

Issues with Modelling Inflation in India

B. Karan Singh

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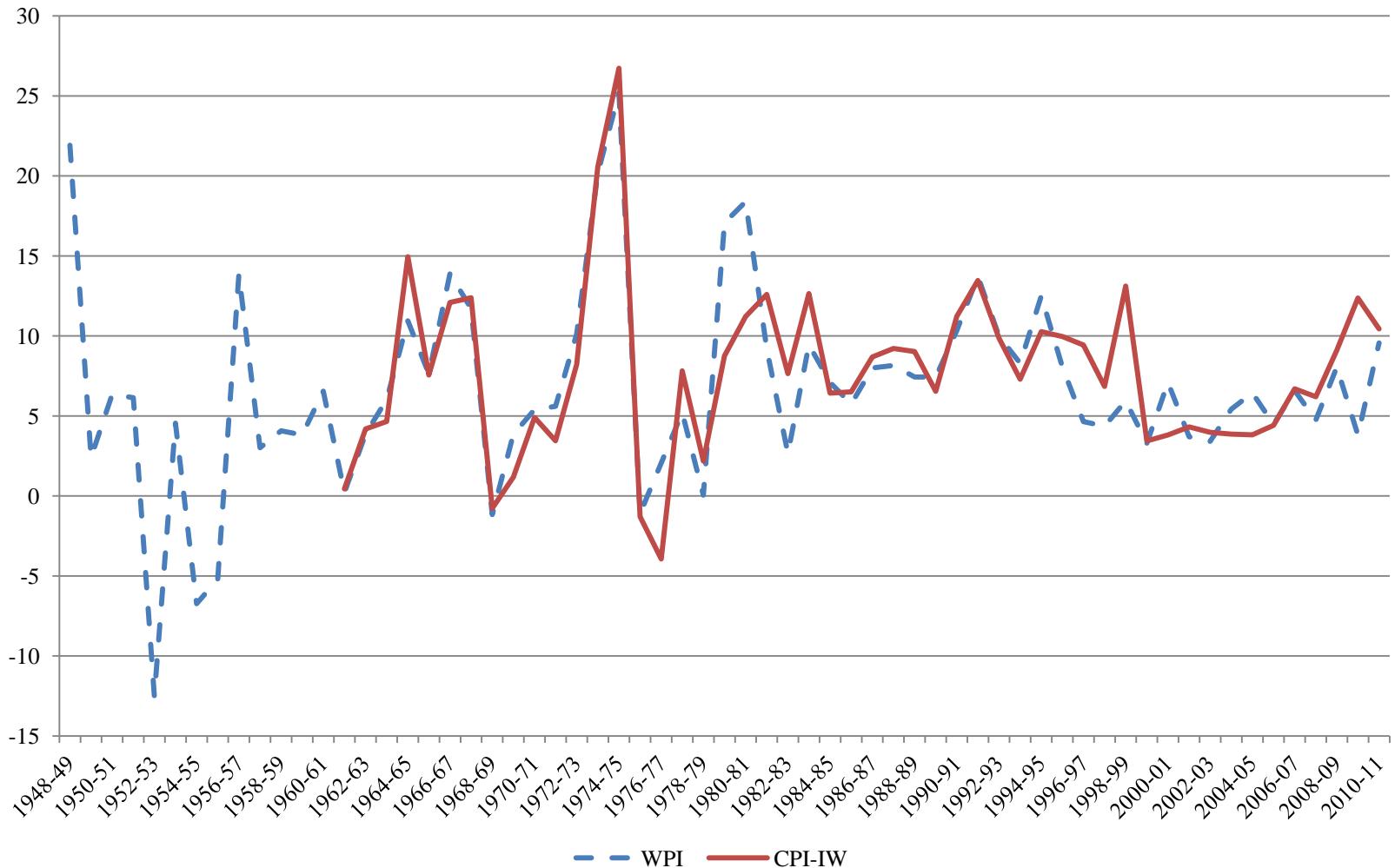
Outline of the Presentation

- 1) Motivation
- 2) Theory of Phillips Curve
- 3) Empirical Findings
- 4) Conclusions

Motivation of the study

- India's economic growth is falling. At the same time, inflation is rising.
- Relationship between Growth and Inflation
- Is demand contributing to the present inflationary situation?
- Are effective demand management policies needed to address the inflationary situation?
- Past studies have not addressed issues related to mismeasurement of key variables in the Phillips curve.

India's Inflation since 1948-49



New-Keynesian Phillips Curve

$$\pi_t = \kappa(y_t - y_t^n) + \beta(E_t \pi_{t+1}) \quad (1)$$

$$\pi_t = \kappa(y_t - y_t^n) + \beta(E_t \pi_{t+1}) + \mu_t \quad (2)$$

$$\pi_t = \kappa(y_t - y_t^n) + \beta(E_t \pi_{t+1}) + \kappa x_t + \mu_t \quad (3)$$

Where,

π_t = Inflation at time t,

y_t = Actual output at time t,

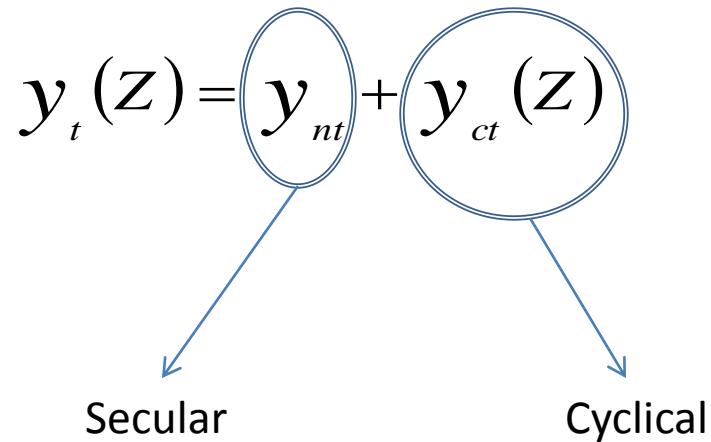
y_t^n = Potential or natural output at time t,

$E_t \pi_{t+1}$ = Expected inflation for the time period $t+1$ at the time t,

μ_t = Exogenous shock (or) Supply Shock at time t,

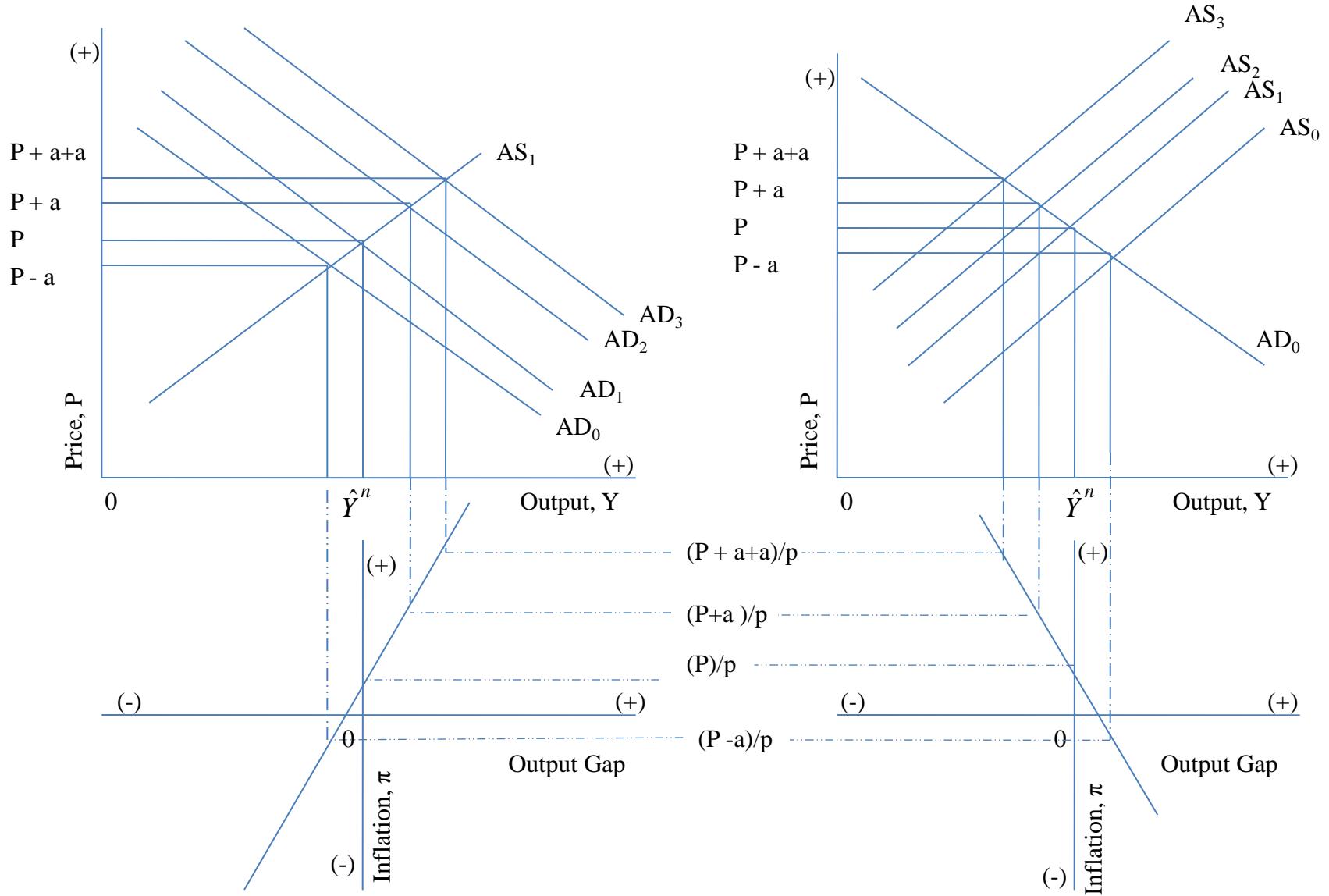
x_t = change in real effective exchange rate at time t.

Theory of Output Gap

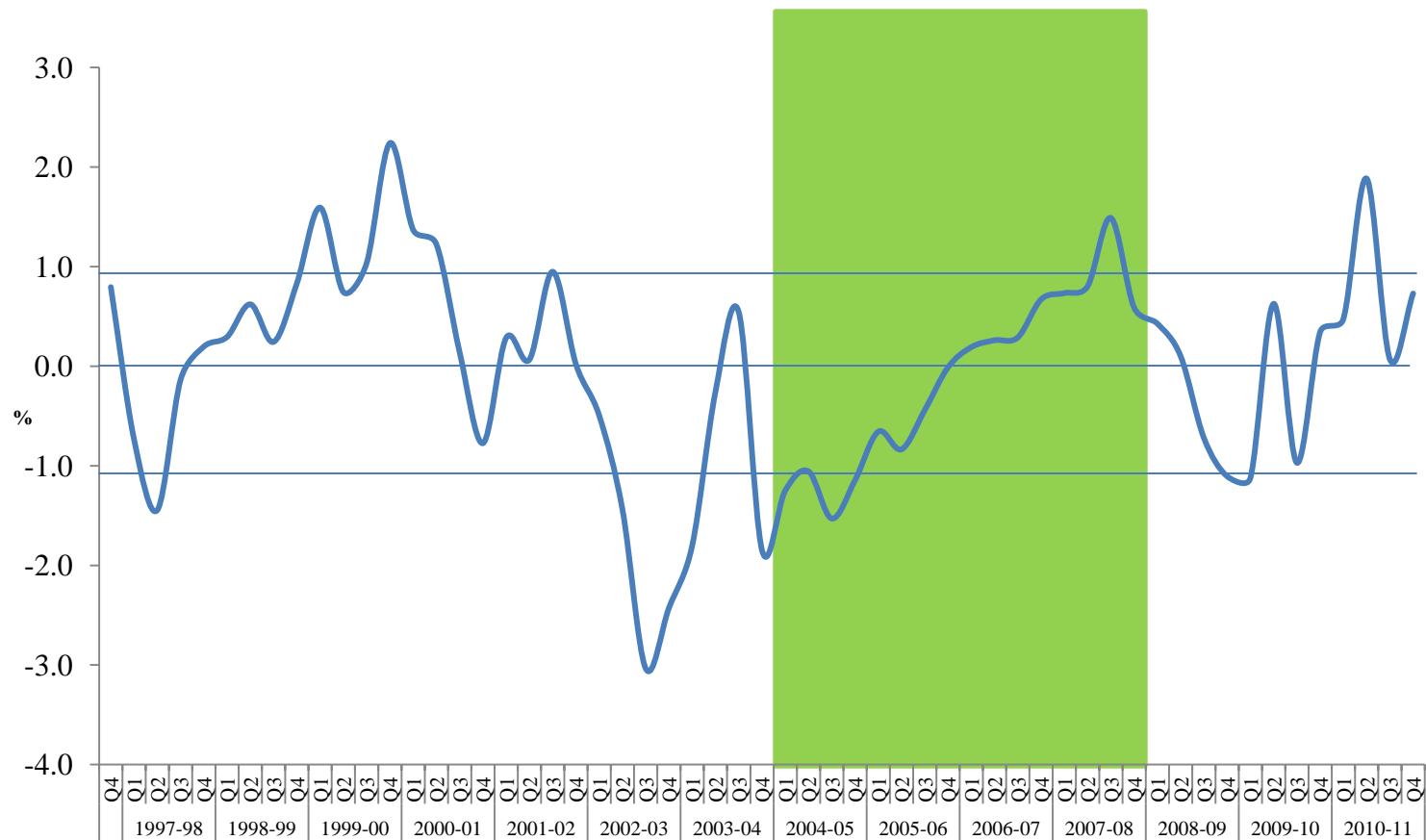


Source: Lucas, Jr. R.E.,(1973). Some international evidence on output-inflation trade offs. The American Economic Review 63(3), 361 - 368.

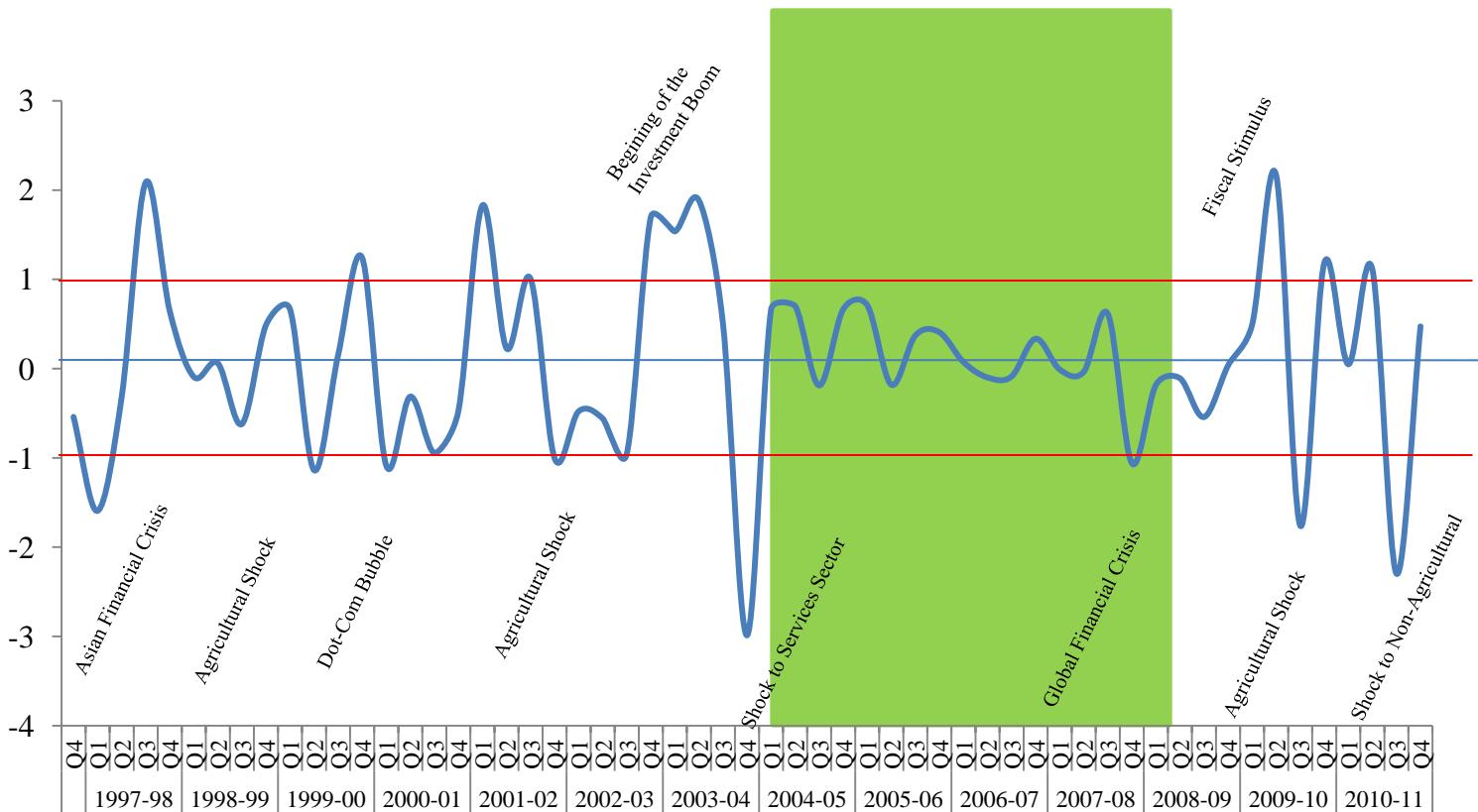
Demand Shock vs. Supply Shock



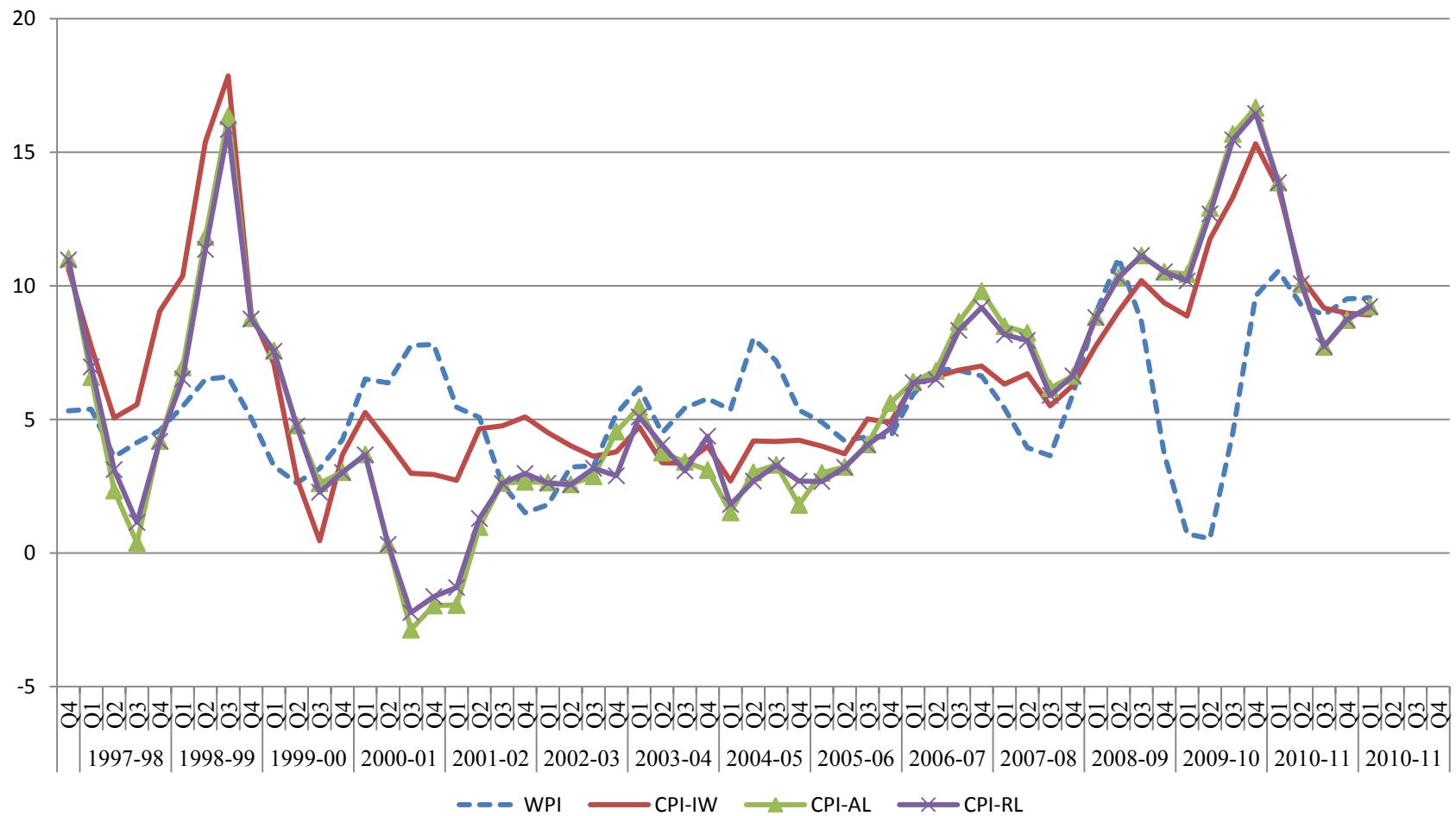
Output Gap: HP



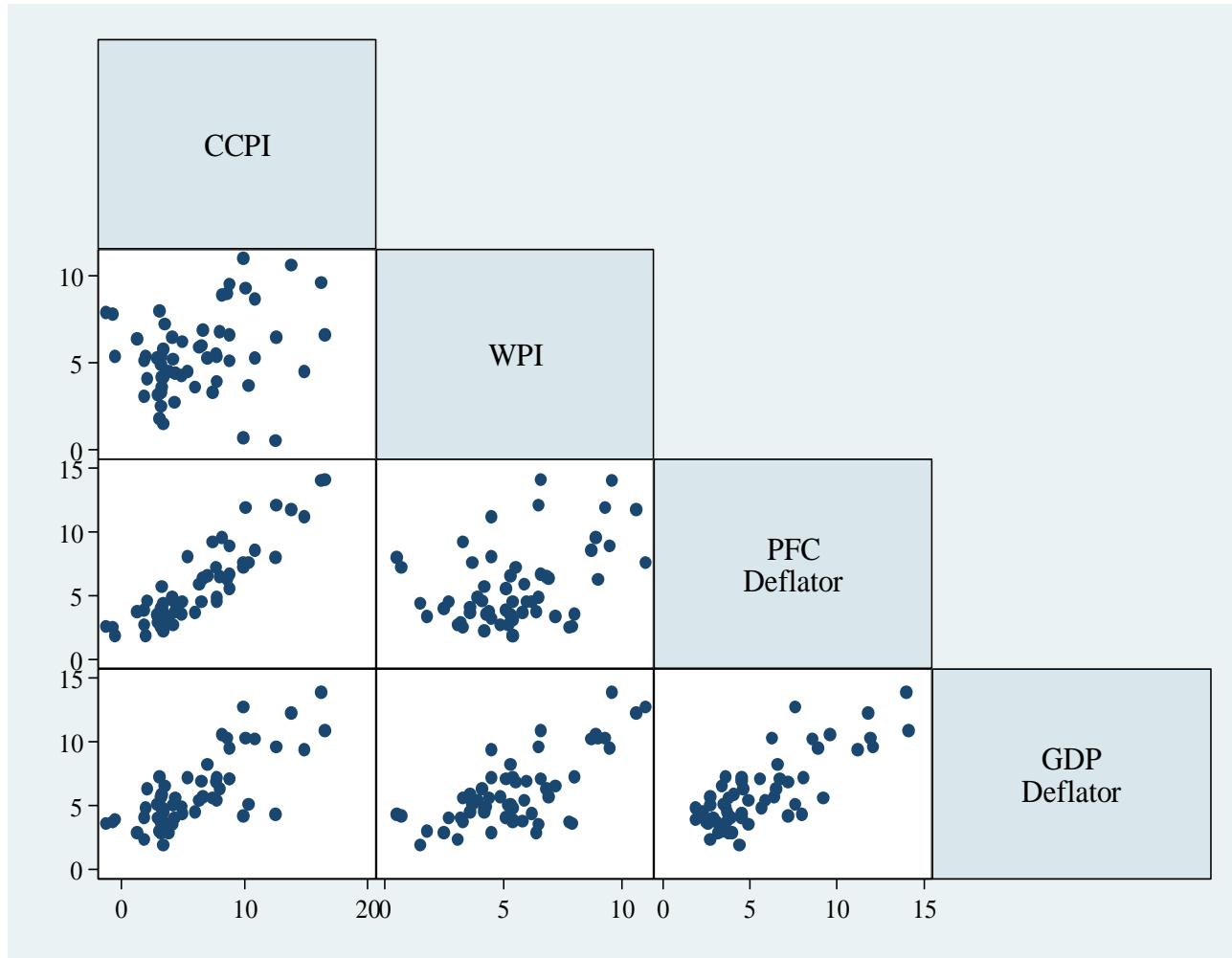
Output Gap: Kalmann Filter



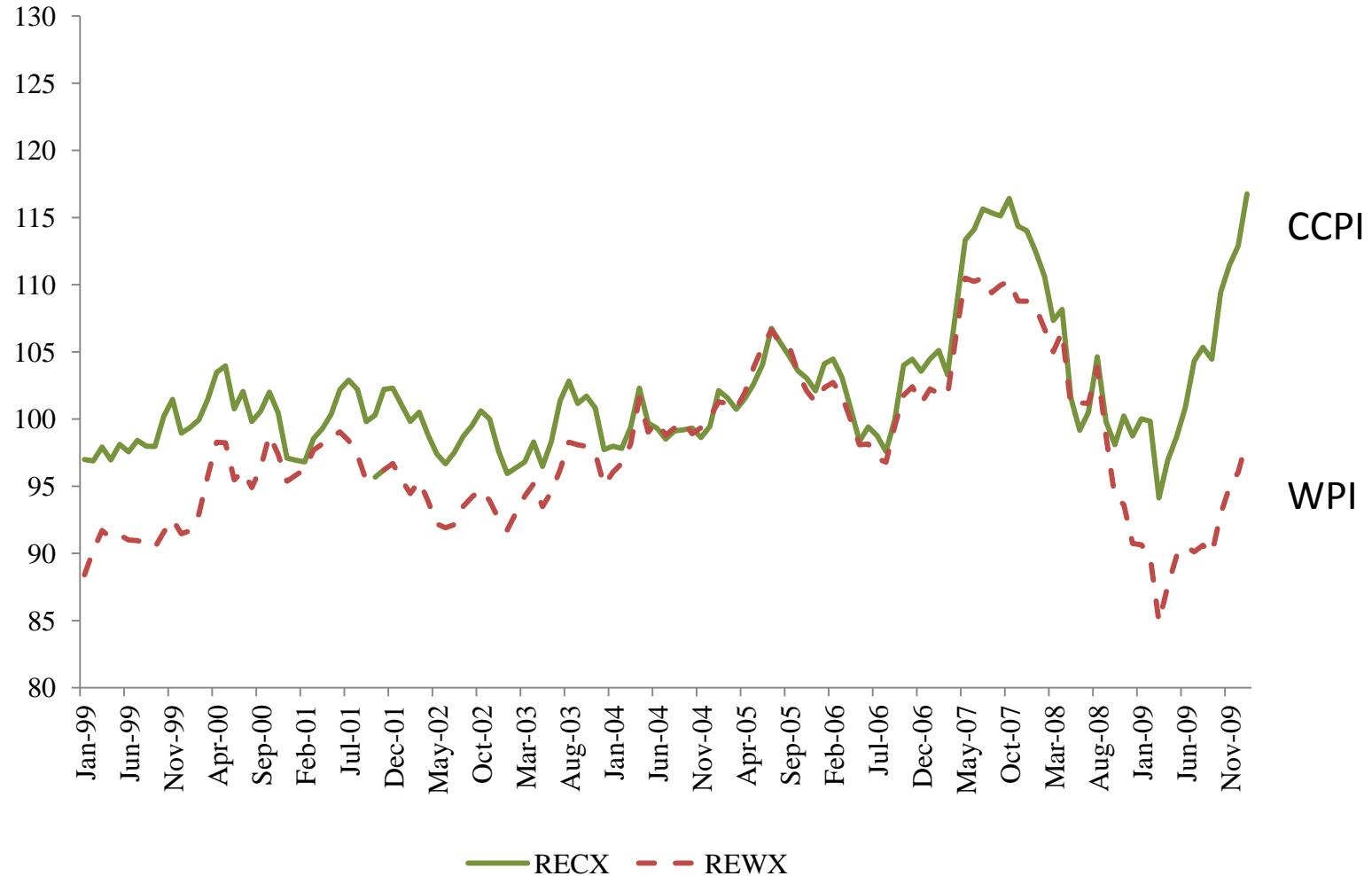
Inflation (%)



Correlation between the Different Measures of Inflation - Q4 1996-97 to Q1 2011-12



Real Effective Exchange Rate



The Empirical Model

$$\pi_t = c + \kappa(\hat{Y}_t - \hat{Y}_t^n) + \beta E_t \pi_{t+1} - \gamma X_t - \alpha((\hat{Y}_t - \hat{Y}_t^n) * sdum) + \varepsilon_t \quad \text{_____ (4)}$$

π_t = Inflation at time t,

y_t = Actual output at time t,

\hat{y}_t^n = Potential or natural output at time t,

$E_t \pi_{t+1}$ = Expected inflation for the time period $t+1$ at the time t,

$sdum$ = Supply Shocks Dummy

X_t = change in real effective exchange rate at time t.

Estimated Open-Economy Phillips Curve

Time period 2	OLS		IV Reg 2SLS	
	Q2 2004 –Q4 2009			
π_{t-1}	0.8 (0.1) ***	0.9 (0.4) ***	0.8 (0.1) ***	0.8 (0.1) ***
$(\hat{Y}_t - \hat{Y}_t^n)$	0.7 (0.4) **	0.9 (0.09) ***	1.5 (0.7) **	2.0 (1.0) **
$(\hat{Y}_t - \hat{Y}_t^n)^* sdm$	-1.7 (0.6) ***	-2.2 (0.6) ***	-2.6 (0.95) ***	-3.4 (1.3) ***
$X_t WPI$	-0.08 (0.04) **		-0.05 (0.03)*	
$X_t CCPI$		-0.04 (0.02) ***		-0.05 (0.02) ***
C	1.4 (0.6) ***	1.1 (0.59) **	1.5 (0.6) ***	1.4 (0.7) ***
Number of Observations	23	23	23	23
Adj R-squared	0.92	0.92	0.81	0.92
Durbin-Watson Statistic	2.3	2.6	2.0	2.3

Note:

1) Standard errors are reported in parentheses.

2) *, **, *** indicate significance at the 10 %, 5 %, and 1% level, respectively.

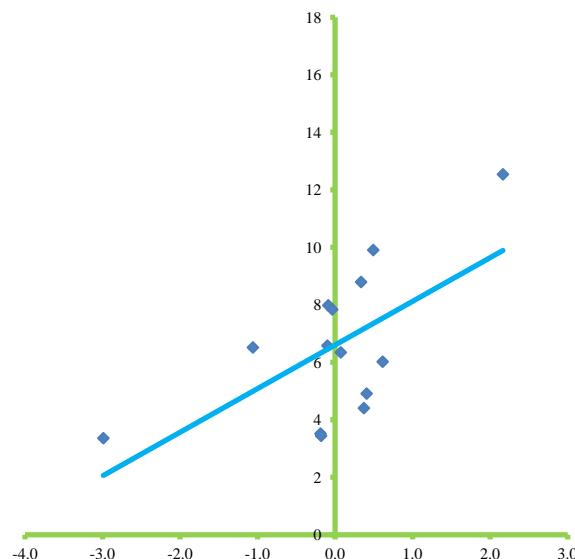
3) We use one quarter lag of inflation (π_{t-1}) as a proxy for expected inflation.

Source: Singh, B.K., Kanakraj, A. and Sridevi, T.O., (2011), “Revisiting the Empirical Existence of the Phillips Curve for India”, Journal of Asian Economics, 22(4), 247-258

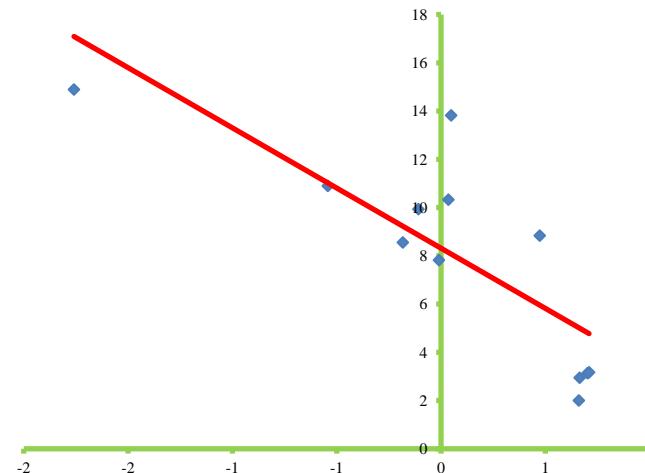
Relationship between Inflation and the Output Gap

Period between Q4 2003-04 and Q4 2010-11

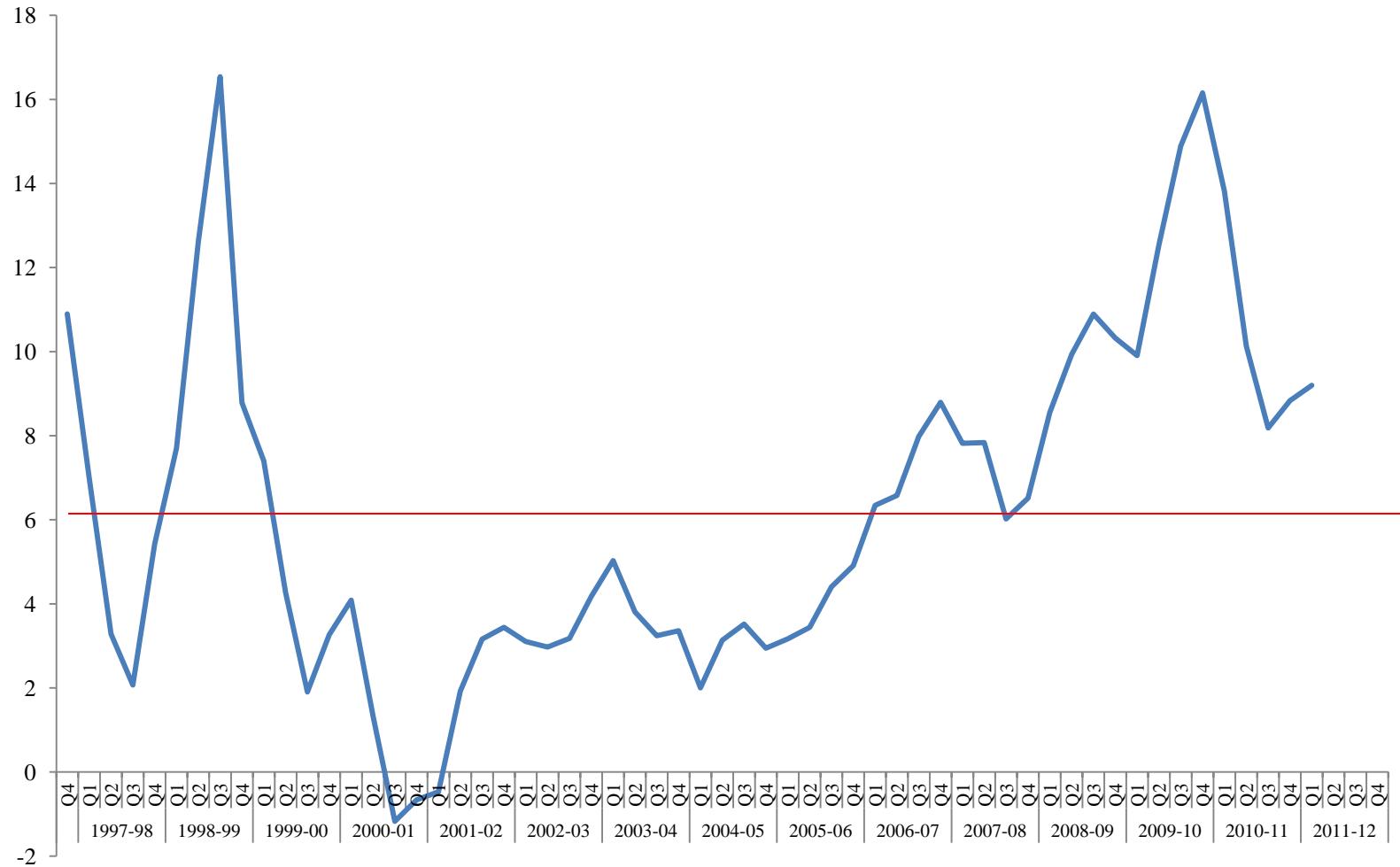
Demand Shocks



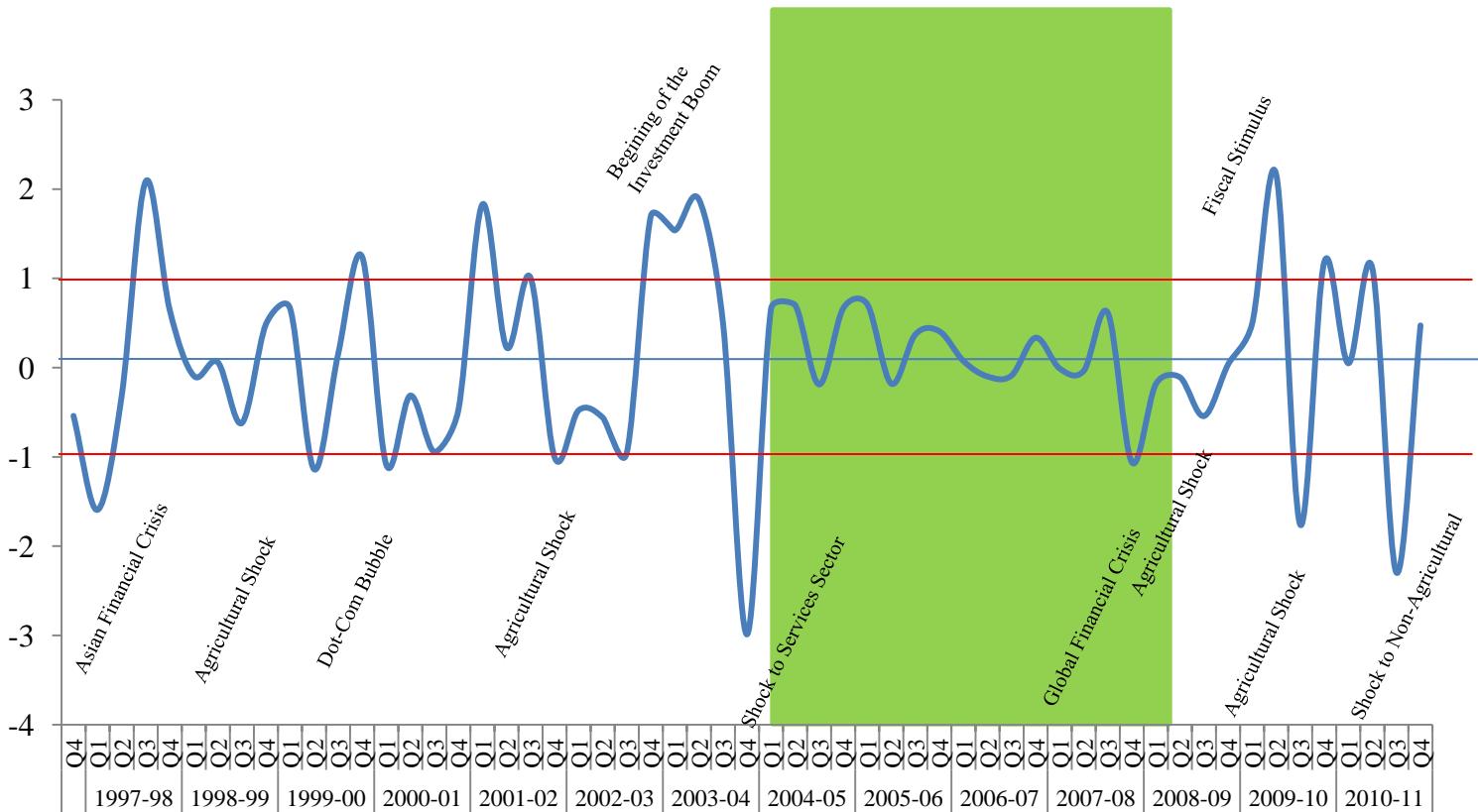
Supply Shocks



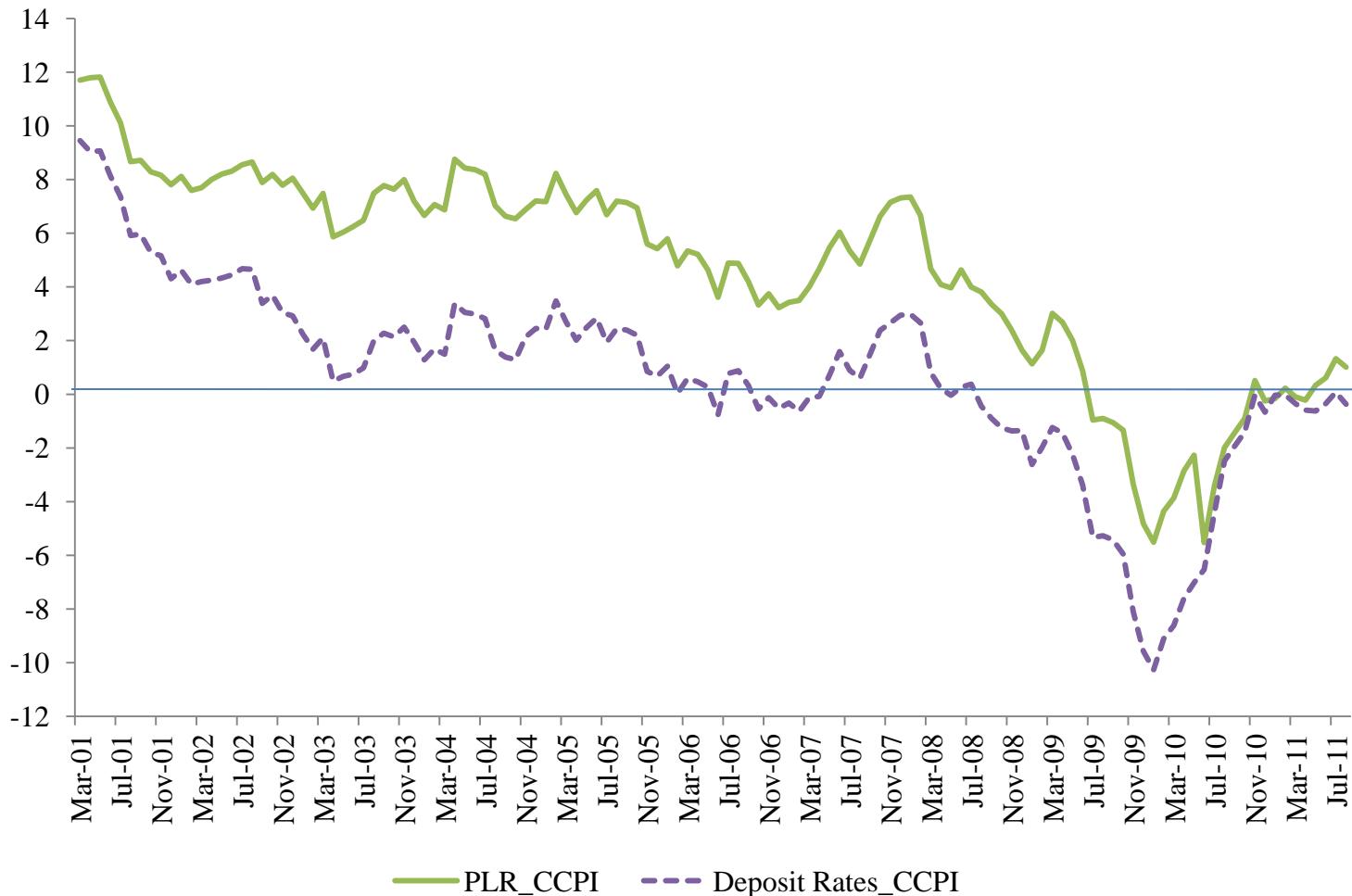
CCPI Inflation (%)



Output Gap: Kalmann Filter



Real Interest rates - CCPI



Change in Fiscal Deficits as a % of GDP



Conclusions

- 1) In normal times, i.e. in the absence of any supply shocks, the RBI may consider 6 percent as the threshold level of inflation.
- 2) The WPI is a poor measure of inflation, and the RBI should instead use the CCPI as a measure of inflation.
- 3) The RBI should consider using the non-smoothed model to estimate the potential growth, since using the linear form of potential output estimation misguides the state of the economy and it results in inefficient policy actions.
- 4) Since there is an empirical relationship between growth and inflation, effective demand management polices are important in addressing the inflationary situation.

Questions

Thank You