
Sectoral Volatility, Development and Governance: A Case Study of Pakistan

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Line of Presentation

- ◆ Objectives
- ◆ Introduction
- ◆ Review of Literature
- ◆ Methodological Issues
- ◆ Data and Variable construction
- ◆ Results and Results Discussion
- ◆ Conclusion

Objectives

Specific questions which will be addressed

- ◆ What are the main characteristics of the structure of the Pakistan's economy?
- ◆ What is the nature of volatility of the different economic sectors?
- ◆ Does volatility in different sectors affect volatility in output?
- ◆ To what extent do volatility in growth rate is associated with the volatility of the sectors under analysis?
- ◆ What are the main implications of the volatility parameters for the Pakistan's policy problem and for the achievement of stable growth rate?
- ◆ How the instability in political structure can effect volatility in growth rate?

Introduction

- ◆ Development of overall economy of any country largely depends upon the characteristics of different prominent sectors
- ◆ Growth stability is an important objective because development requires sustained increases in income
- ◆ Strong impact of sector volatility on development
- ◆ Volatility is costly for poor as well as it deters growth
- ◆ recent volatility in growth rate of GDP can be attributed to the increasing share of some volatility of prominent sectors

Literature Review

- ◆ Pakistan has undergone dramatic structural changes and economic growth.
- ◆ Pakistan has tried to change its economic structure as the other underdeveloped countries from agricultural economy to an industrial export oriented economy.
- ◆ Since the last five decades manufacturing sector itself has experienced a series of changes in its internal structure.
- ◆ The use of capital intensive techniques created the problems of unemployment, balance of payments etc.
- ◆ Despite of technological progresses, use of imported technology by these industries, increase in labor productivity
- ◆ Despite of these technological progresses in industrial sector, agriculture sector plays a significant role in the development of Pakistan's economy.

Literature Review

- ❖ industrial and service sector have exhibited an extra ordinary rate of growth, while the agricultural sector did not shown that rate of growth which was experienced during the time of green revolution.
- ❖ High volatile recorded components at macroeconomic level are real growth rates, price inflation, private investment per capita, government revenue per capita, terms of trade and real exchange rate.
- ❖ In GDP most volatile components are agriculture, industrial and service while least volatile are distribution, transport and communications
- ❖ Among government expenditures, current expenditures are more volatile as compared to development expenditures and public expenditures as percentage of GDP observed to be relatively stable.

Literature Review

Major problems in Pakistan are

- ❧ Excessive centralization of resources and powers, to the detriment of sub – national units of government
- ❧ prevalence of fiscal imbalances both vertically and horizontally
- ❧ Over lapping and non-coordination of expenditure responsibilities among different levels of government.
- ❧ Pakistan also experimented with a succession of exchange rate regimes among which the latest experiment is based on managed floating rate of exchange.
- ❧ Since in the beginning from 1947 national development planning in Pakistan has suffered from lack of systematic, integrated and target oriented approach

Literature Review

- ❖ Lack of clear vision, transparency and functional cooperation at the political levels, marginalization of civil society in the planning process and lack of rigor at the bureaucratic level have severely compromised the quality of planning.
- ❖ At the levels of government technical expertise as well as technology and information management systems are very deficient.
- ❖ Public revenue in Pakistan is inadequate and unstable.
- ❖ The low level of social security is one of the major constraint to sustainable growth.

Literature Review

- ◆ Koren and Tenreyro (2005) explained that despite the number of steps have been taken by most of the developing countries towards the stability of their economies, still one can easily observe the volatility in most of their macroeconomic variables.
- ◆ The major question among the researchers was

Why is GDP growth so much volatile in poor countries than in rich one?

Literature Review

Experts identified the four possible reasons:

- ◆ Poor countries specialize in more volatile sectors.
- ◆ Poor countries specialize in fewer sectors.
- ◆ Poor countries experience more frequent and more severe aggregate shocks.
- ◆ Poor countries' macroeconomic fluctuations are more highly correlated with the shocks of the sectors they specialize in.

Literature Review

◆ Macroeconomic impact of volatility discussed by

Mobarak (2005), Koren and Tenreyro (2005), Lucas(1988), Acemoglu and Zilibotti (1997), Saint and Paul (1992), Greenwood and Jovanovic (1990), Imbs and Wacziarg (2003), Stockman (1988), Dumas, etal (2005) Scheinkman and Xiong (2003), Breena and Garcia (1999), Perotti (1996), Atkinson (1996,1997), Gottschalk and Smeeding (1997), Bourguignon and Morrisson (1998), Li, Squire and Zou (1998), Easterly et al (2002), Ukwu (2003), Gordon (2005), Pritchett (2000), Jalan and Ravallion (1999), Morduch (1995), Pallage and Robe (2003), Wolfers (2003), Barlevy (2002), Barro and Sala-I-Martin (1995), Pritchett (2000) and many others

Literature Review

- ◆ Determinants of volatility discussed by

Levine and Renelt (1992), Rostow and Reynolds, Acemoglu and Zilibotti (1997), Rodrik (1999), Mubarak (2005)

- ◆ Relationship between democracy and volatility explained by

Henisz (2000), Nooruddin (2003), Mobarak (2001), Chandra (1998), Quinn and Woolley (2001)

Literature Review

- ◆ It is well recognized from the literature that volatility of different sectors has impact on the performance of the economy.
- ◆ Especially in the literature, it has been observed that volatility of those sectors in which the economy specialized has a significant effect on the production and trade of the developing as well as of the developed economies.
- ◆ In spite of the crucial importance no empirical quantitative research has however, been conducted to examine the volatility of that sector in which Pakistan is specializing and its impact on the volatility of growth rate in Pakistan.

Methodological Issues

- ◆ Past studies of the growth rate of the Pakistan's economy have applied the more traditional functional forms and not used under the time series data.
- ◆ Rolling standard deviation of the time series data and variance based on the generalized Autoregressive Conditional Heteroskedasticity (GARCH) developed by Bollerslev (1986).
 - ∞ Autoregressive describe a feedback mechanism that incorporates past observations into the present.
 - ∞ Conditional implies a dependence on the observations of immediate past.
 - ∞ Heteroscedasticity represents a time-varying variance (i.e. volatility)

Methodological Issues

- ◆ Augmented Dickey Fuller tests have been employed for the testing of stationarity.
- ◆ Simple OLS estimations used to check the relationship
- ◆ Error Correction Model used to check the contribution of volatility of each sector to the volatility of growth rate of output.
- ◆ Impulse response functions used to check the effect of the shock in the volatility of one sector on the volatility of the growth rate of output.

Data and Variable Construction

- ◆ Quarterly data set covering the period 1971-72 to 2002-03, which capture the different shocks of the Pakistan's economy and adjustments associated with the different economic and political crises.
- ◆ Data has been taken from the Kemal, A R and Arby M F (2004) "Quarterisation of Annual GDP of Pakistan"
- ◆ Output and following sectors are taken into account
 - Output (GDP) = Y
 - Value added of agriculture = VAG
 - Value added of finance and insurance = VFIN
 - Value added of services = VSER
 - Value added of Industry = VIN
 - Value added of Whole sale and retail = VWH

Data and Variable Construction

- ◆ Growth rate of these variables are represented as
 - Growth rate of Output (GDP) = GR_Y
 - Growth rate Value added of agriculture = GR_VAG
 - Growth rate of value added of finance and insurance = GR_VFIN
 - Growth rate of value added of services = GR_VSER
 - Growth rate of Value added of Industry = GR_VIN
 - Growth rate of Value added of Whole sale and retail = GR_VWH
- ◆ Volatility variables are calculated based on 4-quarter moving standard deviation, 8-quarter moving standard deviation and volatility variables based on ARCH-GARCH process are used
 - 4 quarter moving standard deviation = Vol
 - 8 quarter moving standard deviation = Voll
 - Volatility based on ARCH-GARCH = Volt

Data and Variable Construction

- ◆ Volatility variables based on 4 quarter moving standard deviation are represented as

Volatility of Output (GDP)	= VOL_Y
Volatility of Value added of agriculture	= VOL_VAG
Volatility of Value added of finance and insurance	= VOL_VFIN
Volatility of Value added of services	= VOL_VSER
Volatility of Value added of Industry	= VOL_VIN
Volatility of Value added of Whole sale and retail	= VOL_VWH

Data and Variable Construction

- ◆ Volatility variables based on 8 quarter moving standard deviation are represented as

Volatility of Output (GDP)	= VOLL_Y
Volatility of Value added of agriculture	= VOLL_VAG
Volatility of Value added of finance and insurance	= VOLL_VFIN
Volatility of Value added of services	= VOLL_VSER
Volatility of Value added of Industry	= VOLL_VIN
Volatility of Value added of Whole sale and retail	= VOLL_VWH

Data and Variable Construction

- ◆ Volatility variables based on 8 quarter moving standard deviation are represented as

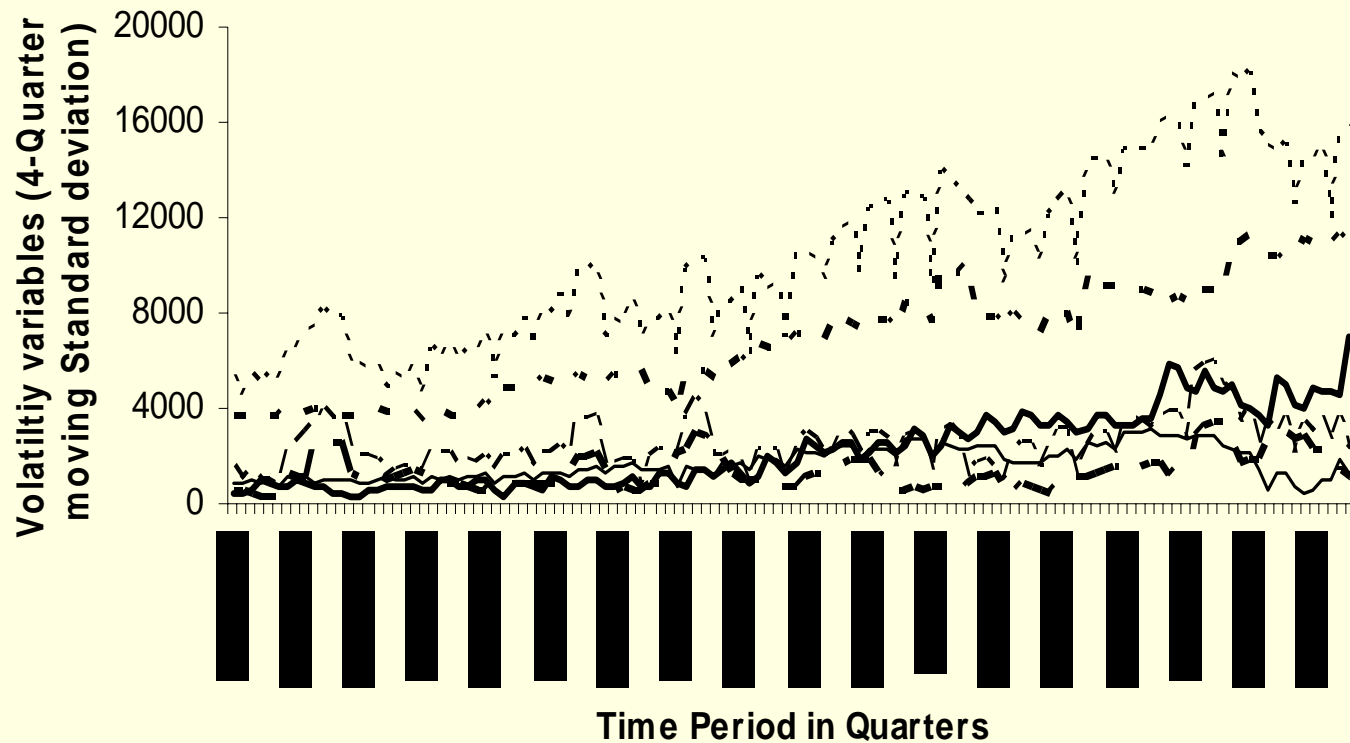
Volatility of Growth rate of Output	= VOLT_GR_Y
Volatility of Growth rate of Value added of agriculture	= VOLT_GR_VAG
Volatility of Growth rate of Value added of finance and insurance	= VOLT_GR_VFIN
Volatility of Value added of services	= VOLL_GR_VSER
Volatility of Value added of Industry	= VOLL_GR_VIN
Volatility of Value added of Whole sale and retail	= VOLT_GR_VWH

Results and Results Discussion

Graphical Analysis

- ☞ Initially Graph of volatility of all the variables has been drawn to check the patrons of volatility
- ☞ Overall view of the Volatility in Income and its determinants based on 4-quarter moving standard deviation
- ☞ Overall view of Volatility of Volatility in Income and its determinants based on 8-quarter moving standard deviations

Volatility in income and its determinants (Based on 4-Quarter moving standard deviation)

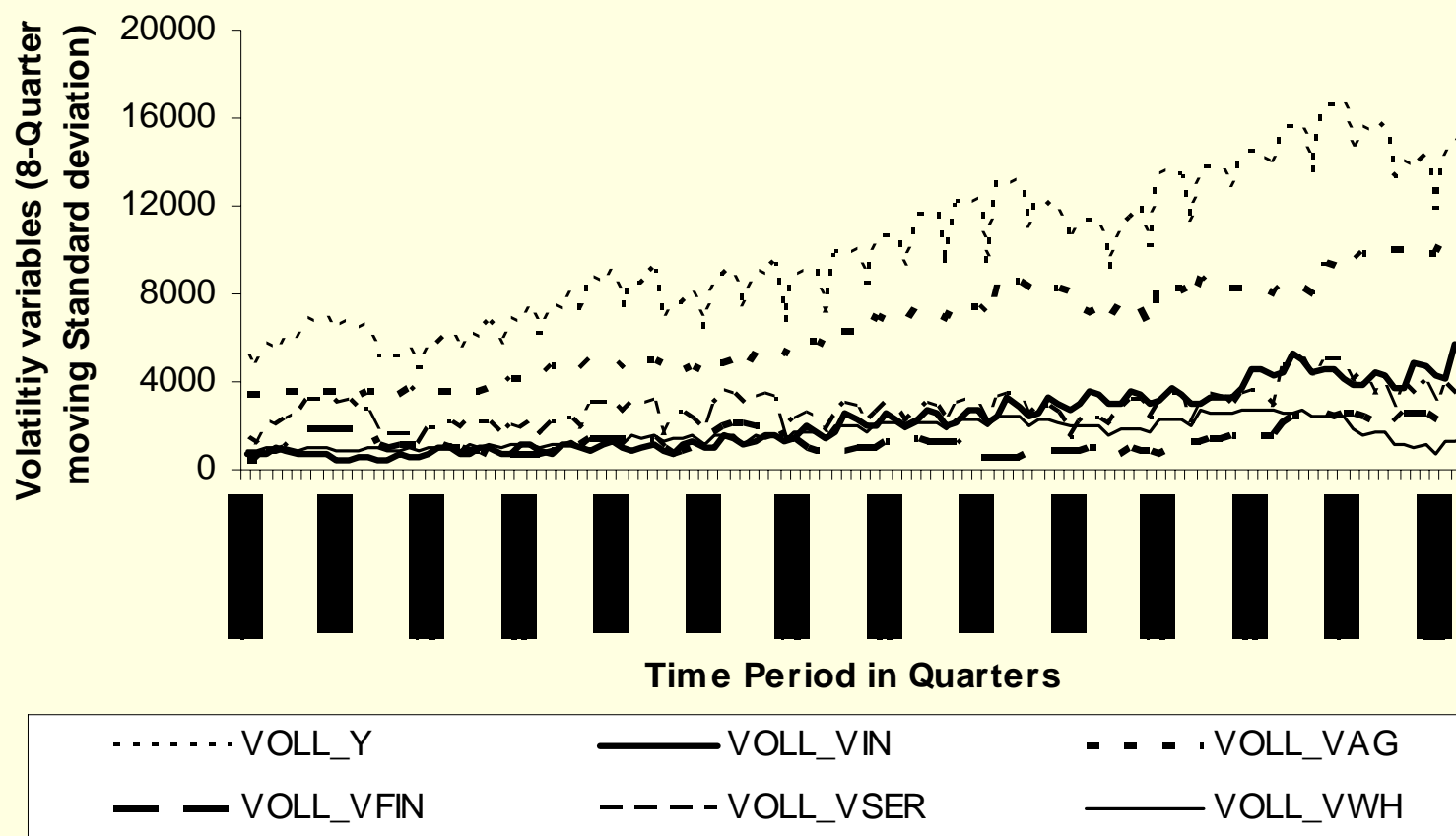


..... VOLL_Y	———— VOLL_VIN	- . - . VOLL_VAG
———— VOLL_VFIN	----- VOLL_VSER	———— VOLL_VWH

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Volatility in income and its determinants (Based on 8-Quarter moving standard)



Results and Results Discussion

- ◆ Augmented Dickey Fuller Test has been applied to check the level of integration.
- ◆ Dickey Fuller test for Unit root

Results and Results Discussion

Major findings of the ADF test

- ☞ Most the variables in their simple form are integrated of order one that is $I(1)$
- ☞ All the variables in their growth rate form are integrated of order zero that is $I(0)$
- ☞ Volatility of growth rate of all variables are integrated of order zero that is $I(0)$
- ☞ As all the variables are integrated of order zero so according to Angel-Granger approach if any of the variables are integrated of order zero then co-integration do not exist.
- ☞ This indicate that there is no long run relationship between volatility of growth rate of output and volatility of growth rates of value added of other sectors, all there exist is the short run relationship.

Results and Results Discussion

- ◆ Regression analysis is used to check the impact of sectoral volatilities on the volatility of output and impact of volatility of sectoral growth rate on the volatility of growth rate of output.
- ◆ Regression Results

Results and Results Discussion

Major findings of the Regression Analysis

- ✎ Volatility of growth rate of selected sectors have significant impact on the volatility of growth rate of the income when regressed combined or separately.
- ✎ Similar results were observed in case of volatility variables obtained through moving standard deviations except of volatility of finance and insurance.
- ✎ Volatility of finance and insurance obtained through moving standard deviation has significant impact on the volatility of output when regressed separately while indicate negative but insignificant impact on the volatility of output when combined with other variables in regression.

Results and Results Discussion

Major findings of the Regression Analysis

- ∞ In magnitude form volatility of growth rate value added of services contribute highest and volatility of growth rate of value added of finance and insurance contribute lowest to volatility of growth rate of output when regressed separately or combined with other variables.
- ∞ volatility of value added of whole sale and retail contribute highest volatility of value added of agriculture contribute lowest to the volatility of output when regressed separately. When combined with other variables indicate that volatility of value added of services contributes highest and volatility of value added of industry contributes lowest to the volatility of output.

Results and Results Discussion

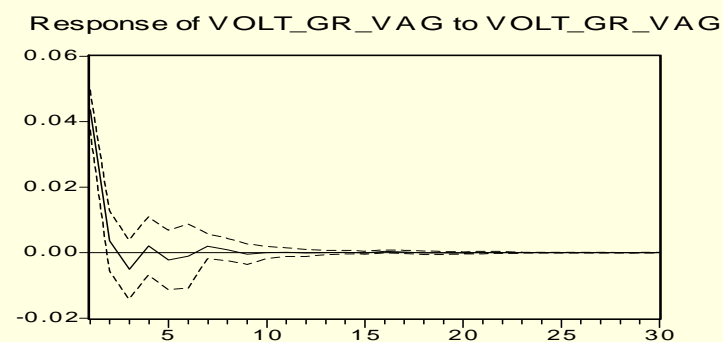
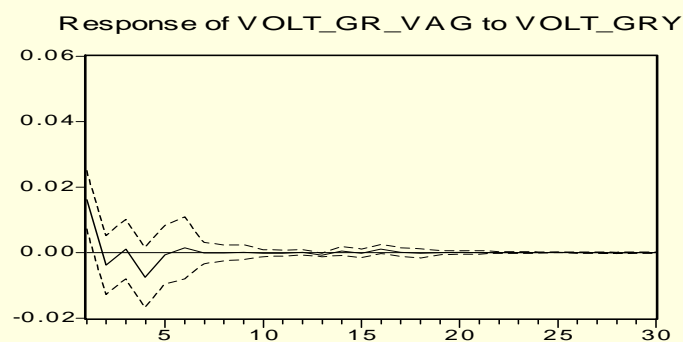
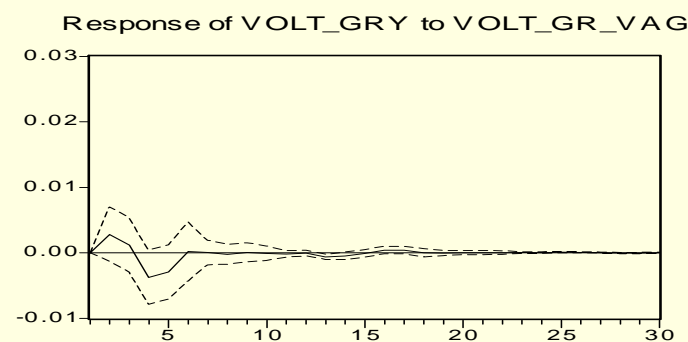
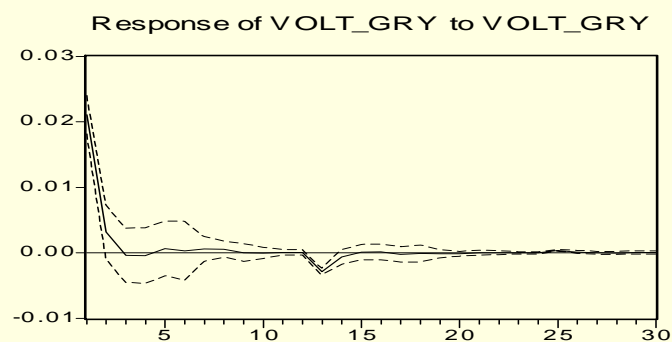
Major findings of the Regression Analysis

- ⌘ A dummy variable is used to check the impact of political stability on the volatility of output in growth and level form. Value of dummy variable is one for the periods of election campaign (one quarter before, during and after the government change) and zero otherwise.
- ⌘ political instability has insignificant effect on the volatility of output in growth and level forms.

Results and Results Discussion

Impulse response Functions

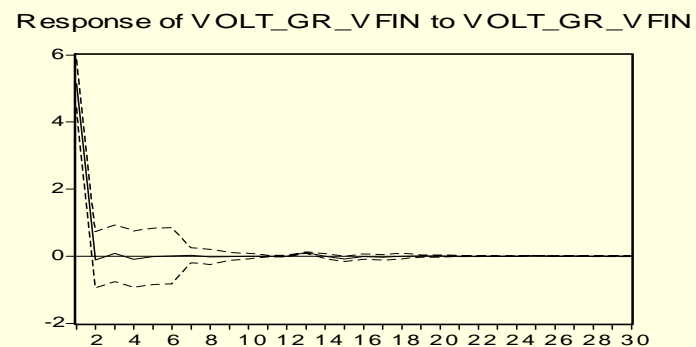
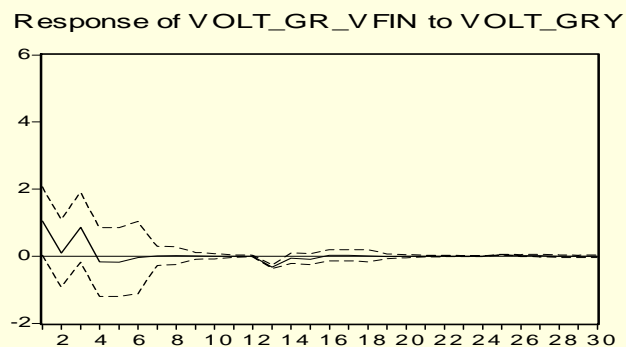
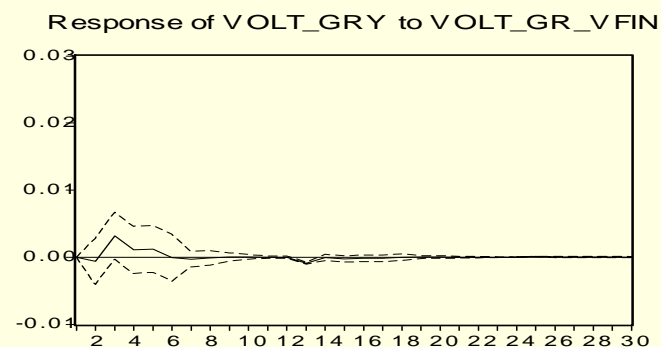
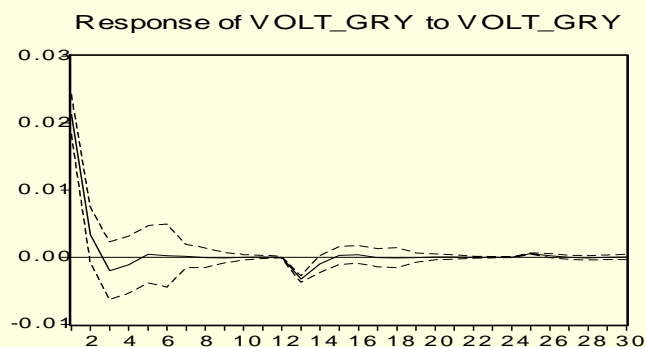
Response to One S.D. Innovations ± 2 S.E.



Results and Results Discussion

Impulse response Functions

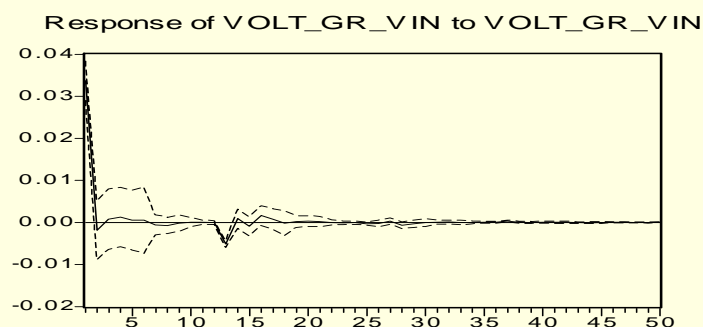
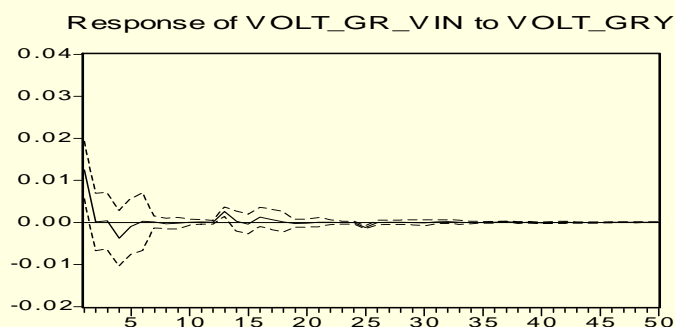
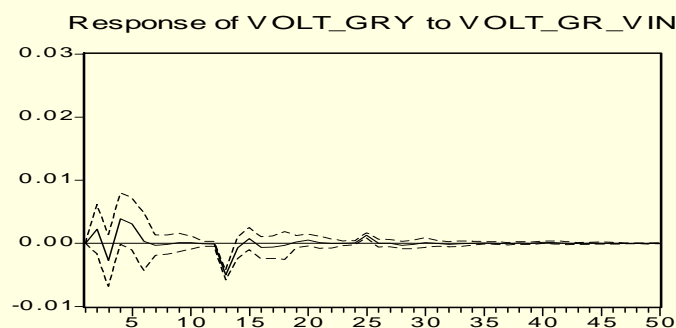
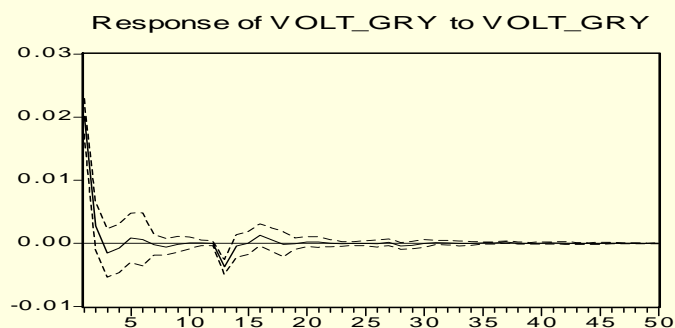
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Results and Results Discussion

Impulse response Functions

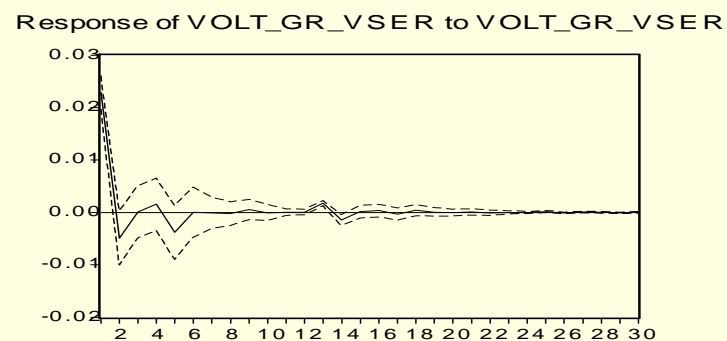
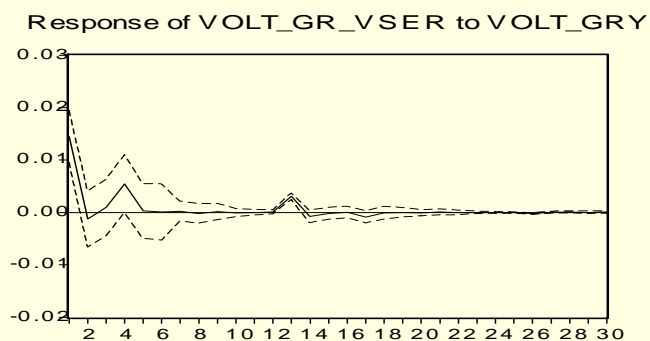
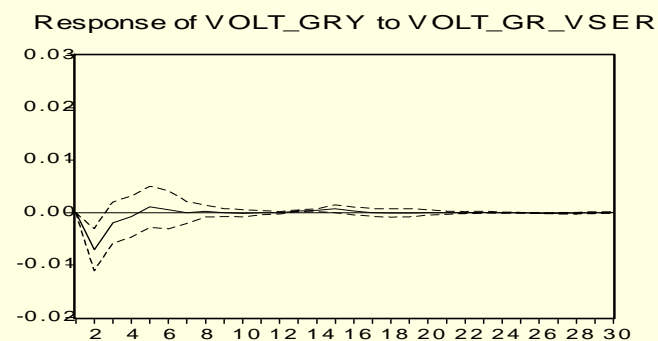
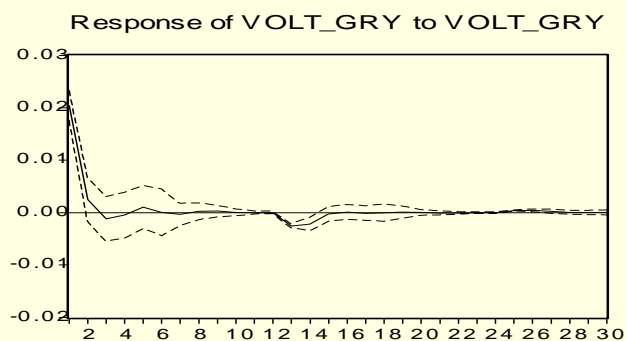
Response to One S.D. Innovations ± 2 S.E.



Results and Results Discussion

Impulse response Functions

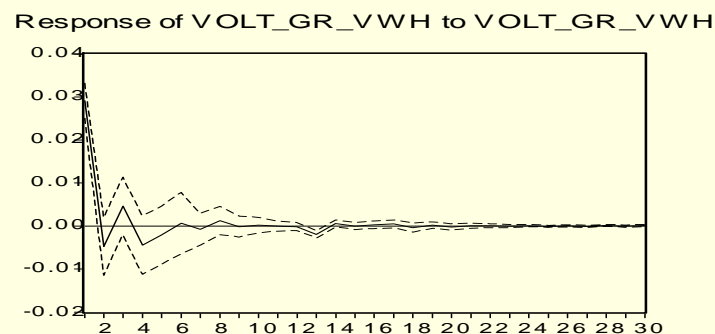
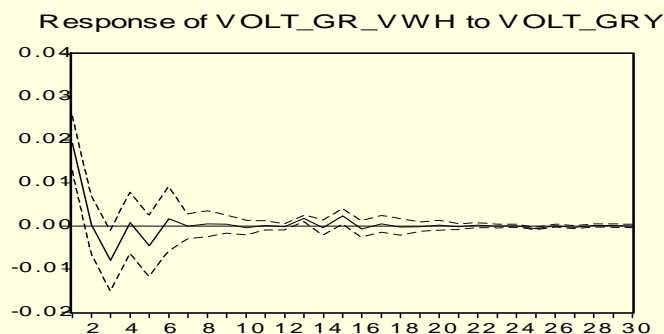
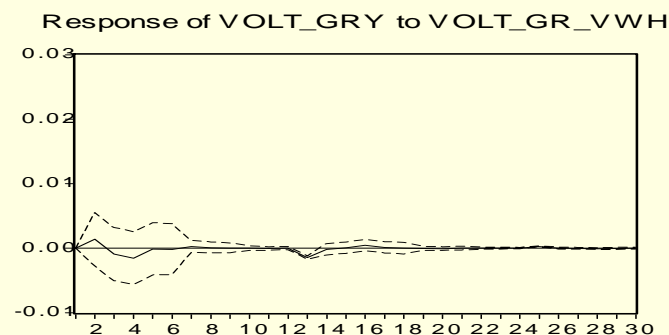
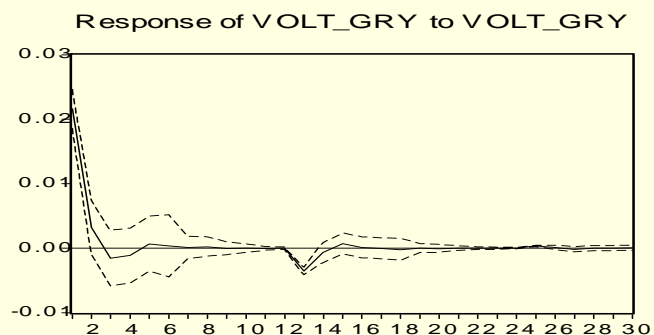
Response to One S.D. Innovations ± 2 S.E.



Results and Results Discussion

Impulse response Functions

Response to One S.D. Innovations ± 2 S.E.



Conclusion

- ◆ Results indicate that volatility of non of the sectors has long term impact on the volatility of growth rate of output.
- ◆ Volatility of growth rate of selected sectors have significant impact on the volatility of growth rate of the income in short run.
- ◆ Volatility of finance and insurance has insignificant impact on volatility of output when regressed after combined with other variables

Recommendations

- ◆ In Pakistan most of the policies are based on short run whereas it requires the introduction of a long term planning and expenditure framework for Pakistan
- ◆ Appropriate policy and institutional framework based on transparent process involving all the legitimate stakeholders, clear strategy and integrated program of action.
- ◆ The National Economic Council has a central role to play in this task.
- ◆ Need to rethink and restructure fiscal federation in Pakistan
- ◆ Need to estimate the detail impact of political stability on the volatility of growth rates.



THANK YOU