in line with the liberalization move. Also, the optimal investment strategy is crucial for business enterprise with the growing turbulence in the economies more importantly after the global financial crisis. Optimal allocation of capital to the right investment projects is of paramount importance to the firm and economy. We are, therefore, motivated to analyze the factors that influence the investment behavior of firms in India and comparison between the public and private firms. We choose a period of 2007-2013 reflecting the after effects of the global financial crisis. The investment behavior has been analyzed with along with the selected variables reflecting cash flow movements, dividend distribution, and firm's size and leverage aspect of financing total assets using a panel regression methodology considering both fixed and random effects models. We find that in case of private firms, the investment behavior is significant influenced by the firm size leaving the dividend payout, cash flows and leverages. However, investment by public firms is more affected by government policies rather than their own financial variables. We find that this behavior has significantly contributed to the robustness of the economic conditions after the crisis.

Keywords:

Investment Behavior, Leverage, Capital Structure Dividend Payout, Global Crisis

JEL Classification: C22, G11, G32

Introduction

Indian economy has witnessed an upward growth trajectory over the last decade. The economy was standing tall even in the years 2008 & 2009 during the time of global crises. However, the ongoing debt crisis of the European Union and slow economic growth in the United States does pose a challenge to India's growth prospects. The uncertainty in the global economy, the Euro Zone crisis, the persistent rise in the crude oil prices in the international market, and control in the level of Foreign Institutional Investment (FII) flows has resulted in a sharp depreciation of the rupee in the foreign exchange market over the last few years.

Given the external global challenges from the economic uncertainty, the growth prospects of India largely depend on its ability to tackle supply side constraints in the domestic economy. Investment is the most critical supply side factor of the economy and it is thus necessary to have a higher level of investment for ensuring a relatively high and long-run sustainable growth rate in the economy.

For any country, rate of accumulation of physical capital or investment is an important driver of short-term and long-term economic performance and in this, both public and private sector investments play an important role. The evidence garnered by some studies show that in developing countries, it is the private investment that plays a greater role than pubic investment in determining economic growth (Galbis, 1979). As a result, there have been various research studies done regarding the determinants of private investment in developing countries. (Chibber et. al. 1992; Serven and Solimano, 1993; Khan and Knight,1981, 1982; Sioum, 2002, Greene and Villaneuva, 1991; Tun Wai and Wong, 1982).

The Private Sector and Public Sector in India

In India, on one hand we have the private sector companies that account for more than three-fourth of the country's GDP and over 90 per cent of its manufacturing output. Keeping in view its importance, in the year 2011-2012, CRISIL Research conducted a poll of 200 companies (170 private sector companies) and found that at an overall macro-economic level, Capital Expenditure (CAPEX) by corporate is slowing. Also, close to half of the companies in the poll indicated that they have no plans of starting any new projects in 2012-13.They also reported that the sectors where CAPEX is expected to decline significantly are cement, textiles, telecom and automobiles.

On the other hand India's Public sector enterprises as a consequence of various initiatives in five-year plans have immensely contributed to India's economic development in both pre-independence and post-independence era. The number of Central Public Sector Enterprises (CPSEs) as on 2011 was 248, with total investment of nearly Rs 666848 crores against five CPSEs with total investment of Rs 29 crores in 1951(Public Enterprises Survey- Dept of Public Enterprises).

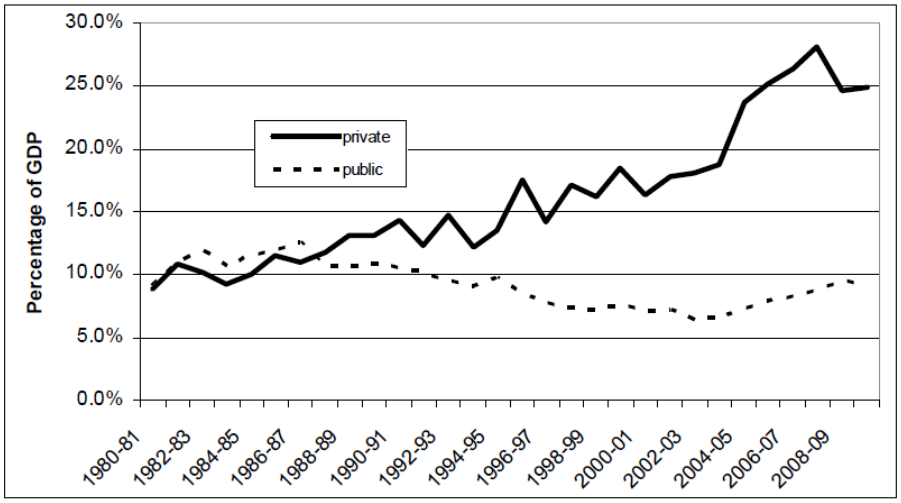
With the opening of the economy, private sector is playing a greater role in shaping the industrial landscape. As a result, the Public sector enterprises have been exposed to competition from domestic and multi-national corporations, with many companies still facing issues like bureaucracy, corruption, ineffective governance, financial autonomy political interference, risk aversion, and inability to recruit the right talent.

Trend of Investment

Investment measured by Gross Capital Formation (GCF) comprises Gross Fixed Capital Formation (GFCF) and Change in Stock (CIS). GFCF refers to creation of physical assets and Change in stock measures the inventories i.e. the working capital. As per the report of Planning Commission, it is the GFCF, which is important for measuring the potential growth of the economy, and also accounts for more than 90% of the Gross Domestic Investment.

Looking at the relative share of the public and private investment, private corporate sector investment has been emerging as an important contributor to the gross fixed investment vis-à-vis the public sector. As can be seen from Figure 1, after the liberalization period of 1990s dominance of public investment has declined and a major role in investment activity is being played by the private sector.

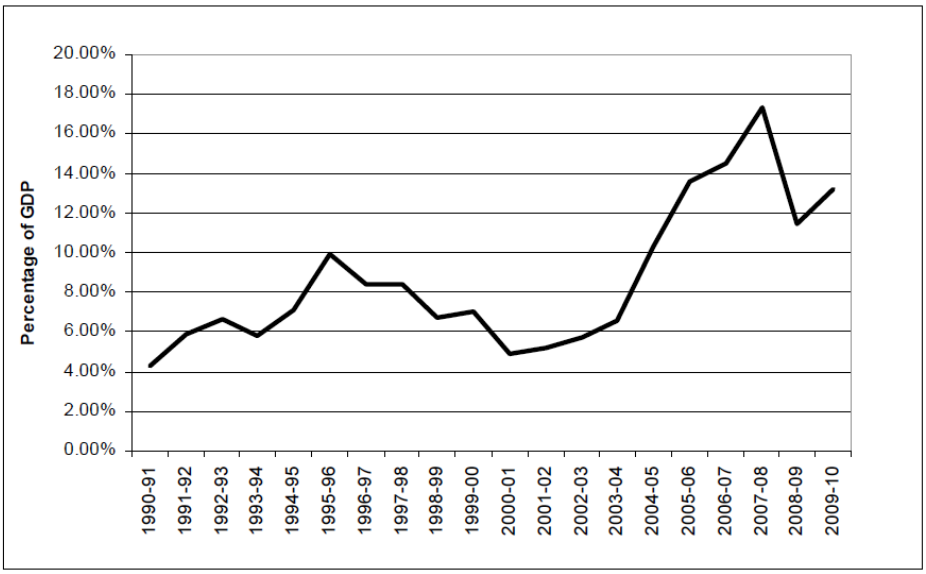
Figure 1 - Trend in Gross Capital Formation



Source- Report of the Working-Group on Estimation of Investment, its Composition and Trend for Twelfth Five-Year Plan

In the post reform period, the rate of investment of the private corporate sector has increased from around 4 per cent in the 1990-91 to more than 15% in 2007-08, and then it came down in 2008-09 and again started picking up (Figure 2).

Figure 2: Trend of Private Corporate Investment in Post Reform Period



Source- Report of the Working-Group on Estimation of Investment, its Composition and Trend for Twelfth Five-Year Plan

Table 1 shows the institution wise investment rate in India since 1980-81 on an annual basis. It shows that the dominance of public investment has declined gradually and substantially since the year 1987-88, whereas the investment by private corporate sector has exhibited an increasing trend in the post reform period.

But an analysis of the crisis period depicts that investment by the private corporate sector slumped and the public sector investment that has helped sustain the drive of overall investment during the crisis period. Therefore, in view of the trends and research studies it can be argued that India emerged unhurt from the wider effects of the global financial crisis *mainly due to the impetus from the public sector*.

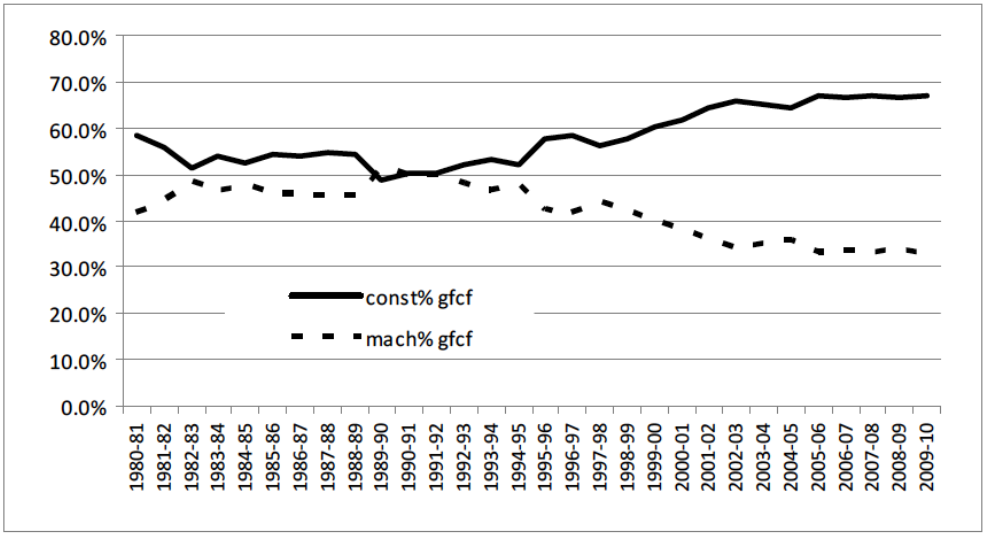
Table-1 Trend and Composition of Investment by Institutions

Year	Gross Fixed Capital Formation (% of GDP)	Pvt. Corporate Sector(% of GDP)	Public Sector(% of GDP)
1980-81	19.2	9.2	2.5
1981-82	18.9	11	5.5
1982-83	19.1	11.9	5.4
1983-84	18.2	10.7	3.3
1984-85	19.1	11.5	4.2
1985-86	20.6	11.9	5.3
1986-87	20.1	12.5	5.1
1987-88	21.9	10.8	3.5
1988-89	22.8	10.8	3.9
1989-90	23.7	10.8	4.1
1990-91	26	10.6	4.3
1991-92	21.8	10.2	5.9
1992-93	23	9.5	6.6
1993-94	22.2	9.1	5.8
1994-95	24.7	9.7	7.1
1995-96	25.3	8.6	9.9
1996-97	23.7	7.8	8.4
1997-98	25.6	7.4	8.4
1998-99	24.2	7.3	6.7
1999-2000	26.8	7.7	7
2000-2001	24.4	7.2	4.9
2001-02*	25.13	5.16	7.21
2004-05	28.72	7.42	10.33
2005-06	30.33	7.94	13.56
2006-07	31.29	8.3	14.53
2007-08	32.92	8.86	17.31
2008-09	32.35	9.44	11.3
2009-10	31.74	9.15	12.14
2010-11	31.74	8.39	13.35
2011-12	30.63	7.86	10.57
2012-13	32.4	11.5	8.4

Gross Fixed Capital Formation (GFCF) includes ‘construction activities’ and ‘machinery and equipment’. The dominant mode of investment for most of the years was construction activities however, the share of construction activities in the total GFCF has gradually declined over the years and the share of machinery and equipment has increased mainly because of private corporate sector. Figure 3 shows that for the public sector, the investment trend witnessed a decline in the share of

construction over the years during the pre-reform period, while the share of machinery and equipment increased over the same period. However, after the reform period the trends have reversed with construction's share rising and share of machinery and equipment falling. This change is consistent with the new economic policy, in which Government withdrew itself from the direct production of goods and started focusing more on the development of infrastructure and hence the increase in construction activities.

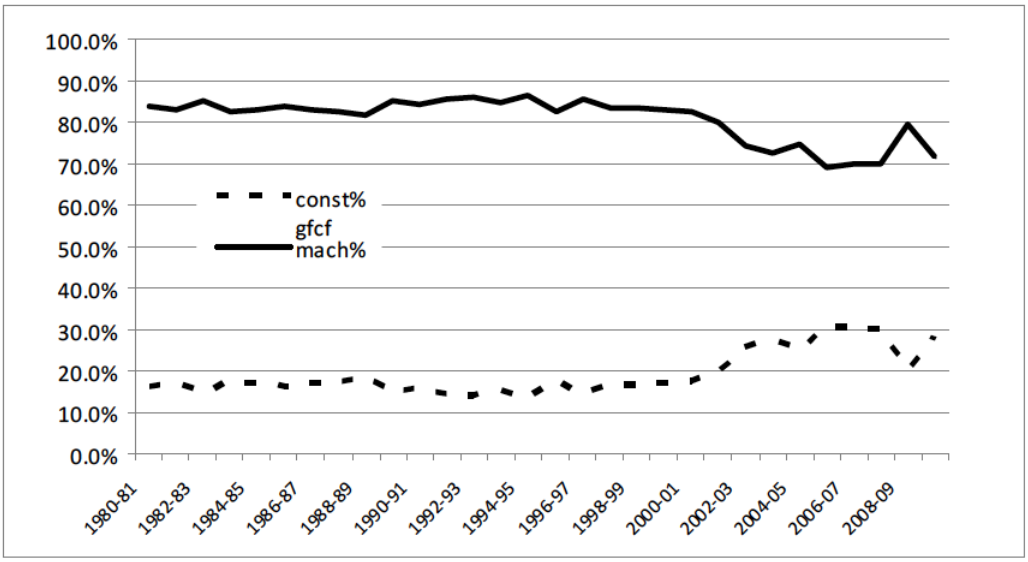
Figure 3 –Trend and Composition of GFCF in Public sector



Source- Report of the Working-Group on Estimation of Investment, its Composition and Trend for Twelfth Five-Year Plan

The trend for private sector investment shows the dominant share for investment remained with 'machinery & equipment' over the years (Figure 4).

Figure 4 –Trend and Composition of GFCF in Private sector



Source- Report of the Working-Group on Estimation of Investment, its Composition and Trend for Twelfth Five-Year Plan

Literature Review

The earlier studies have contributions from Modigliani and Miller (1958), who conclude that under the perfect and complete market assumptions, a firm's investment decisions are independent from the financing sources. According to his paradigm, a firm's investment should depend only on the profitability of its investment opportunities. Firms invest as long as the marginal dollar of the capital expenditure generates at least one dollar of a present value of cash flows , on the assumption of perfect capital market (Tobin, 1969). However, in imperfect or incomplete markets the financial structure of a firm becomes relevant. There are a number of factors that make a firm's investment policy depend on its financial position. First, market participants have different access to information, Myers and Majluf (1984) demonstrate that asymmetric information between a firm and the capital markets may result in the rejection of good investment project because the lenders include into the cost of capital a premium which reflects the risk of an average investment project. Stiglitz and Weiss (1981), also demonstrate how asymmetric information may result in the rationing of debt finance. Second, sub optimal investment can occur due to agency costs between shareholders and management, when managers who are not owners pursue their own interests (Jensen and Meckling, 1976). The combined effects of asymmetric information, managerial agency problems and transactions costs explain a disparity between the cost of internal and external funds. Under such financial constraints, large no of studies demonstrate funding of future investment from internal sources in an attempt to reduce the financing costs.

The role of 'financing constraints' in determining investment has been studied in numerous papers. Fazzari et.all (1988) suggest that firms may be classified into three

groups according to the severity of their financial constraints. They treat firms paying low dividends as being financially constrained and those paying high dividends to be financially uncon-strained. They find that firms' investment policies are indeed sensitive to their cash flow fluctuations and that most financially constrained firms have greater cash flow sensitivity than least constrained firms Kaplan and Zingales (1997) show that an increase in the investment/cash flow sensitivity is not necessarily an increase in the degree of financial constraints. Moyen 2004 worked with two models, an unconstrained model and a constrained model. The unconstrained model establishes a positive relation between investment and internal funds thus supporting Fazzari et al.(1988) while the constrained model shows a negative relationship, thus supporting Kaplan and Zingales (1997). To study the presence of finance constraints on firms' investment behavior , Ganesh-Kumar, Sen and Vaidya (2001) work with a sample of Indian manufacturing firms in the post-1991 period (when substantial market oriented reforms were introduced) and concluded that suppliers of funds in India use the firm's export competitiveness as a signal of the strength of the firm, and hence these exporting firms are less constrained by the availability of internal funds than firms which produce mostly for domestic consumption. Cleary (1999) suggest that investments of large firms and firms with high payout ratios have higher sensitivity to internal funds than small firms and firms with lower payout ratios. Aggarwal and Zong (2006) study of largest industrialized countries provide evidence of the existence of financial constraints in an international environment and establish that investment levels are related to cash flow in varying degrees.

Few studies investigate the relationship between investment decisions and ownership structure . According to Chen and Kensinger (1988), managers who have substantial stakes in their firms may face severe consequences if the firm fails. These managers may avoid risky ventures that might be desirable for outside shareholders, thus suggesting a difference between the investment behaviour of family-controlled and institution-controlled firms. Pawlina and Renneboog (2005) examine the relationship between investments and the type of controlling shareholders using a large sample of UK listed firms and report that outside block holders influence firms' investment policies and the types of outside block holders determine the diversified abilities and motivations to monitor management and influence firms' investments. Yuting *et* al., 2010 argue that the intensity of investments of widely held firms is greater than the intensity of investments for concentrated ownership firms. Gedajlovic *et* al., 2010 examine this relationship for Japan's manufacturing firms with different categories of Japanese shareholders. They observe that share ownership by financial institutions is associated with higher levels of investments in capital expenditures whereas ownership by foreign investors and insiders is negatively associated with such expenditures.

The studies in India have contributions from Rajakumar (2005) who analysed the relationship between investment behaviour and the financiang pattern of Indian firms for the period 1988-89 to 1998-99. The firms in the study were segregated according to the mode of financing and the results for the relationship between debt equity ratio and investment at the aggregate level reported a positive correlation coefficient , thus

suggesting higher the debt , greater the investment. Hosamane and Niranjan (2010) analyze the determinants of the investment patterns for Indian manufacturing sector and concluded that output, change in output and profits, along with capital stock and change in capital stock are significant variables in determining investment. Das (2008) looked at the relationship between investment decisions with Cash flow, working capital and marginal profitability of capital (MPK) for manufacturing firms in India. Using a panel VAR framework his findings suggest that both MPK and cash flow affect investment. A latest study by Reserve Bank of India (2010) looks at the determinants of private corporate investment in India from 2000-01 to 2008-09. They found that firm specific factors like 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. Mallick (2009) studied the trends in private investment in India in the pre and post reform period. He found that the rate of capital formation in the public sector was higher than in the private sector in the pre-reforms periods, but this rate increased in the private sector and decreased in the public sector after economic reforms.

The evidence and theory that we have enumerated above indicate that there are various factors that affect investment decisions of firms. In the extant literature, there has been no research focusing on the differences in the determinants of public and private investment specifically in India. Understanding the behavior of public and private investment provides an important insight into the process of economic development. This paper seeks to examine the difference in the determinants for investment for both public sector and the private sector, over 2005-2013, the period, which reflects a *pre* and *post recession* analysis.

Methodology

Model

In order to determine the factors influencing the behavior of investment for both public and private sector Indian firms, we use a panel regression model assuming a linear relationship between the investment and the various firm financial parameters based on reported financial statements. The panel regression model based specification proposed by Gujarati (2006) uses a dependent variable, which in our case is

Y_{it} representing the firm's investment with a constant β_1 and β_{it} as regressors.

$$Y_{it} = \beta_1 + \beta_2 X_{2it} + \beta_3 X_{3it} + \ldots + \beta_k X_{kit} + \mu_{it}$$

Where firm(i) = 1, 2,. . ., k and time period (t) = 1, 2, 3, . . . , n,

μ_i –random error denoting firm specific effects,

i = 1, 2,. . ., k and t = 1, 2, 3, . . . , n, μ_i -firm specific effects,

The explanatory variables are firm size (Total Assets; TA), Years of Incorporation (Age), Dividend Payout Ratio (DP), Leverage (Debt to Total Assets; DA), and Cash

Flows (CASHFLOW) during the year. We conducted unit root test to examine the stationarity of the series based on Levin, Lin and Chu (LLC) Test.

We first use a generic estimator first to find the co-efficient of the regressors. and then proceed to find the impact of fixed effects (FE) and random effects (RE) in the cross sections. We can test whether a fixed or random effects model is appropriate using a Hausman test where X it and Z it as instruments yields a consistent estimate.

Data

We have used the CMIE[1] Prowess database on private sector firms listed on Mumbai Stock Exchange (BSE) and are part of the BSE 100 Index and public sector firms which are a part of the BSE–PSU index thus consisting the top companies in India as per market capitalization. From the initial sample we have excluded all those firms for whom observations are not available for any variable included in the model during the sample period. The period under consideration is a period after the crisis - from April 2007 to March 2013.

Key Variables

We describe the dependent and independent variables as follows.

Investments (INV)-Investment is an endogenous variable representing the changes in the level of gross fixed assets normalized to account for the difference between firms.

Total Debt to Total Assets Ratio (DA) – represent the debt position of the company. It determines the percentage of a company's assets with respect to the total assets of the firm. Impact of financial leverage on investment decisions of the firm is measures by this ratio.

Cash Flows (CF) - Cash flow are an important determinant influencing investment decisions. If firms have enough cash inflows it can be utilized in investment activities. A relation between cash and investment will also provide evidence that investment is related to the availability of internal funds, which has been an area of research.

Dividend payout ratio - Dividend payout ratio is a good indicator of whether a firm has internal funds. Fazzari *et. al.* (1988) have classified firms paying low dividends as classified as financially constrained and those paying high dividends classified as financially unconstrained. Hence this ratio can be used as the proxy for the severity of external financing constraints.

Firm Size (TA)-The size of the firm will be considered to see whether there are any significant differences in investment behavior of large firms vis-à-vis small and medium size firms. As large firms have better access to the capital markets we expect greater responsiveness towards investment opportunities for these firms. We take natural log of the reported Total Assets.

[1] Centre for Monitoring of Indian Economy.

Results

We first conducted the panel unit root analysis of the dependent and independent variables at 5% significance level. Results indicate that the null hypothesis is rejected of all the measures for all processed variables. This allows us to proceed for direct regression estimates without modifications.

We first run the panel regression for Private sector firms and estimate the coefficients (Table 2). In order to proceed for selection between the fixed and random effects we use the Hausman (1968) test specifications. Hausman test is used to select between fixed or random effects models. The null hypothesis of the Hausman test shows that coefficients of random and fixed effect models are equal and GLS and OLS estimator are unbiased. Alternative hypothesis represent that estimator of fixed and random effect model is differentiae there is no random effect, GLS estimator is biased and OLS estimator is unbiased.

Table 2: Panel Regression Coefficients (Private)

Private Investment Fixed Effects (R^2=0.909337)				
Variable	Total Assets	Dividend Payout	Cash Flow	Debt to Total Assets
Coefficient	0.435622	-0.093823	-0.007583	-0.091152
Std. Error	0.012409	0.119927	0.004255	0.029352
Prob.	0.000000	0.434400	0.075300	0.002000
Private Investment Random Effects (R^2= 0.745336)				
Variable	Total Assets	Dividend Payout	Cash Flow	Debt to Total Assets
Coefficient	0.442241	-0.099458	-0.006372	-0.089213
Std. Error	0.011626	0.111790	0.004217	0.027651
Prob.	0.000000	0.374000	0.131400	0.001300

The results of Hausman test indicate that there is no significant difference between the fixed and random effects for private firms (Table 5). In case of private firms, Total Assets is positively related to Investments and the impact is significant. Dividend Payout, Cash flow and Debt to Total Assets are negatively related to Investments and their impact is insignificant. The significant positive relation between Investments and assets shows that bigger the firm higher is the investment spending. The significant negative relation between debt to total assets and Investment shows that higher the financial leverage of a company lower will be the spending on capital projects.

Table 3: Panel Regression Coefficients (Public)

Public Investment Fixed Effects (R^2= 0.913735)				
Variable	Total Assets	Dividend	Cash Flow	Debt to Total Assets

		Payout		
Coefficient	0.003802	-0.077321	-0.034963	0.016732
Std. Error	0.109794	0.532722	0.011757	0.047478
Prob.	0.000000	0.963800	0.271000	0.000100
Public Investment Random Effects (R^2=)				
Variable	Total Assets	Dividend Payout	Cash Flow	Debt to Total Assets
Coefficient	0.004757	-0.059707	0.034266	0.020818
Std. Error	0.091062	0.521428	0.011705	0.045412
Prob.	0.000000	0.725900	0.322500	0.000000

The results of Hausman test indicate that there is a significant difference between the fixed and random effects for public firms (Table 6). In case of public firms also, total assets is positively related to investments and the impact is significant. Dividend payout, cash flow are negatively related to investments and their impact is insignificant. However, the debt to total assets, which is measure of leverage based financing, is significantly positive. Also, the coefficient of total assets is weak indicating that though size of the firms may have impact on investment, *yet investment patterns are determined by some factors beyond the financial variables selected for the study for example – government polices.* We also find that the move of private firms is towards equity financing confirming the earlier researches (Rajakumar, 2005). Though the rate of capital formation in the post crisis period has slowed down, yet it confirms the positive attitude of government towards investment, which is mainly through the public firms that have accounted for the major chuck of the total investment in capital assets.

Remarks

Our paper shows that investment patterns of Indian firms based on panel regression model of public and private firms differ significantly in the post crisis period. Contrary to the convention, leverage and cash flow considerations are insufficient to the investment considerations. Larger private firms exhibit a higher sensitivity toward investments. In tune with the agenda of any developing country, India investments are imperative to development in terms of contribution to GDP and employment. Therefore, the government polices have larger influence on the investment behavior of private firms. This behavior has significantly contributed to the robustness of the economic conditions after the crisis.

References

Aggarwal, R. and Zong, S. (2006), "The cash flow – investment relationship: international evidence of limited access to external finance", *Journal of Multinational Financial Management*, Vol. 16, pp. 89-104.

Chen, A., Kensinger, J.(1988), "Puttable Stock: A New Innovation in Equity Financing", *Financial Management*, Vol. 17, pp. 27–37.

Cleary, S. (1999), "The Relationship between Firm Investment and Financial Status", *The Journal of Finance*, Vol. 54 No. 2, pp. 673-692.

Das, P. K. (2008), "Fundamentals, financial factors and firm investment in India: A Panel VAR approach", *The Indian Economic Journal*, Vol. 55 No. 4

Fazzari, S., Hubbard, R.G. and Petersen, B. (1988), "Financing Constraints and Corporate Investment", *Brookings Papers on Economic Activity*, No. 1, pp.141-195

Ganesh-Kumar, A., Sen, K. and Vaidya, R. (2001), "Outward Orientation, investment and Finance constraints: a study of Indian firms", *Journal of Development Studies*, Vol. 37 No. 4, pp. 133-49.

Gedajlovic, E., Yoshikawa, T. and Hashimoto, M. (2005), "Ownership structure, investment behavior and firm performance in Japanese manufacturing industries", *Organisation Studies,* Vol. 26 No. 1, pp. 7–35

Greene, J. and Villaneuva, D. (1991), "Private investment in developing Countries: an empirical analysis", IMF Staff Papers, Vol.38, No. 1, pp.33–58.

Gujarati, D.N. (2006), *Essentials of Econometrics*, 3rd ed., McGraw-Hill, New York

Hay, D. A. and Liu, G. S. (1998), "The Investment Behaviour of Firms in an Oligopolistic Setting", *The Journal of Industrial Economics*, Vol. 46 No. 1, pp. 79-88.

Hosamane, M. D.and Niranjan, R.(2010), "Determinants of Investment Pattern in Indian Manufacturing Industries: A Panel Data Study*", Indian Journal of Economics and Business*, Vol. 9 No. 1, pp. 219-232.

Jangili,R. and Kumar, S. (2010) , "Determinants of Private Corporate Sector Investment in India", *Reserve Bank of India Occasional Papers*, Vol. 31, No. 3, pp. 67-89.

Jensen, M. and Meckling, W. (1976), "Theory of the firm: Managerial behavior, agency costs and ownership structure", *Journal of Financial Economics*, Vol. 3, No. 4, pp. 305-360.

Kaplan, S. and Zingales, L. (1997), "Do Financing Constraints Explain Why Investment is Correlated With Cash Flow?" , *Quarterly Journal of Economics*, Vol. 112, pp.168-216.

Lin, S., Chen, Y., Wang, T., Wang, H. and Liu Y.A. (2012), "The Decision Behavior of Taiwan Firms Investing in China: Evidence from Different Industries", *Review of Pacific Basin Financial Markets and Policies*, Vol. 15 No. 1, pp. 23-47

Mallick, J. (2006), "Trends and Patterns of Private Investment in India", Working Paper No. 226, Institute for Social and Economic Change, Bangalore

Modigliani, F. and Miller, M. (1958), "The Cost of Capital, Corporate Finance, and the Theory of Investment", *American Economic Review*, Vol. 48 No. 3, pp. 261-297.

Moyen, N. (2004), "Investment–Cash Flow Sensitivities: Constrained versus Unconstrained Firms", *The Journal of Finance*, 59, Vol. 59 No. 5, pp. 2061–2092

Myers, S. and Majluf, N. (1984), "Corporate Financing and Investment Decisions when Firms Have Information Investors Do Not Have", *Journal of Financial Economics*, Vol. 13, pp. 187-221.

Pawlina, G. and L. Renneboog (2005), "Is investment-cash flow sensitivity caused by agency costs or asymmetric information? Evidence from the UK", *European Financial Management*, Vol. 11, pp. 483-513.

Racine, M.D., Tannous, G. and Yuting, F. (2010), "Ownership structures, financing constraints and investments", paper presented at the Northern Finance Association Annual meeting, Winnipeg.

Rajakumar, J. D. (2005), "Corporate Financing and Investment Behaviour in India", *Economic and Political Weekly*, Vol. 40 No. 38, pp. 4159-4165.

Serven, L.and Solimano, A. (1993), "Debt Crisis, adjustment Policies and Capital Formation in developing Countries: Where Do We Stand?" *World Development,* Vol.21, No. 1, pp.127-140

Stiglitz, J. and Weiss, A. (1981), "Credit Rationing in Markets with Imperfect Information", *The American Economic Review*, Vol. 71 No. 3, pp. 393-410

Tobin, J. (1969), "A General Equilibrium Approach to Monetary Theory", *Journal of Money, Credit and Banking*, Vol. 1 No. 1, pp. 15-29.

Vincente, G. (1979), "Money, Investment and Growth in Latin america, 1961-1973", *Economic development and Cultural change*, Vol.27, pp.423-43

Wai, U. Tun, and Chorn-huey Wong (1982), "Determinants of Private Investment in Developing Countries", Journal *of Development Studies,* Vol. 19 No. 1, pp. 19-36

Table 4: Unit Roots Tests

Panel unit root test: Summary

Series: PRCF

Sample: 2007 2013

Exogenous variables: Individual effects

User-specified lags: 1

Newey-West automatic bandwidth selection and Bartlett kernel

Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-7.97009	0.0000	78	413
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-4.78795	0.0000	78	413
ADF - Fisher Chi-square	221.232	0.0000	78	413
PP - Fisher Chi-square	561.723	0.0000	78	472

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary

Series: PRI

Sample: 2005 2013

Exogenous variables: Individual effects

User-specified lags: 1

Newey-West automatic bandwidth selection and Bartlett kernel

Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-50.4562	0.0000	78	413
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-11.6987	0.0000	78	413
ADF - Fisher Chi-square	165.660	0.0025	78	413
PP - Fisher Chi-square	268.127	0.0000	78	472

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary

Series: PRDP

Sample: 2007 2013

Exogenous variables: Individual effects

User-specified lags: 1

Newey-West automatic bandwidth selection and Bartlett kernel

Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-7.13360	0.0000	78	378
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.06571	0.1433	78	378
ADF - Fisher Chi-square	127.287	0.0992	78	378
PP - Fisher Chi-square	187.672	0.0000	78	432

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary

Series: PRDA

Sample: 2007 2013

Exogenous variables: Individual effects

User-specified lags: 1

Newey-West automatic bandwidth selection and Bartlett kernel

Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-6.23972	0.0000	78	406
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.31128	0.0949	78	406
ADF - Fisher Chi-square	145.802	0.0319	78	406
PP - Fisher Chi-square	171.701	0.0006	78	464

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary

Series: PRTA

Sample: 2007 2013

Exogenous variables: Individual effects

User-specified lags: 1

Newey-West automatic bandwidth selection and Bartlett kernel

Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-36.8772	0.0000	78	413
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-15.7098	0.0000	78	413
ADF - Fisher Chi-square	163.604	0.0035	78	413
PP - Fisher Chi-square	364.781	0.0000	78	472

** Probabilities for Fisher tests are computed using an asymptotic Chi square distribution. All other tests assume asymptotic normality.

Table 5: Regression Results (Private)

Fixed effects

Dependent Variable: PRI

Method: Panel Least Squares

Sample: 2007 2013

Periods included: 7

Cross-sections included: 78

Total panel (balanced) observations: 546

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.878997	0.143572	-6.122348	0.0000
PRTA	0.435622	0.012409	35.10453	0.0000
PRDP	-0.093823	0.119927	-0.782333	0.4344
PRCF	-0.007583	0.004255	-1.782335	0.0753
PRDA	-0.091152	0.029352	-3.105513	0.0020
	Effects Specification			
Cross-section fixed (dummy variables)				
R-squared	0.909337	Mean dependent var		4.224394
Adjusted R-squared	0.897326	S.D. dependent var		1.099653

S.E. of regression	0.352360	Akaike info criterion	0.862666
Sum squared resid	58.10565	Schwarz criterion	1.369841
Log likelihood	-166.0379	Hannan-Quinn criter.	1.061166
F-statistic	75.70910	Durbin-Watson stat	1.047209
Prob(F-statistic)	0.000000		

Random effects

Dependent Variable: PRI

Method: Panel EGLS (Cross-section random effects)

Sample: 2007 2013

Periods included: 7

Cross-sections included: 78

Total panel (balanced) observations: 546

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.958452	0.145944	-6.567273	0.0000
PRTA	0.442241	0.011626	38.04003	0.0000
PRDP	-0.099458	0.111790	-0.889679	0.3740
PRCF	-0.006372	0.004217	-1.511037	0.1314
PRDA	-0.089213	0.027651	-3.226367	0.0013

	Effects Specification	
	S.D.	Rho
Cross-section random	0.404762	0.5689
Idiosyncratic random	0.352360	0.4311

	Weighted Statistics		
R-squared	0.745336	Mean dependent var	1.177265
Adjusted R-squared	0.743399	S.D. dependent var	0.696278
S.E. of regression	0.352705	Sum squared resid	65.43496
F-statistic	384.8660	Durbin-Watson stat	0.932207
Prob(F-statistic)	0.000000		

	Unweighted Statistics		
R-squared	0.762998	Mean dependent var	4.224394
Sum squared resid	151.8937	Durbin-Watson stat	0.401590

Hausman Test

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	5.032403	4	0.2840

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
PRTA	0.435622	0.442241	0.000019	0.1272
PRDP	-0.093823	-0.099458	0.001886	0.8968
PRCF	-0.007583	-0.006372	0.000000	0.0314
PRDA	-0.091152	-0.089213	0.000097	0.8439

Cross-section random effects test equation:

Dependent Variable: PRI

Method: Panel Least Squares

Sample: 2007 2013

Periods included: 7

Cross-sections included: 78

Total panel (balanced) observations: 546

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.878997	0.143572	-6.122348	0.0000
PRTA	0.435622	0.012409	35.10453	0.0000
PRDP	-0.093823	0.119927	-0.782333	0.4344
PRCF	-0.007583	0.004255	-1.782335	0.0753
PRDA	-0.091152	0.029352	-3.105513	0.0020

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.909337	Mean dependent var	4.224394
Adjusted R-squared	0.897326	S.D. dependent var	1.099653
S.E. of regression	0.352360	Akaike info criterion	0.862666

Sum squared resid	58.10565	Schwarz criterion	1.369841
Log likelihood	-166.0379	Hannan-Quinn criter.	1.061166
F-statistic	75.70910	Durbin-Watson stat	1.047209
Prob(F-statistic)	0.000000		

Table 6: Regression Results (Public)

Fixed effects

Dependent Variable: PUBI

Method: Panel Least Squares

Sample: 2007 2013

Periods included: 7

Cross-sections included: 59

Total panel (balanced) observations: 413

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.019664	1.407534	-3.653576	0.0003
PUBTA	0.003802	0.109794	10.37694	0.0000
PUBDP	-0.077321	0.532722	-0.045393	0.9638
PUBCF	-0.034963	0.011757	-1.102092	0.2710
PUBDA	0.016732	0.047478	-3.937173	0.0001

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.913735	Mean dependent var	9.657205
Adjusted R-squared	0.902306	S.D. dependent var	3.526404
S.E. of regression	1.102212	Akaike info criterion	3.143510
Sum squared resid	568.5600	Schwarz criterion	3.650685
Log likelihood	-771.6019	Hannan-Quinn criter.	3.342010
F-statistic	79.95359	Durbin-Watson stat	0.627327
Prob(F-statistic)	0.000000		

Random Effects

Dependent Variable: PUBI

Method: Panel EGLS (Cross-section random effects)

Sample: 2007 2013

Periods included: 7

Cross-sections included: 59

Total panel (balanced) observations: 413

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-7.737803	1.192181	-6.490460	0.0000
PUBTA	1.346455	0.091062	14.78611	0.0000
PUBDP	-0.182878	0.521428	-0.350726	0.7259
PUBCF	-0.011590	0.011705	-0.990214	0.3225
PUBDA	-0.187927	0.045412	-4.138323	0.0000

Effects Specification		
	S.D.	Rho
Cross-section random	1.857121	0.7395
Idiosyncratic random	1.102212	0.2605

Weighted Statistics			
R-squared	0.306214	Mean dependent var	1.874211
Adjusted R-squared	0.300938	S.D. dependent var	1.330316
S.E. of regression	1.112276	Sum squared resid	650.7456
F-statistic	58.03967	Durbin-Watson stat	0.548779
Prob(F-statistic)	0.000000		

Unweighted Statistics			
R-squared	0.599707	Mean dependent var	9.657205
Sum squared resid	2638.264	Durbin-Watson stat	0.135360

Hausman Test

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	13.649591	4	0.0085

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.

PUBTA	1.139325	1.346455	0.003762	0.0007
PUBDP	-0.024182	-0.182878	0.011906	0.1458
PUBCF	-0.012958	-0.011590	0.000001	0.2199
PUBDA	-0.186930	-0.187927	0.000192	0.9426

Cross-section random effects test equation:

Dependent Variable: PUBI

Method: Panel Least Squares

Sample: 2007 2013

Periods included: 7

Cross-sections included: 59

Total panel (balanced) observations: 413

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.142532	1.407534	-3.653576	0.0003
PUBTA	1.139325	0.109794	10.37694	0.0000
PUBDP	-0.024182	0.532722	-0.045393	0.9638
PUBCF	-0.012958	0.011757	-1.102092	0.2710
PUBDA	-0.186930	0.047478	-3.937173	0.0001

Effects Specification
Cross-section fixed (dummy variables)

R-squared	0.913735	Mean dependent var	9.657205
Adjusted R-squared	0.902306	S.D. dependent var	3.526404
S.E. of regression	1.102212	Akaike info criterion	3.143510
Sum squared resid	568.5600	Schwarz criterion	3.650685
Log likelihood	-771.6019	Hannan-Quinn criter.	3.342010
F-statistic	79.95359	Durbin-Watson stat	0.627327
Prob(F-statistic)	0.000000		