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Sectoral Macroeconomic Policies and Poverty Reduction in Rural India

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Motivation

- Is poverty reduction market led or policy led? Or a combination of the two can identify a pro-poor (employment generating) growth pattern for poverty reduction.

- Linking macroeconomic policies and poverty remains a debatable issue

- Key policy challenge: How best to evaluate the poverty impact of macro policies while minimising the cost in terms of reduced growth?

- This paper examines the connection between rural poverty in India and policies that could contribute to poverty reduction, using time series data from 1950 to 2004.

1. Growth impact of adjustment policies

- Demand-and supply-side treatment is inevitable to address long-run growth (Mallick, 2006; Mallick and Moore, 2008)

- External liquidity Crisis can be caused by structural supply-side bottlenecks, not always by excess demand as it is in developed countries

- Hence contractionary policies advocated by IFIs at the time of crisis can only create recession, although it can help achieve macroeconomic stability (Mallick, 2004)

- Policy options are still required to support demand at this time of crisis.

Real GDP Growth (%)-1994-2001

	India	Mexico	Thailand	Korea	Malaysia	Indonesia	Philippines	Russia	Argentina
1994	6.8	4.4	9.0	8.3	9.2	7.5	4.4	-13.5	5.8
1995	7.6	-6.2	9.2	8.9	9.8	8.2	4.7	- 4.2	-2.8
1996	7.5	5.2	5.9	6.8	10.0	8.0	5.8	-3.4	5.5
1997	5.0	6.8	-1.4	5.0	7.3	4.5	5.2	0.9	8.1
1998	5.8	5.0	-10.5	-6.7	-7.4	-13.1	-0.6	-4.9	3.8
1999	6.7	3.6	4.4	10.9	6.1	0.8	3.4	5.4	-3.4
2000	5.4	6.6	4.6	9.3	8.3	4.8	4.4	9.0	-0.8
2001	4.1	-0.3	1.8	3.0	0.5	3.3	3.2	5.0	-4.4

Source: World Economic Outlook, IMF, September 2002.

Growth impact of adjustment policies

➢ On the fiscal side, IFI-supported macroeconomic adjustment can be growth-oriented through decomposing public spending (Mallick, 2001)

➢ From the monetary side, channelling non-bank credits to the lower-end of the private sector is the key to growth-oriented adjustment

➢ Thus addressing growth-oriented adjustment requires a strategy to invest in infrastructure and human development; and channelling credit to the lower end of the private sector.

2. Poverty impact of macroeconomic policies

- The macroeconomic impacts can be both direct and indirect.

- The direct impact works through prices (income & cost effects), and public spending on the poor
  - supply of public goods directly targeting the poor;
  - opportunities provided for the poor such as education

- The indirect impacts of macroeconomic policy on poverty work through its effect on growth.

- So the literature remains dominated by a paradigm of growth being necessary for poverty reduction but it may not be sufficient if the relevant policies are not in place.

Economic Growth or Policy Intervention

- The evidence in the poverty literature is mixed with claims that economic growth path in developing countries has been pro-poor

- Cross-country evidence: high correlation between growth and poverty
  - Dollar & Kraay (2002) - growth is good for the poor irrespective of the nature of growth
  - Ravallion and Datt (1998 and 2002) – pro-poor growth (see also Palmer-Jones and Sen, 2006)

- On the contrary there are studies reporting the role of re-distributive policies aiding more directly to poverty reduction
  - see Alesina and Rodrik, 1994; Dagdeviren *et al.*, 2002; Agenor, 2004.

The trickle down effect and Poverty reduction mechanism

- Lewis (1954) was perhaps the first study from which the concept of trickle down effect (TDE) might have emerged

- TDE – anti-poverty effect of rising real income – Whether or not economic growth trickles down to the poor is an empirical question

- Employment growth is the driving force behind reducing poverty, but employment directly hinges on the nature of the capital formation.

- Hence the level of poverty, GDP and capital formation (particularly in agriculture) are important to investigate the linkages.

- Basu and Mallick (2008) tested this trickle down effect in the context of India using aggregate data from 1951 to 1991

Results from Basu and Mallick (2008, CJE)

- Capital formation does not contribute to a reduction in the incidence of poverty
    - Rural poverty is negatively affected by changes in the agricultural output, while capital formation has contributed to an increase in poverty

- If poverty has to be reduced via growth in employment, theoretically we should find a negative impact of capital formation on poverty.

- A positive relationship suggests that a substantial portion of the capital formation has probably taken place in the form of acquiring labour-saving devices.

Is growth alone sufficient?

- We see a long-run trickle down, but not in the short-run probably because of capital-labour substitution

- The long-run trickle down suggests that government intervention helps offset any short-run poverty shocks

- LR trickle down also suggests that all types of capital are not labour-displacing and hence there can be labour-augmenting neutral technical progress.

- As technology augments labour productivity, higher economic growth along with distributive policies namely anti-poverty programmes must have reduced poverty in India

Distributional channel of poverty reduction

- Not all forms of growth are pro-poor

- There is evidence that growth alone cannot take care of poverty; policies do matter for poverty reduction (Basu and Mallick, 2008)

- Selective intervention has reduced poverty:

  - Besley and Burgess (2000) found that following the implementation of the tenancy legislation in West Bengal, the incidence of poverty has declined.

  - Tendulkar (1998) and Rao (1994) - the implementation of the government's anti-poverty measures since the late 1970s helped reduce the incidence of poverty in India.

Need for establishing robust correlations between certain policies and rural poverty

- Some policies could be correlated with poverty reduction in rural areas (such as irrigation policies and bank credit policies).

- This is potentially important because often researchers find that anti-poverty policies do not seem to be particularly effective at reducing poverty in developing countries.

- Perhaps the most famous example is Dollar and Kraay (2002), who find no evidence that policies help the poor (e.g. primary education or democratic institutions). However, with an individual country data, controls, and policy measures, this paper reaches a different conclusion.

Summary results of the present paper

- We have developed a framework to test the effect of macroeconomic policies on poverty using data from India spanning over the last five decades.

- The government-led channel of development spending and financing directly influences poverty after accounting for the effect of sectoral output and price ratios.

- First, the policy-driven model emphasises the sectoral output and intersectoral terms of trade as a mechanism in determining the level of poverty.

- Second, the paper considers key components of fiscal spending and monetary/financial policy via availability of credit rather than the cost channel to show that a strategy of government-led spending and financing is a precondition for growth with poverty alleviation.

Distributive policies

- So increased government spending (Squire, 1993) or access to assets and opportunities (Birdsall and Londono, 1997) can be a logical extension of the argument that growth does not ensure the elimination of poverty.

- Poverty results either due to permanent non-availability of two square meals a day because of lack of work and income, or due to shocks such as ill health or crop failure.

- These shocks can be temporary if the households have assets to sell or access to credit, otherwise these households can eventually be pushed below the poverty line

Macroeconomic policies with a development focus

- This paper focuses on the relationship between macroeconomic policies and poverty in India

- When it comes to economic development as a long-term goal, there is a need to identify macroeconomic policies that have distributional and allocational properties

- The objective of macroeconomic policies is to overcome permanent shocks and to weather temporary shocks

- A measure of poverty is the Head Count Index, HCI, and government macroeconomic policies refer to government development expenditure and credit to the agricultural sector.

- Other control variables include sectoral (agricultural) growth and terms of trade (i.e. the ratio of agricultural to non-agricultural prices).

A simple framework

- In order to capture rural poverty in a macro setting, there is a need to identify the poor in relation to output of the rural sector, where most poor are engaged.

- We put together a two sector model namely agriculture and non-agriculture to examine possible linkages between rural and urban economy.

- The relationship between poverty rate and macroeconomic performance and policies is tested using annual time series data from India over the last five decades on several sectoral and policy variables

Sectoral growth pattern is crucial

- First we characterize the macroeconomic setting by assuming that there are two production sectors:
- agricultural-goods (y_A) (more unskilled labour intensive)
- non-agricultural goods (y_N) (more capital intensive). Non-agricultural goods include industrial products and services.
- The aggregate output can be written as follows:

$$y = \theta y_A + (1 - \theta) y_N$$

- By considering y_N as a numeraire, we write the above equation as follows:

$$\frac{y}{y_N} = (1 - \theta) + \theta \frac{y_A}{y_N}$$

Relative prices and Poverty

■ We assume that price (*P*) is the weighted cost-of-living index in the form of a Cobb-Douglas function:

$$P = \alpha P_A + (1-\alpha) P_N \qquad \frac{P}{P_N} = (1-\alpha) + \alpha \left(\frac{P_A}{P_N} \right)$$

$$H = f \left(\overset{-}{\frac{y}{y_N}}, \overset{+}{\frac{P}{P_N}} \right)$$

$$H = (1-\theta) + \theta \left(\frac{y_A}{y_N} \right) + (1-\alpha) + \alpha \left(\frac{P_A}{P_N} \right) \qquad 0 < \alpha, \theta < 1$$

Capital stock and poverty

- We introduce a standard capital stock equation in which investment (*I*) can raise capital accumulation in agriculture:

$$K = (1-\rho)K_0 + I \qquad\qquad I = I_p + I_g$$

$$I_p = \omega_0 + \omega_1 I_g + \omega_2 CD_{ps} + \omega_3 DE_g$$

$$H = \phi + \theta\left(\frac{y_A}{y_N}\right) + \alpha\left(\frac{P_A}{P_N}\right) + (1-\rho)K_0 + (1+\omega_1)I_g + \omega_2 CD_{ps} + \omega_3 DE_g$$

where, $\phi = \omega_0 + (1-\theta) + (1-\alpha).$

Official Poverty in India (proportion of population below poverty line)

	1951-52	1961-62	1973-74	1977-78	1983	1987-88	1993-94	1999-00	2004-05
Rural	47.4	47.2	55.7	53.1	45.7	39.1	37.3	27.1	28.3
Urban	35.5	43.6	48.0	45.2	46.8	38.2	32.4	23.6	25.7
National	45.3	46.5	54.1	51.3	44.5	38.9	36.0	26.1	27.5
Sources: World Bank Poverty Database; and NSSO, Government of India									

Empirical specification

- With GDP in agriculture, and non-agriculture, and policy variables, the following relation can be estimated:

$$POV_t = \alpha + \beta \left(\frac{GDP_A}{GDP_N} \right)_t + \gamma \left(\frac{P_A}{P_N} \right)_t + \delta ACOR_t + \lambda PK_A + \mu GE_D + \omega CD_A + u_t$$

- We use rural poverty rate, as there is higher concentration of poverty in rural India where there is higher dependence on agricultural sector.

- Aside from HCI, consumption deprivation as an alternative measure of poverty can also be used

- Higher fiscal spending and credit allocation to the rural sector can have a direct trickle-down effect on poverty, via higher economic activity and employment.

Time series plots of variables
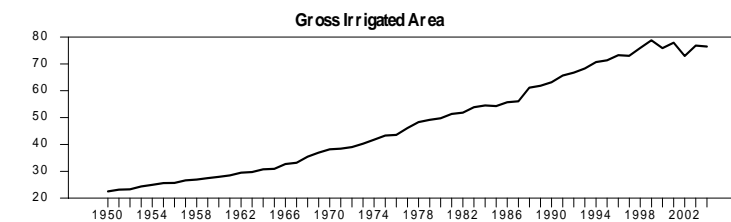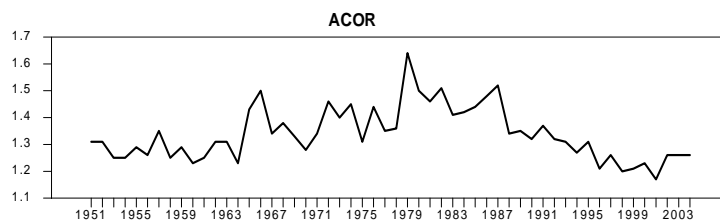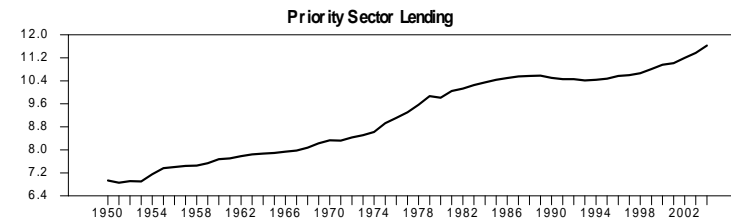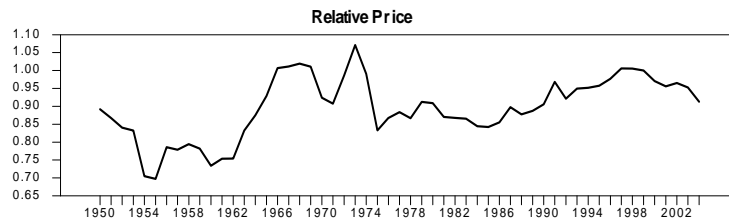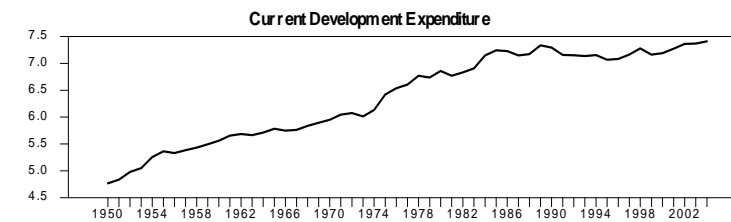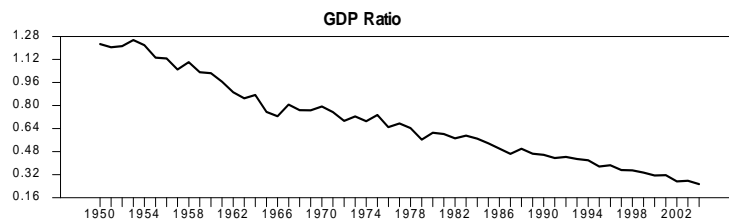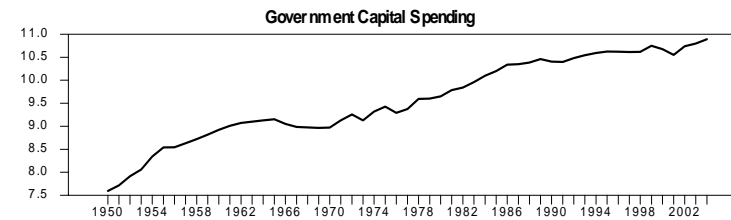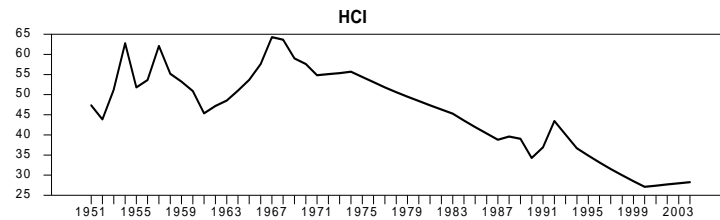
Philips-Hansen Fully-Modified Cointegration

1.
$$LPOV_t = 12.92 - 0.345\ YR_t + 0.552\ PR_t - 1.017\ LPY_t$$
$$\quad\quad\ (1.035)^{**}\quad (0.132)^{**}\quad\quad\quad (0.194)^{**}\quad\quad\quad (0.097)^{**}$$

2.
$$LPOV_t = 14.66 - 0.514\ YR_t + 0.477\ PR_t - 1.154\ LPY_t - 0.219\ ACOR_t$$
$$\quad\quad\ (2.305)^{**}\quad (0.241)^{*}\quad\quad\ (0.198)^{*}\quad\quad\ (0.193)^{**}\quad\quad\ (0.256)$$

3.
$$LPOV_t = 4.23 + 0.127\ YR_t - 0.240\ PR_t - 0.002\ LDE_t$$
$$\quad\quad (4.241)\ \ (0.377)\quad\quad (0.319)\quad\quad (0.001)^{**}$$
$$\quad\quad - 0.449\ CRED_t + 0.001\ LPY_t + 0.579\ ACOR_t$$
$$\quad\quad\ (0.173)^{**}\quad\quad\quad (0.452)\quad\quad\quad (0.361)$$

4.
$$LPOV_t = 4.17 + 0.179\ YR_t - 0.187\ PR_t - 0.002\ LDE_t$$
$$\quad\quad\ (0.577)^{**}\ (0.332)\quad\quad (0.253)\quad\quad (0.001)^{*}$$
$$\quad\quad - 0.428\ CRED_t + 0.558\ ACOR_t - 0.002\ GIA_t$$
$$\quad\quad\ (0.114)^{**}\quad\quad\quad (0.162)^{**}\quad\quad\ (0.007)$$

5.
$$LPOV_t = 9.324 - 0.512\ YR_t - 0.618\ PR_t - 0.521\ CRED_t$$
$$\quad\quad\ (2.451)^{**}\ (0.609)\quad\quad (0.372)\quad\quad (0.115)^{**}$$
$$\quad\quad - 0.476\ LGC_t - 0.064\ LDE_t - 0.01\ GIA_t + 0.373\ ACOR_t$$
$$\quad\quad\ (0.219)^{*}\quad\quad (0.083)\quad\quad (0.005)^{*}\quad\quad (0.178)^{*}$$

Stationarity of Cointegration Errors
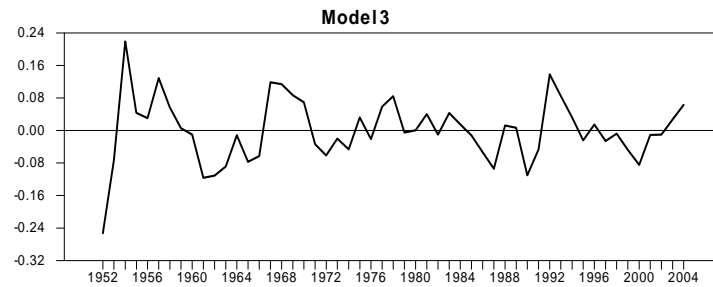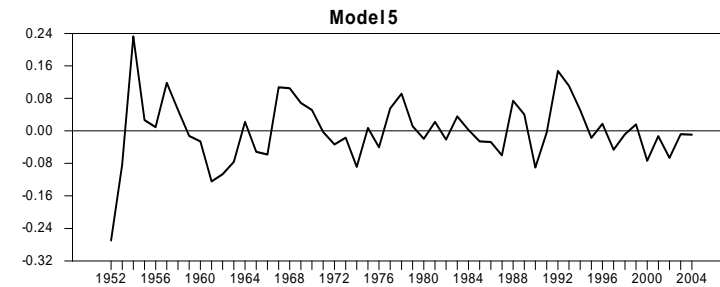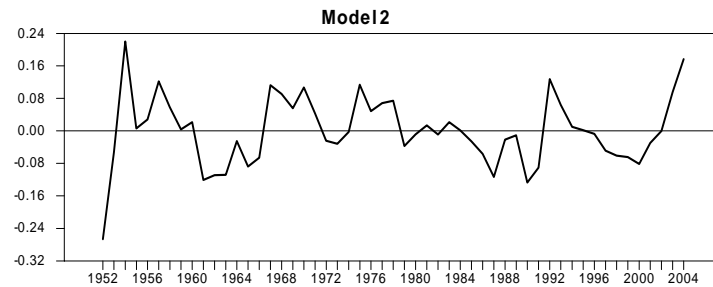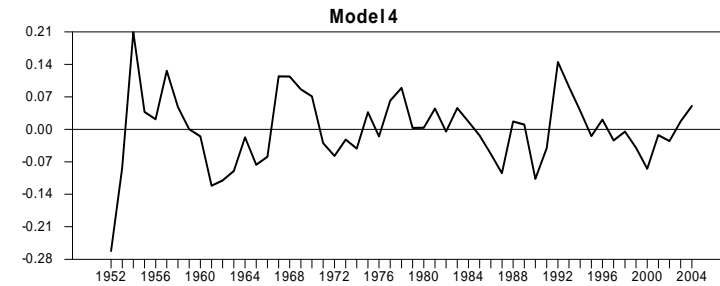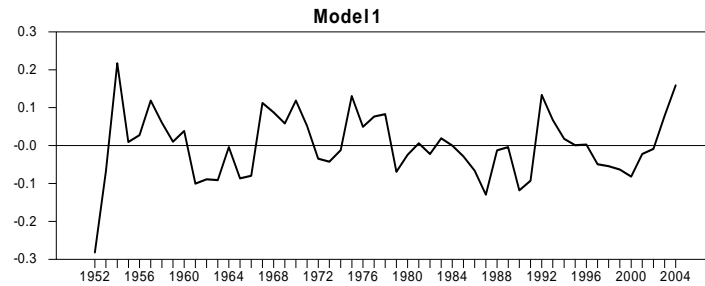
Johansen I(1) Analysis – Rank test statistics with variables in Model 5

rank	Eigen Value	Trace	Trace*	Frac95	P-Value	P-Value*
0	0.698	184.507	167.925	159.319	0.001	0.015
1	0.5	121.099	111.824	125.417	0.09	0.255
2	0.439	84.412	79.036	95.514	0.233	0.399
3	0.353	53.746	50.995	69.611	0.475	0.596
4	0.24	30.645	29.446	47.707	0.688	0.747
5	0.168	16.13	15.687	29.804	0.709	0.739
6	0.095	6.407	6.303	15.408	0.652	0.664
7	0.021	1.102	1.095	3.841	0.294	0.295

Normalized cointegrating equation

$$LPOV_t = -2.017\, YR_t + 2.661\, PR_t + 0.253\, CRED_t$$
$$\quad (1.282) \qquad\qquad (2.791) \qquad\qquad (0.857)$$

$$-0.567\, LDE_t - 1.00\, LGC_t + 2.227\, ACOR_t - 0.006\, GIA_t$$
$$\quad (2.634) \qquad\qquad (1.799) \qquad\qquad (4.868) \qquad\qquad (0.464)$$

- Since CRED and GIA are not significant, we imposed two zero restrictions on these coefficients. The likelihood ratio (LR) test statistic for testing the two zero-restrictions is distributed as $\chi^2(2) = 0.434\ [0.805]$, which is not rejected.

- The restricted cointegrating vector is written as follows:

$$LPOV_t = -2.086\, YR_t + 1.936\, PR_t - 0.538\, LDE_t - 1.207\, LGC_t + 2.027\, ACOR_t$$
$$\quad (1.443) \qquad (2.732) \qquad (3.110) \qquad (2.604) \qquad (4.883)$$

Structural VAR

- Consider the following SVAR model:

$$B_0 X_t = a + B(L) X_{t-1} + \varepsilon_t$$

- The reduced form is: $A(L) X_t = \alpha + u_t$

$$A(L) = I_n - A_1 L - \ldots - A_p L^p \text{ where } A_1 = B_0^{-1} B(L); \ u_t = B_0^{-1} \varepsilon_t$$

- $X_t = [CDR_t, \ INV_t, \ RPR_t, \ GDR_t, \ POV_t]$

- The impulse-response functions will be given by: $A(L)^{-1} B_0^{-1}$

- To make B_0 invertible, impose at least $\left(n \times (n-1)\right)/2$ restrictions to exactly identify the system

Recursive identifying Restriction on the matrix of contemporaneous effects, B_0

- u_t is the vector of VAR residuals and ε_t is the vector of structural shocks

$$\begin{bmatrix} u_{cd} \\ u_{in} \\ u_{pr} \\ u_{yr} \\ u_{pv} \end{bmatrix} = \begin{bmatrix} a_{11} & 0 & 0 & 0 & 0 \\ a_{21} & a_{22} & 0 & 0 & 0 \\ a_{31} & a_{32} & a_{33} & 0 & 0 \\ a_{41} & a_{42} & a_{43} & a_{44} & 0 \\ a_{51} & a_{52} & a_{53} & a_{54} & a_{55} \end{bmatrix} \begin{bmatrix} \varepsilon_{cd} \\ \varepsilon_{in} \\ \varepsilon_{pr} \\ \varepsilon_{yr} \\ \varepsilon_{pv} \end{bmatrix}$$

Derived structural shocks of the VAR involving variables in model 5
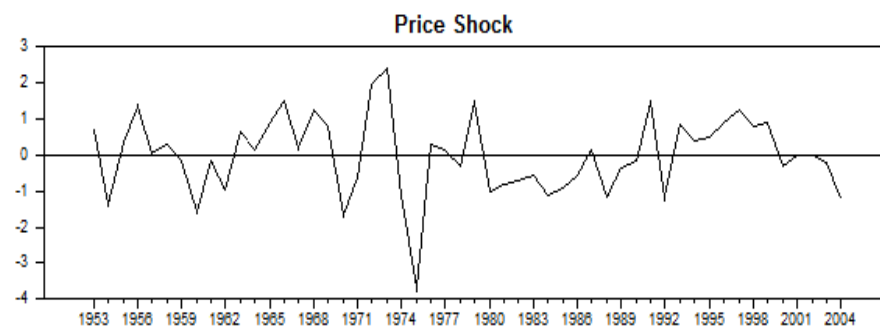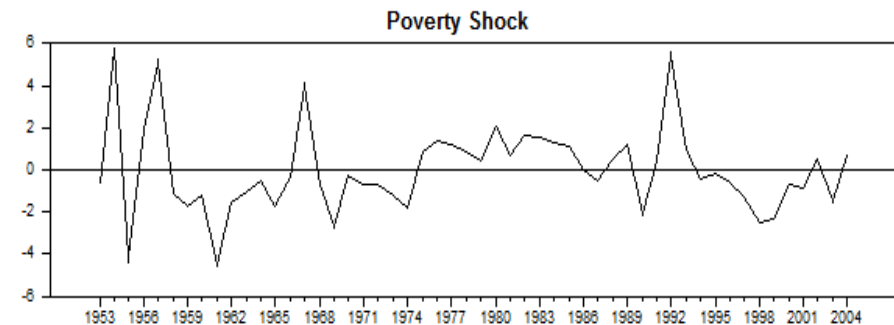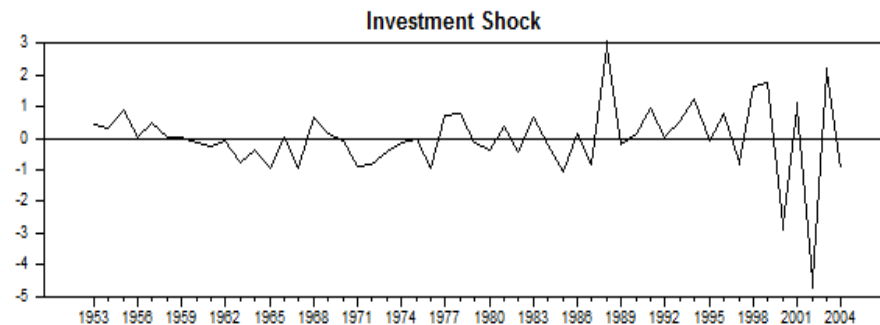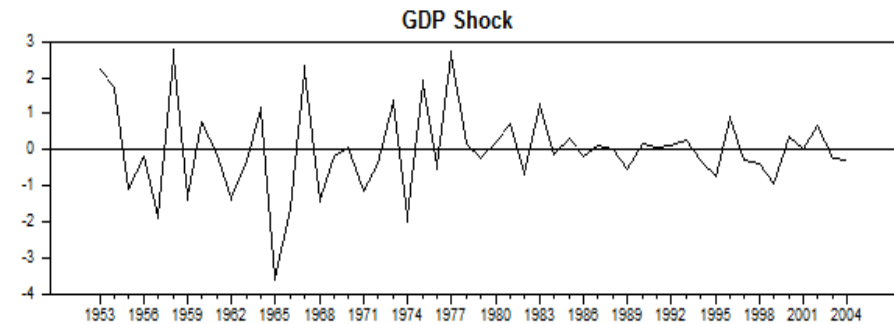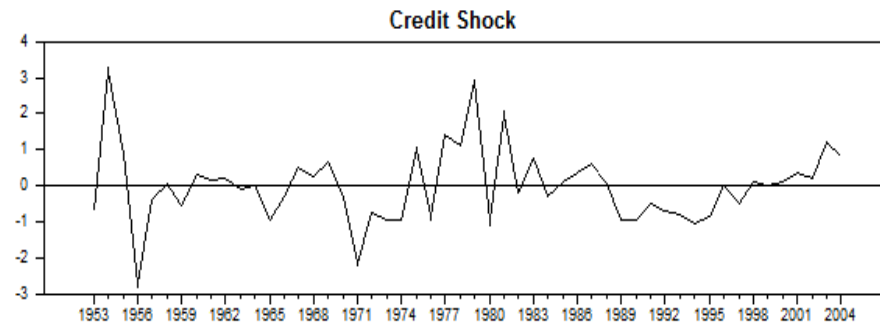
Responses to Agricultural Credit Shock

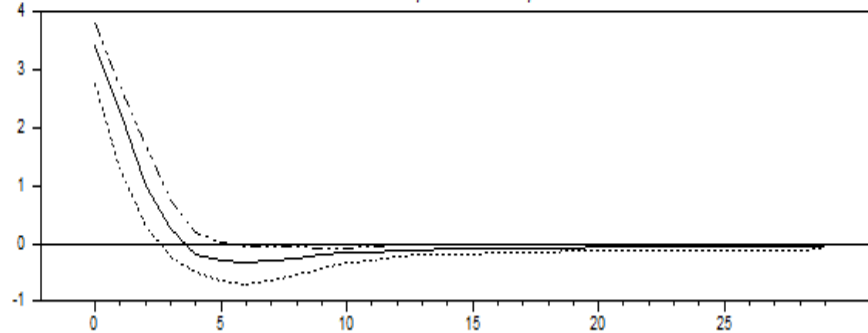

Responses to agricultural credit shock

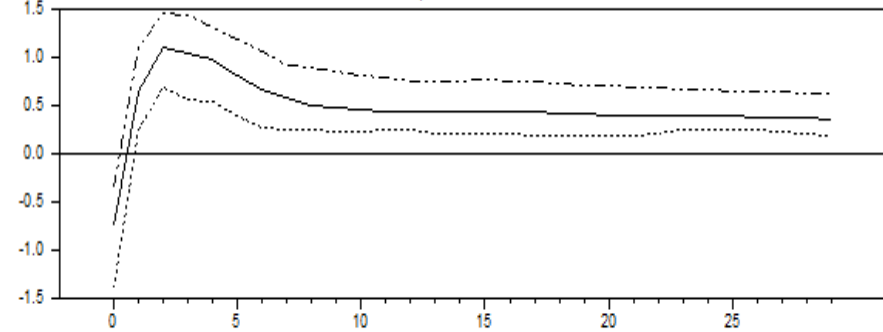Panel A: Response of agricultural credit
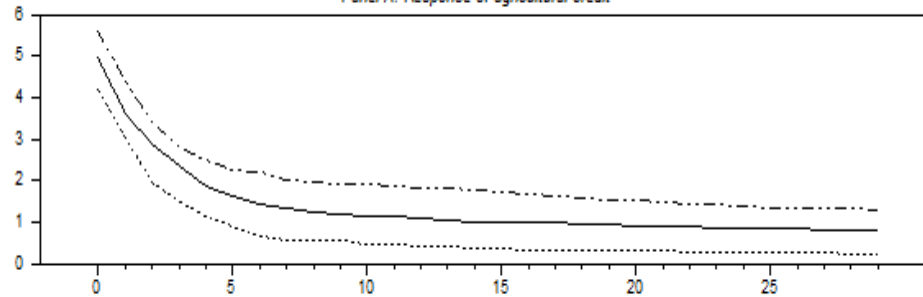
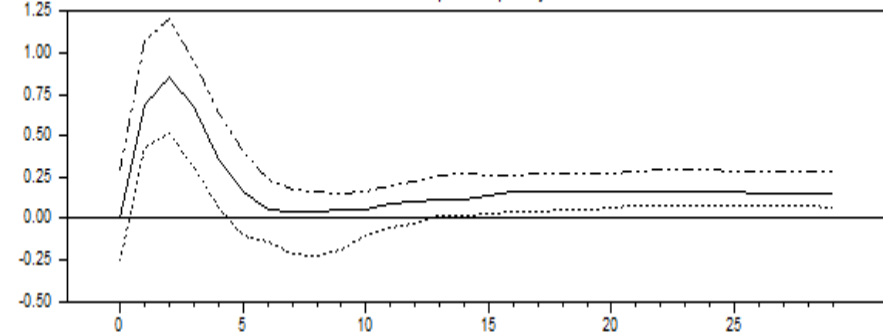Panel B: Response of agricultural investment
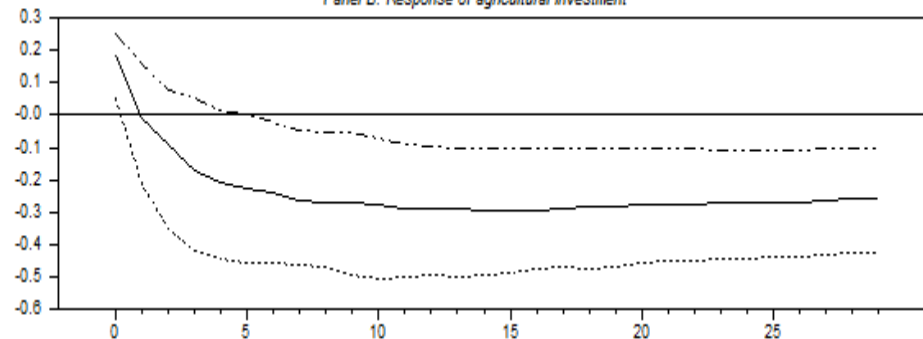
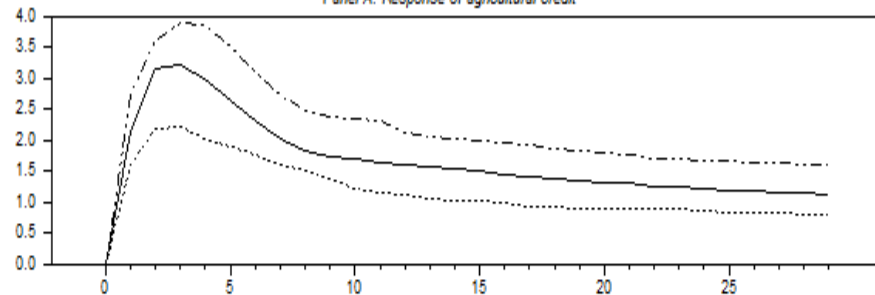Panel C: Response of relative price
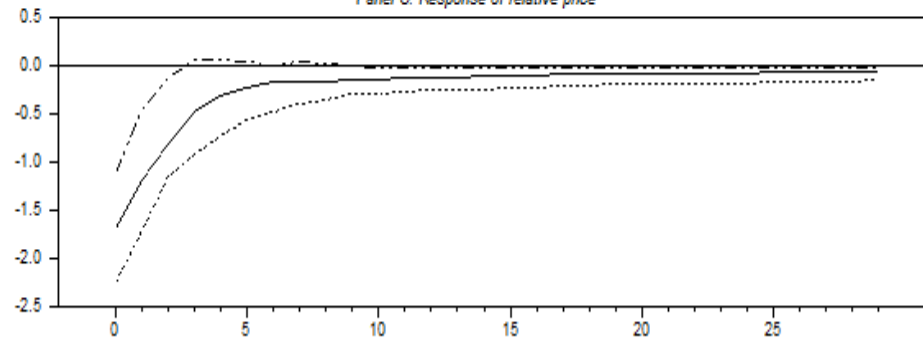
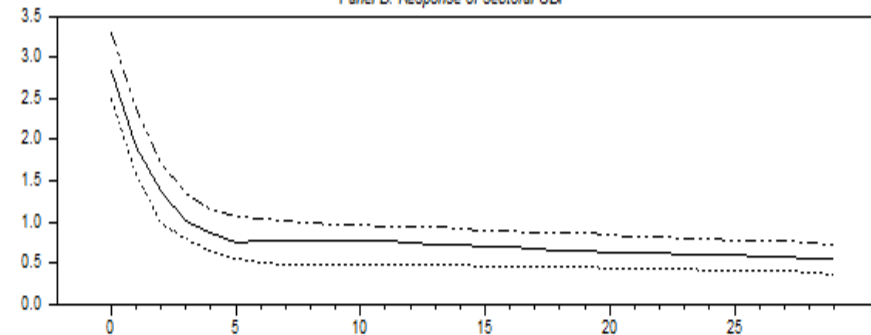Panel D: Response of sectoral GDP
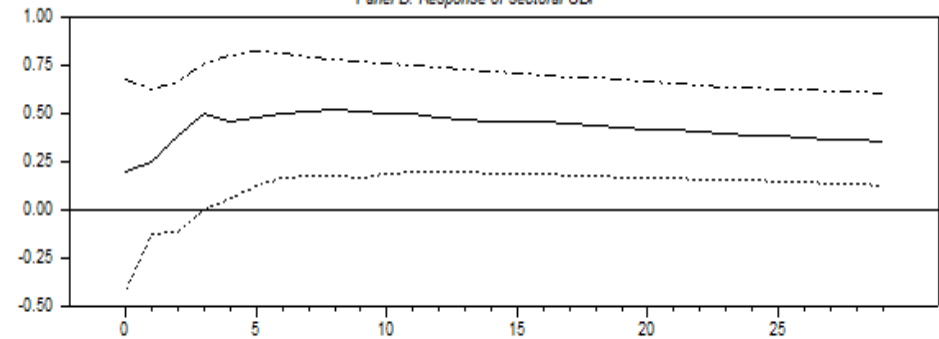
Panel E: Response of poverty
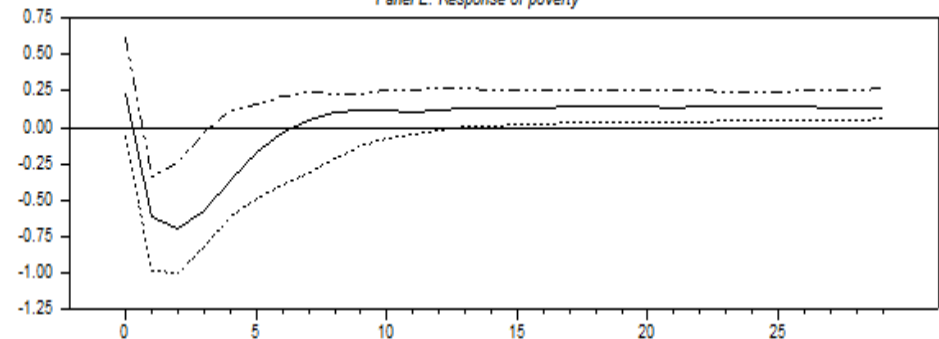
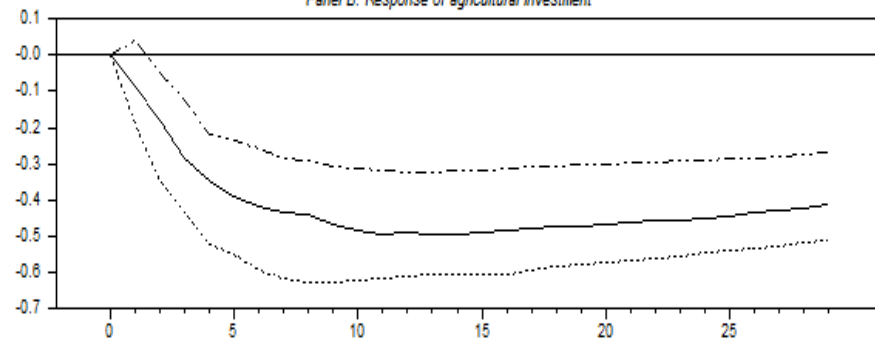# Responses to Agricultural investment shock

Responses to agricultural investment shock
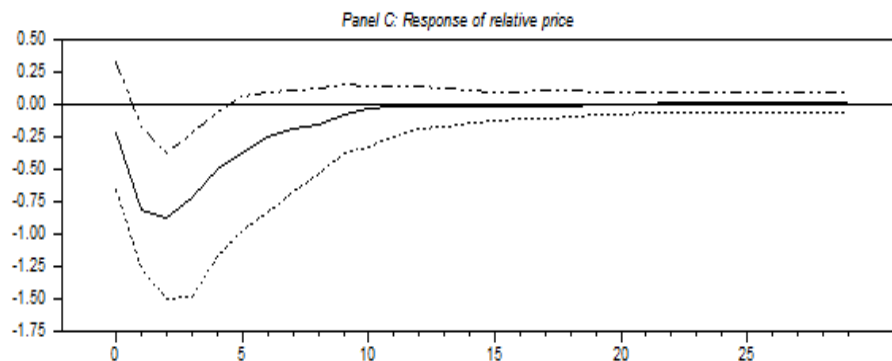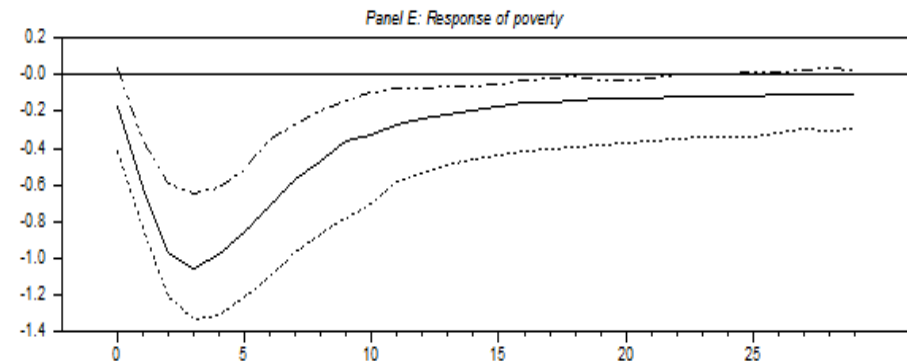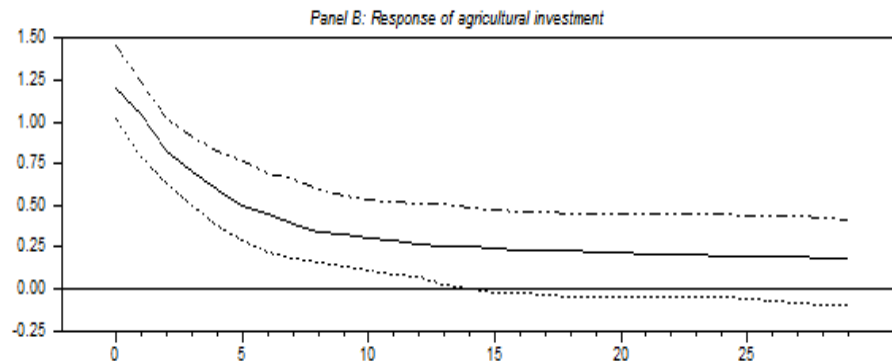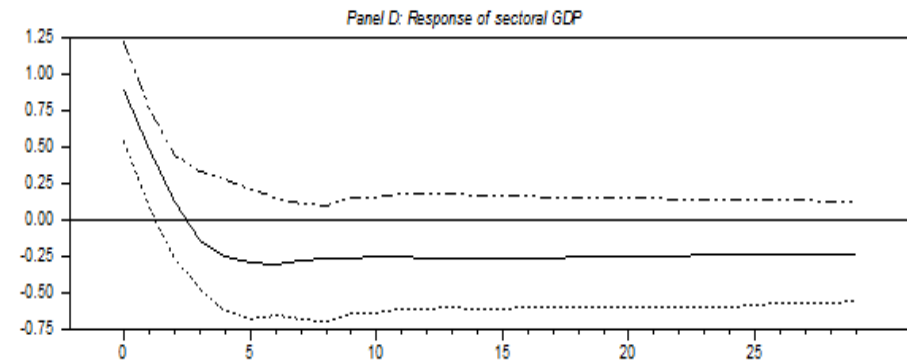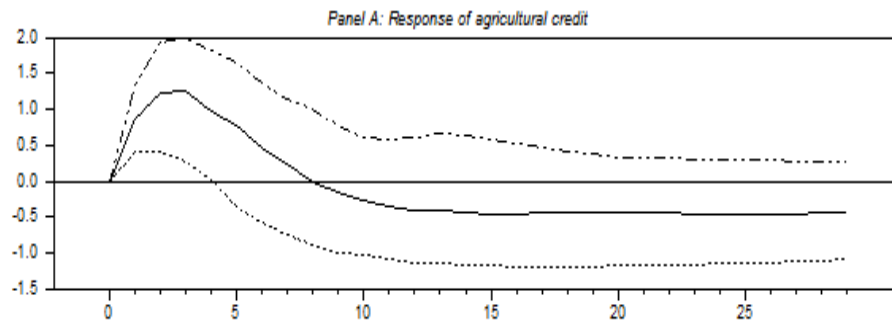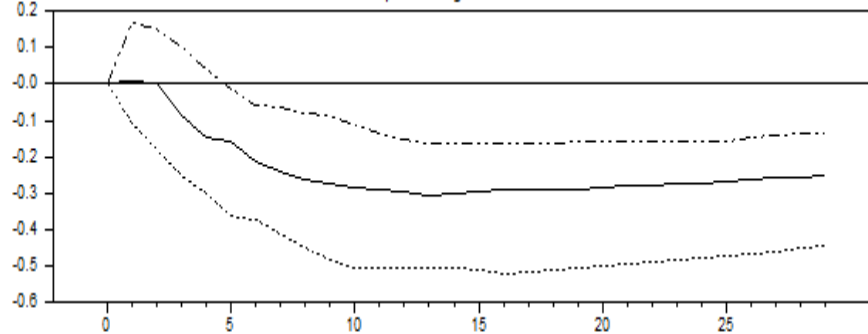
Panel A: Response of agricultural credit

Panel B: Response of agricultural investment

Panel C: Response of relative price

Panel D: Response of sectoral GDP

Panel E: Response of poverty

Responses to relative price shock

Responses to relative price shock

Responses to sectoral GDP shock

Responses to sectoral GDP shock
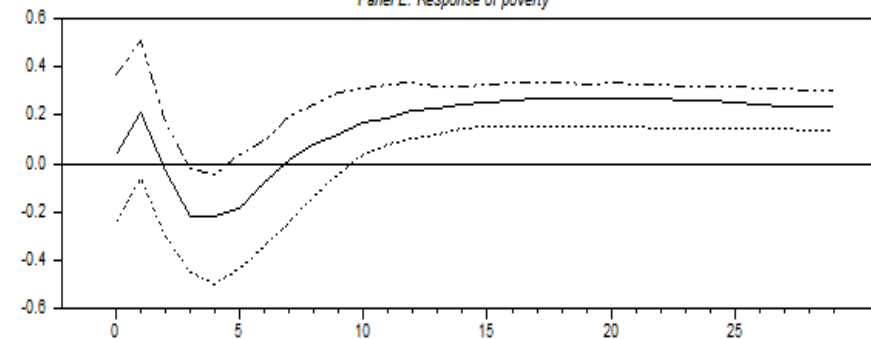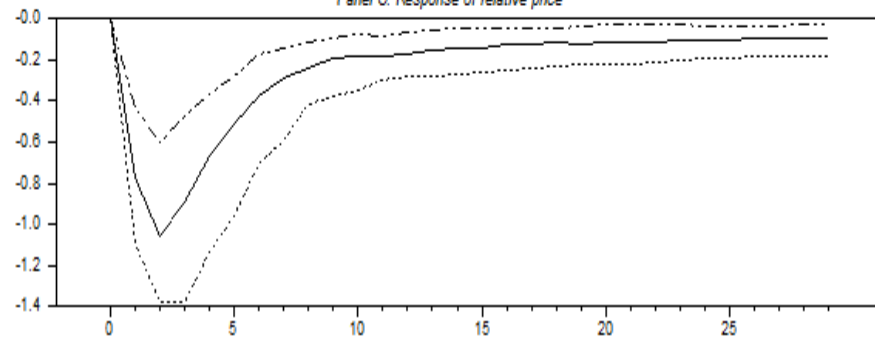
Responses to rural poverty shock

Responses to poverty shock

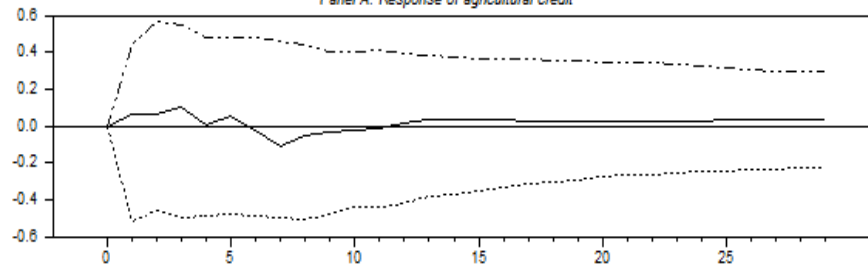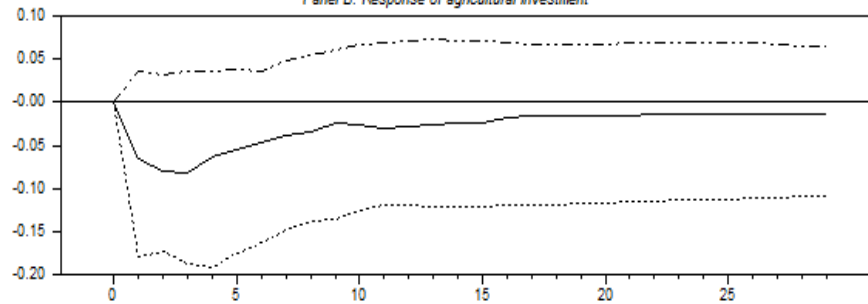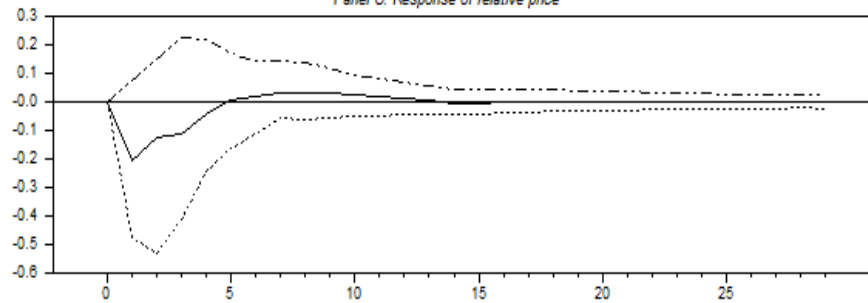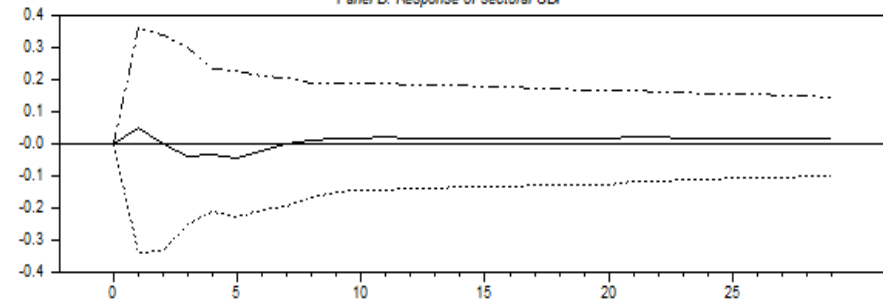Panel A: Response of agricultural credit

Panel B: Response of agricultural investment

Panel C: Response of relative price

Panel D: Response of sectoral GDP

Panel E: Response of poverty
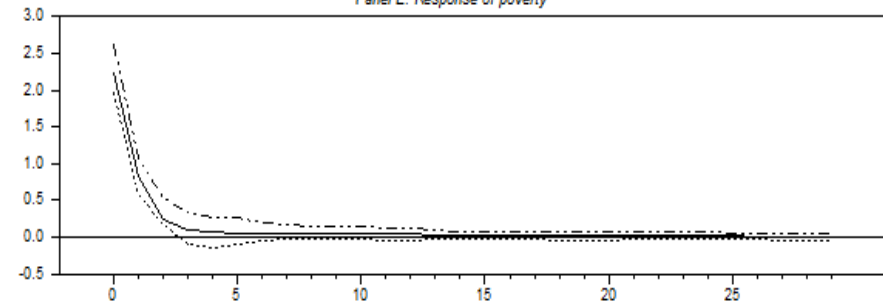
Variance Decompositions (k=12)

Shocks in ↓	Credit	Invest	Price	GDP	Poverty
Credit	0.414	0.061	0.174	0.045	0.097
Invest	0.054	0.663	0.172	0.072	0.332
Price	0.108	0.026	0.440	0.194	0.033
GDP	0.424	0.247	0.209	0.684	0.048
Poverty	0.001	0.004	0.005	0.003	0.488

Summing up the results

- In a basic setting, we find that rural poverty has declined with rise in aggregate per capita real income and the sectoral distribution of such aggregate output.

- Once we combine this basic model with policy variables, the impact of such aggregate variables are no longer important with the ratio of sectoral outputs being insignificant and the relative prices of agriculture being significant in influencing poverty.

- A rise in relative price of agriculture increases poverty by eroding the purchasing power of poor as any demand pressure arising from higher income effect is not sufficient to offset the rise in food prices,

- whereas more irrigated area on the back of higher government capital spending offsets the adverse impact, along with the extension of bank credit to agriculture, which contributes significantly to poverty reduction.

Higher food prices are of little help

- Poverty reduction via distributional and allocational channels can be more permanent when an economy experiences a decline in its traditional sector leading to higher relative prices.

- Even with higher relative prices of agriculture, we cannot reduce poverty because many farmers cannot increase output as they are not equipped to gear up production.

- Also due to market distortions, they may not benefit from higher food prices.

- So poverty rises as higher food prices further reduce their purchasing power, pushing more people below the poverty line.

Generating poverty series via exponential smoothing
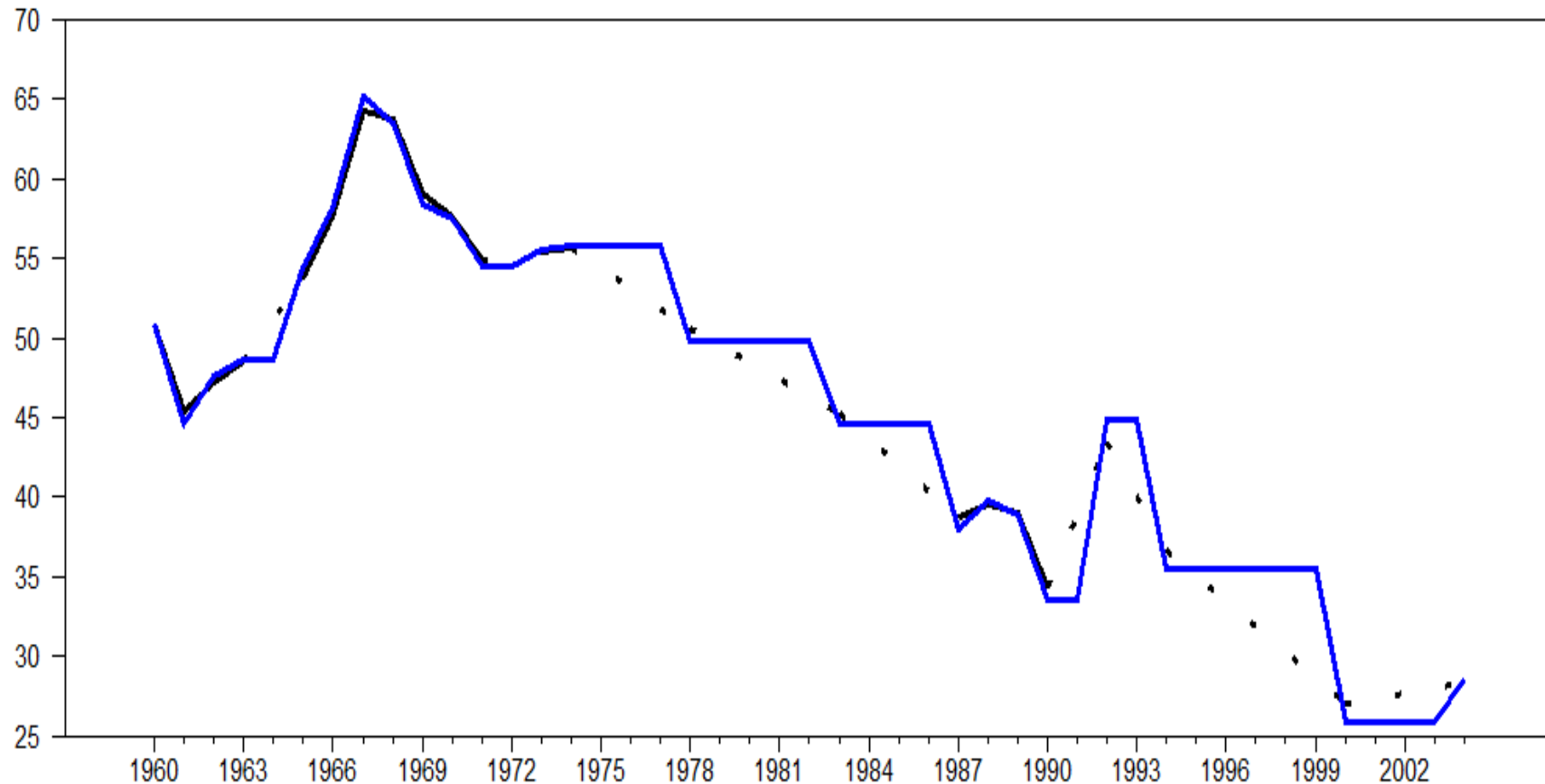
Concluding remarks

- This paper analyses the problem of poverty primarily from a macro-economic perspective, tracing the poors' economic status to their low share in the low growth sector

  - Economic growth is necessary (Lewis) but not a sufficient condition for reducing poverty

- Policies that directly influence the income of the poor after accounting for the effect of sectoral GDP composition is important for poverty reduction, such as investments in rural infrastructure, primary education, health and nutrition.

- Policies that improve the distribution of income and assets within a society, such as

  - land tenure reform, pro-poor public expenditure, and

  - measures to increase the poor's access to financial markets,

  - should form essential elements of a country's poverty reduction strategy.