Private corporate investment in the post reform India and the possibility of endogenous cycles

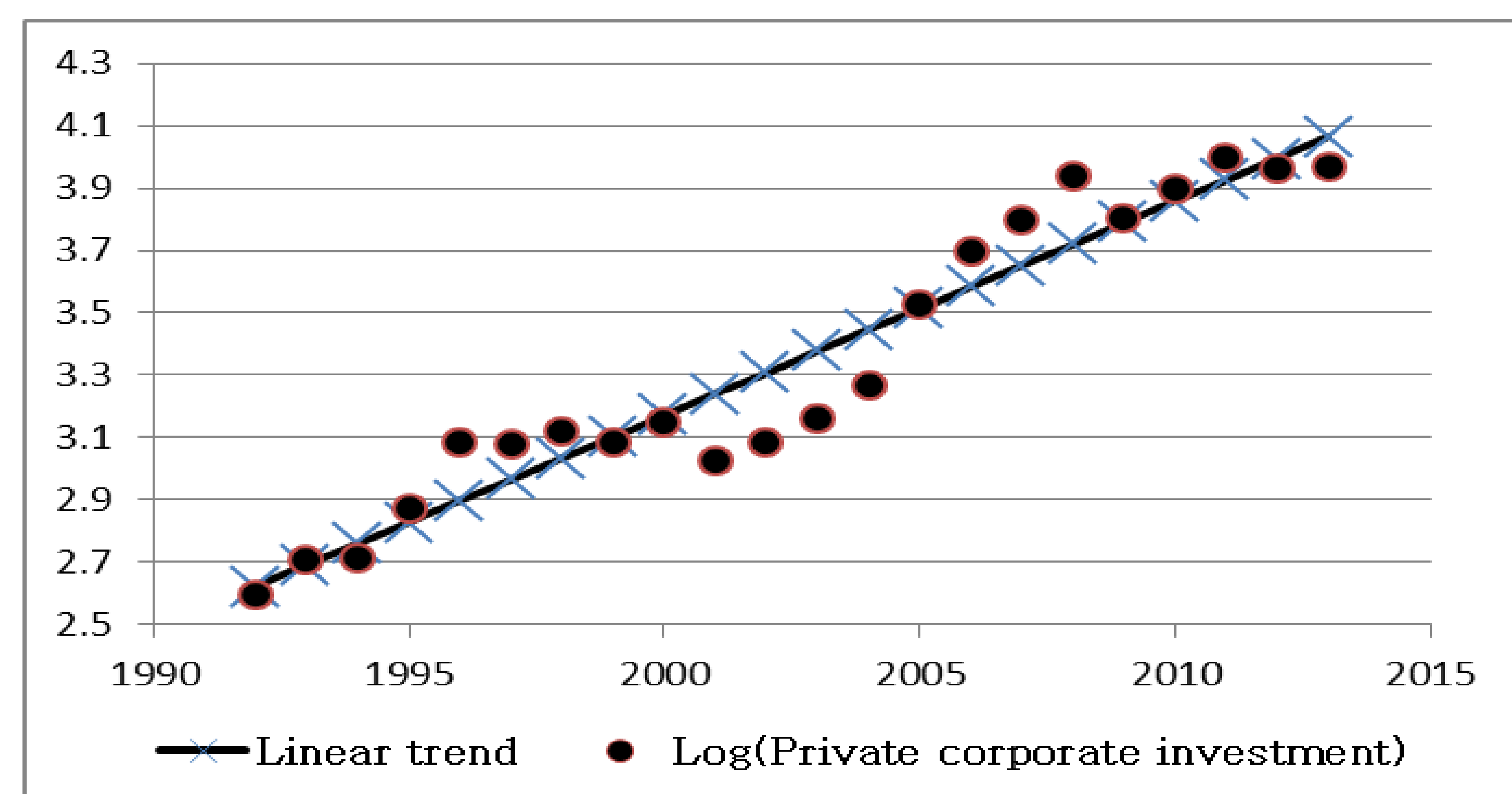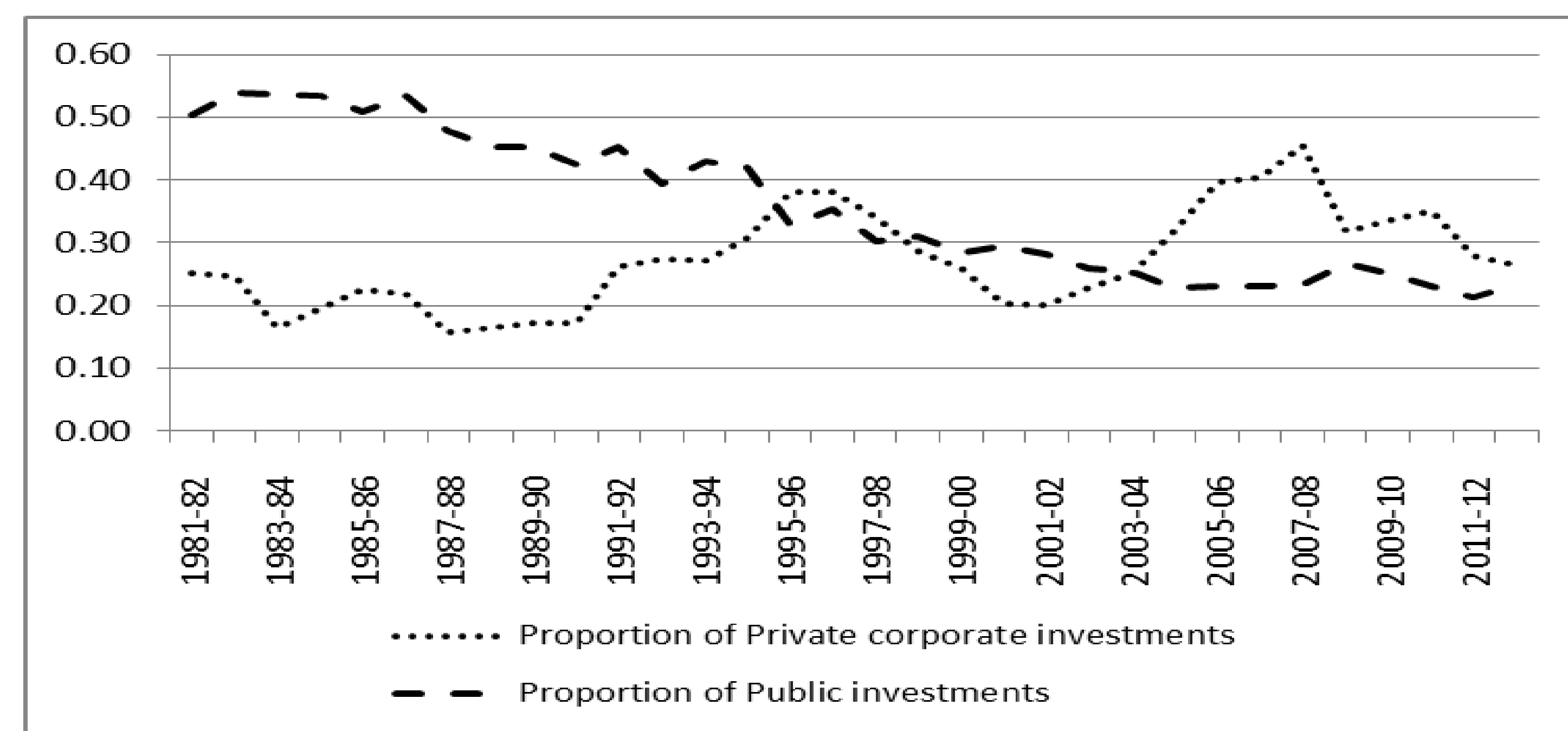## Sushrut Risbud, Indian Institute of Management Calcutta

Expected contributions:
- Providing a demand side theoretical framework to analyze private investment activity in India
- Keeping cycles at the center while empirically modeling investment process
- Analyzing differential impact of debt on investment in economic upturn and downturn
- Providing policy implications based on factors contributing to behavior of private investments

STYLISED FACTS

Time interval	ΔC/Δ GDP	ΔI/Δ GDP	GDP growth rate	Investment growth rate
1981–82 to 1990–91	0.70	0.29	0.06	0.07
1993–94 to 2001–02	0.70	0.26	0.06	0.08
2002–03 to 2007–08	0.55	0.57	0.08	0.16
2009–10 to 2011–12	0.73	0.49	0.08	0.11
2012–13 to 2013–14	0.72	0.01	0.05	−0.0003

C= Consumption, I= Investments

- - - - - Proportion of Private corporate investments
- – – – – Proportion of Public investments

—— Linear trend   ● Log(Private corporate investment)

Data Source for all the figures and table above: Handbook of statistics on Indian economy, published by RBI.

Important stylizations emerging out of above table and diagrams
- During 2002-03 to 2007-08 period increase in investment dominates all other drivers of aggregate demand. This is in tandem with finding by Mohanty and Reddy (2010), who concluded that for the first time in India's post-independence economic history, during the period 2002/3-2007/8, when the economy averaged a 9% growth rate, demand growth was strongly investment driven.
- Investment remained an important driver of aggregate demand till 2011-12, falling thereafter. This finding is again in line with Mohanty (2015 a, b); who suggests that in the recent years high GDP growth is accompanied by high investment growth and low GDP growth is accompanied by low level of investment growth.
- Post 1991 private corporate investment has emerged as a major driver of investment. It has remained above public investment for all the years after 2003-04.
- It also appears that there is cyclicality in the private corporate investment process

RESEARCH AGENDA
- Based on the stylized facts, I feel it is essential to consider cycles pivotal in the modeling private corporate investments post economic reforms.
- Further, I intend to use demand side approach, which generates cycles endogenously in the system.

THEORETICAL FRAMEWORK
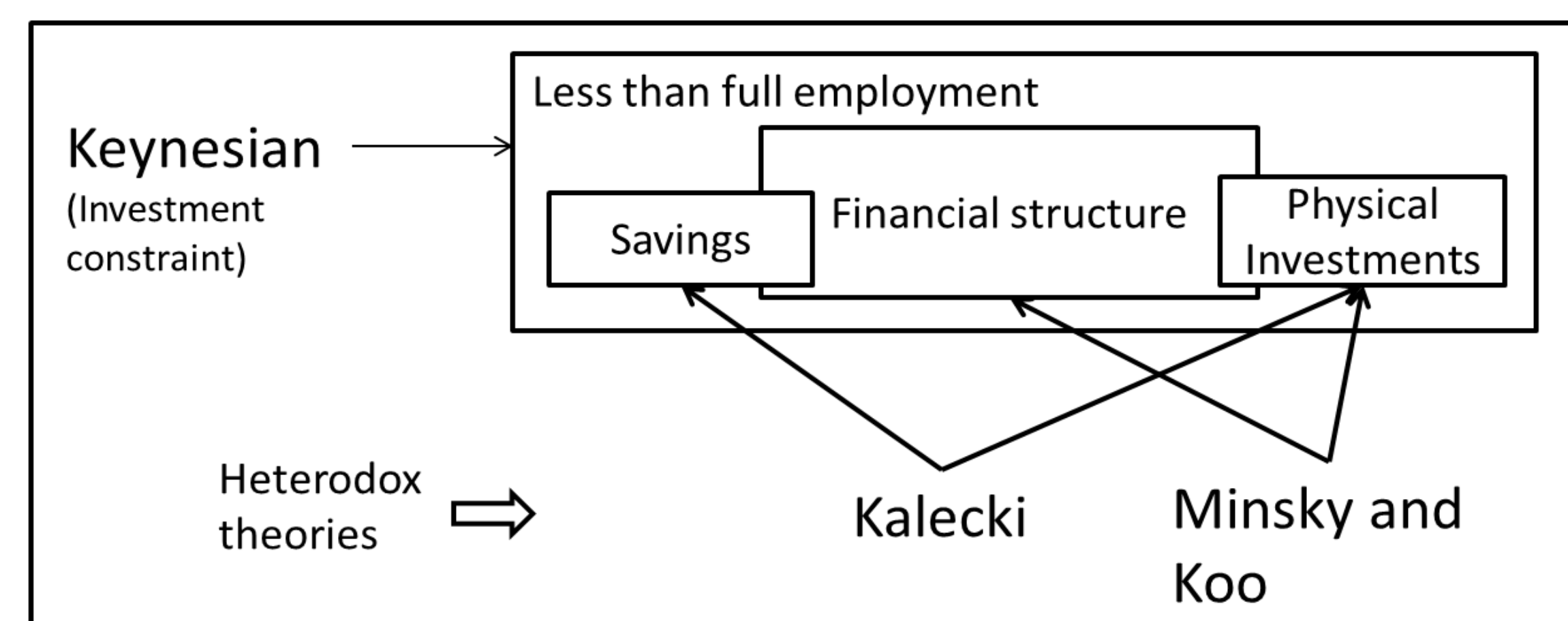
Kalecki: private investment and expected profitability lead to cycles; endogenous in the investment process (Kalecki, 1971).
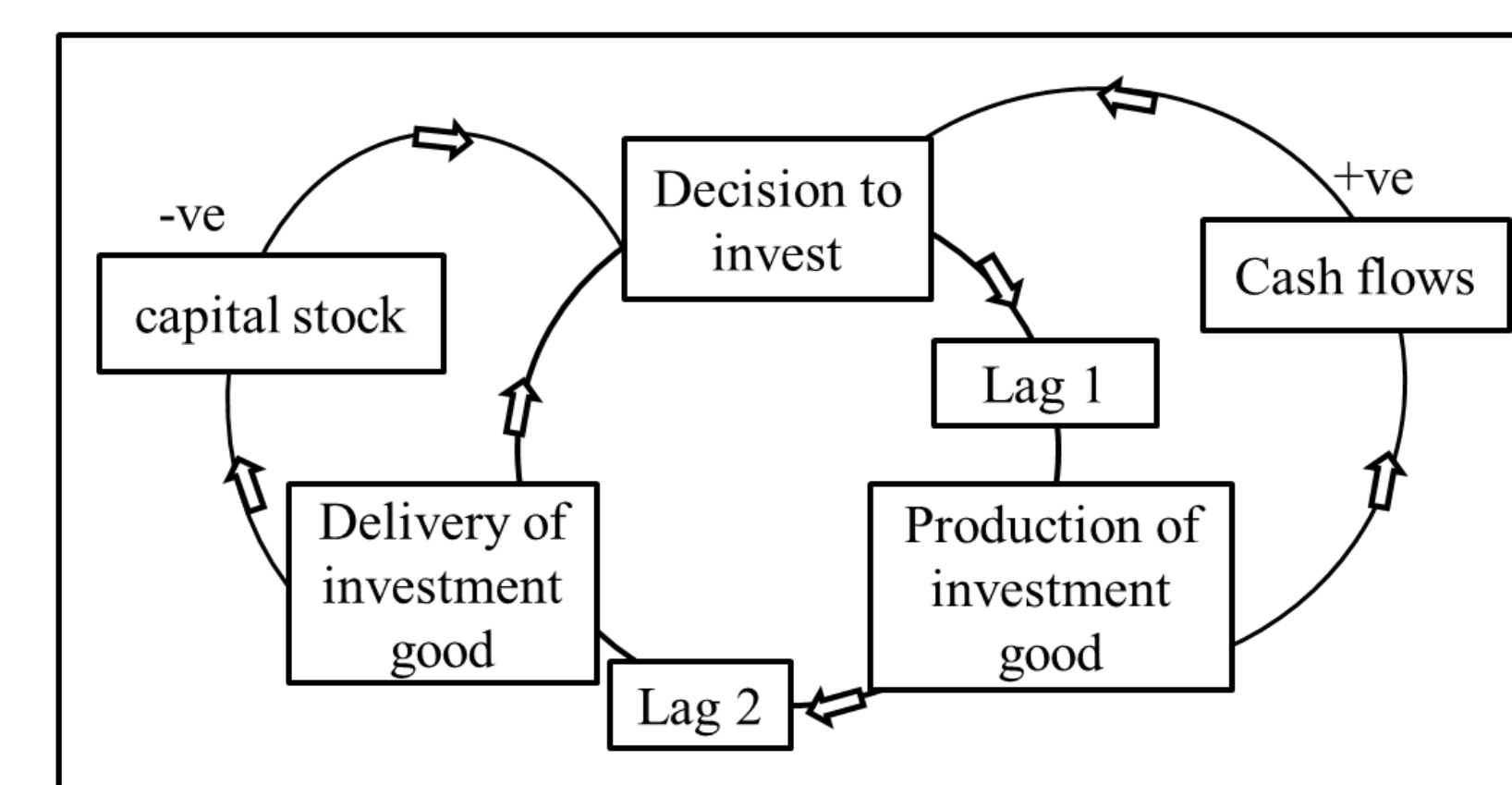
$$g = \frac{I}{K} = F\left(\frac{P}{K}\right)$$

P = Profits, K = Capital stock

- There are three stages in investment process viz. Decision to invest, production of investment and delivery of investment.
- In a closed economy production of investments lead to generation of aggregate demand and profits and delivery of investments over and above depreciation lead to increase in capital stock.
- Increase in profits at early stage positively affect expectations about future profits and induce entrepreneurs to invest. However, increase in capital stock at later stages negatively affects decision to invest.
- This process creates cycles which are endogenous in the process of investment.
- This kind of analysis creates a dynamic system which may not reach an equilibrium.

Minsky: Based on risk perceptions and investment growth financed by borrowings there can be endogenous cycles in the investment activity (Minsky, 1986).
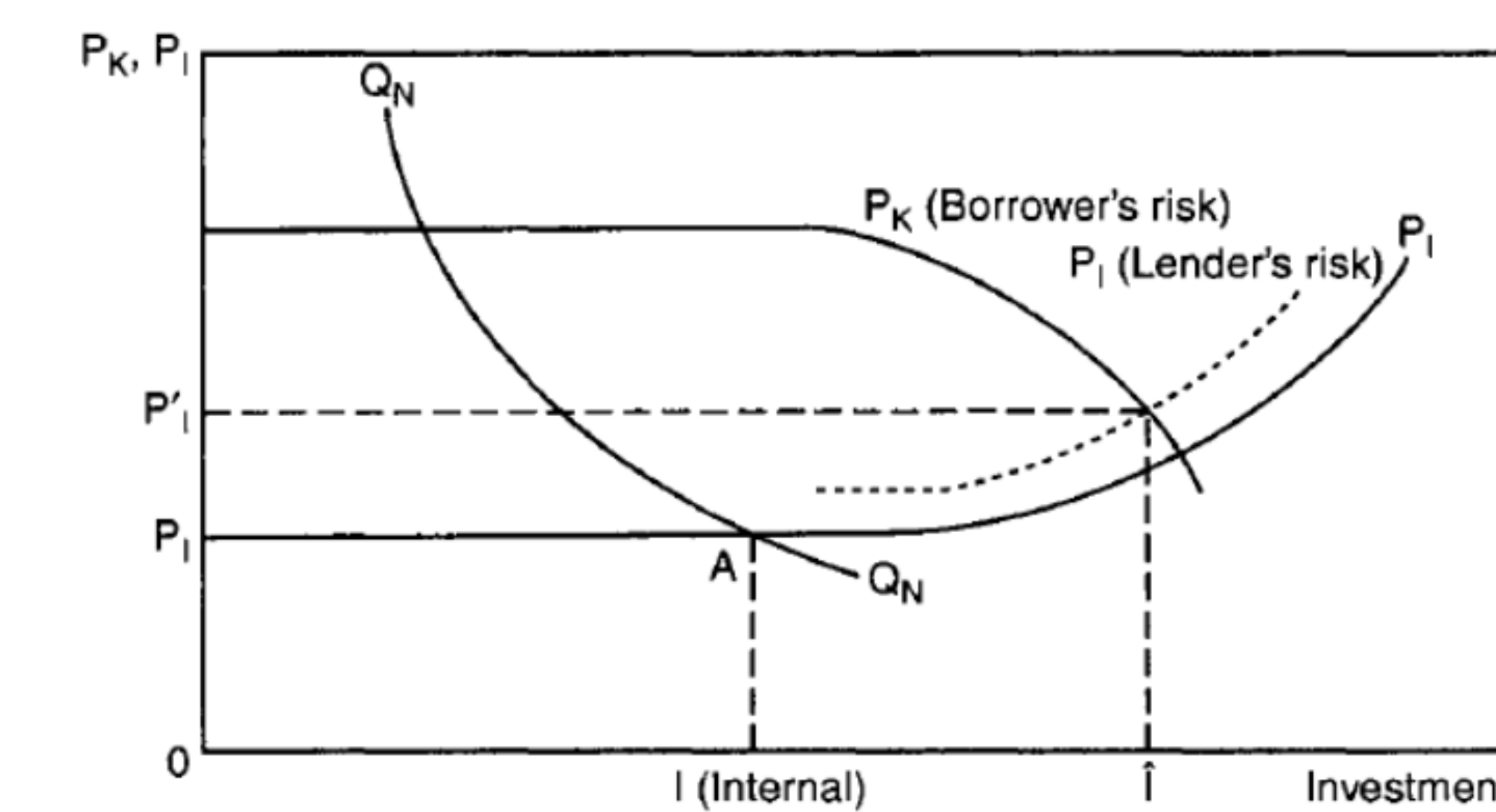

Figure 8.3: Investment: Impact of Internal Funds and External Finance
Pk=Demand price, PI= Supply price, QN-QN = Internal funds, I=level of investment

- The investment process explained by Minsky is in nominal terms. Minsky gives importance to the determination of demand and supply price of investment, which changes based on risk perceptions.
- The interaction between demand and supply price determines the level of investment.
- In the Minsky process, an upturn in the cycles is caused out of investments undertaken using borrowed funds.
- Downturn begins when interest rate rises and as a result many firms need to borrow to service the debt and some firms default.
- Minsky divides firms into different categories based on debt serving capacity.
- Defaults of firms in particular category lead to changed in risk perception. Change in risk perception increase buffer requirements and demand and supply price curves move inwards. This leads to a fall in investment activity.
- In the Minsky process downturn ends when sufficient firms default. However, Minsky does not elaborate on how surviving firms behave in the downturn. Koo provides an explanation in this respect.
- The role of finance (i.e. borrowing) as explained by Minsky can be introduced in Kalecki's cycles.

Koo: Firms with stressed balance sheet become debt minimizers, which prolong the downturn (Koo, 2009)
- Koo starts the analysis with highly leveraged firms.
- CEO (owner) of any company with healthy business but troubled balance sheet (i.e. internal knowledge of the possibility that Assets – Liabilities <0) will use operating cash flows to pay down the debts to improve balance sheet quality. When many companies follow this path a country as a whole can face a reduced growth rate or go into recession in extreme case. This kind of recession usually occurs after the bursting of an asset bubble, and Koo terms it as a balance sheet recession.
- Central argument given by Koo is, in usual circumstances investments (addition to A.D.) are more that savings (leakage from A.D.). However, if many firms start repaying debt it is further leakage in aggregate demand (A.D.). This kind of behavior may prolong the downturn in the economy.

RELEVANT LITURATURE:
Few papers which combine some aspects of Kalecki-Minsky-Koo theories

Eggertsson & Krugman, 2012	• It links Fisher, Minsky and Koo approach to explain debt deleveraging and a liquidity trap. • There are patient agents and impatient agents and impatient agents borrow from patient agents. Shared view about the risk implicitly sets an acceptable leverage level. However, due to some shock accepted leverage level falls, this deleveraging shock leads to fall in spending by debtors. Further, if creditors do not start spending it may lead to fall in aggregate demand. • In such situation even zero interest rate may not lead to increase in spending. • I feel combining Fisher with Koo may not be appropriate for our analysis. Drivers in Fisher and Koo processes are different and I intend to concentrate on demand drivers.
Alexiou, 2010	• Combines Keynes, Kalecki and Minsky's ideas to set an empirical function, determining investments of G7 countries.
Fazzari, Ferri, & Greenberg, 2008	• Using Keynesian framework create a system which generates endogenous cycles resembling Minsky process. • A sustained rise in investment and boom leads to inflationary pressure. High inflation in boom leads to increase in interest rate. • This leads to increased debt servicing cost and lowers cash flows, which inversely affects investment activity. Further, fall in investment through its effect on aggregate demand leads to fall in output.
Fazzari & Mott, 1986	• Showed that effective demand and financial conditions are primary determinants of investments. • In Keynes and Kalecki models, an emphasis is placed on firm's expectations about aggregate demand conditions and its ability to satisfy the demand based on existing capital stock as well as the availability of internal and external funds. These aspects were used while building an empirical model.

Few India specific investment models at macro level

Anand & Tulin, 2014	• Standard macro-financial variables do not explain recent investment slump. Increased uncertainty and deteriorating business confidence has played a major role in explaining recent investment downturn.
Mohanty & Reddy, 2010	• Conducted analysis of investments from demand perspective and provided a framework to distinguish between growth phases based on drivers.
Sen, 2007	• Neo-classical framework is used to analyze investment activity in India. • Empirical model is suggested for private equipment investment. • Different factors influenced private equipment investment in different time intervals. Factors are financial deepening, public fixed investment, and relative price of equipment investment.
Athukorala & Sen, 2002	• Neo-classical framework is used to analyze investment activity in India. • Determinants of private corporate investment and non-residential business investments are different.

References not included in above literature review but included in poster
- Kalecki, M. (1971). Selected essays on the dynamics of the capitalist economy 1933-1970. Cambridge, Great Britain: Cambridge University Press.
- Koo, R. C. (2009). The Holy Grail of Macroeconomics: Lessons from Japanes Great Recession. 2 Clementi Loop, Singapore: John Wiley & Sons (Asia) Pte.Ltd.
- Minsky, H. P. (1986). Stabilizing an Unstable Economy.
- Mohanty, M. (2015a). Globalisation and the Slowdown of the Indian Economy: Another View. NOTES D'ANALYSE POLICY NOTES (4). Pôle de recherche sur l'Inde et l'Asie du Sud (PRIAS) of Centre d'Études et de Recherche Internationales (CERIUM) of the Université de Montréal.
- Mohanty, M. (2015b). India: Globalisation and growth, Indian Institute of Managemnt Calcutta, working paper No. 762.

DATA ANALYSIS

Data source: National accounts statistics published by CSO India, RBI handbook of statistics on Indian economy

Correlation matrix

	PVI	PVI [lag 1]	PVI [lag 2]	DBC	DBCUP	PI
PVI	1	**0.78**	**0.51**	**0.57**	**0.61**	-0.2
PVI [lag 1]	**0.78**	1	**0.8**	0.29	0.18	-0.29
PVI [lag 2]	**0.51**	**0.8**	1	0.11	0	-0.4
DBC	**0.57**	0.29	0.11	1	**0.83**	-0.41
DBCUP	**0.61**	0.18	0	**0.83**	1	-0.06
PI	-0.2	-0.29	-0.4	-0.41	-0.06	1

Values in bold are significant at 5% level of significance

Description of variables
- PVI = Private corporate investment,
- BC = Change in bank credit
- BC*Upturn = Change in bank credit * upturn dummy
- BC*Downturn = Change in bank credit * downturn dummy
- Upturn and downturn are dummy variables. They are defined using Hodrick Prescott filter on GDP series.
- PI = Public investment
- All variables are normalized by lagged value of capital stock and are in real terms.

Some initial findings:
- Private corporate investment rate follows cyclical pattern. In all the models first lag of private corporate investment is positive but second lag is negative.
- Bank credit affects investment differently in upturn and downturn. Coefficient of bank credit appears positive and significant in model 2. However, when interactive term is added in models 3 and 4, bank credit loses its significance in downturn.
- Public investment does not seem to affect private corporate investment significantly. This is different than previous empirical studies who show a positive relation. I feel this result needs to be explored further. Perhaps public investments have differential impact in different time intervals.

	Dependent variable: PVI			
Models	1	2	3	4
PVI[1 lag]	1.025**	0.835**	0.827***	0.850***
	(0.38)	(0.36)	(0.23)	(0.23)
PVI[2 lags]	-0.312	-0.203	-0.147	-0.184
	(0.33)	(0.27)	(0.14)	(0.16)
BC		0.368**		
		(0.16)		
BC*Upturn			0.336***	0.296**
			(0.10)	(0.12)
BC*Downturn			-0.154	-0.246
			(0.15)	(0.24)
PI				-0.129
				(0.30)
Constant	0.015	0.011	0.012	0.02
	(0.01)	(0.01)	(0.01)	(0.02)
adj. R square	0.61	0.71	0.81	0.8
Adf test on error terms	-2.0008	-1.78	-3.34	-3.08
p-value	0.57	0.65	0.08	0.15
Phillips-Peron test on error terms	-22.14	-23.28	-22.79	-23.13
p-value	0.01	0.01	0.01	0.01
DW test for autocorrelation	2.08	2.18	2.25	2.27
p-value	0.46	0.5	0.54	0.51

*** & ** are significance levels at 1 percent and 5 percent respectively.
Parenthesis contains heteroskedasticity consistent standard errors.