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Nexus between Financial Development and Investment in Pakistan: A Vector Auto-regressive Model Approach

Author(s)
Arslan Khalid[1]

Affiliations
[1]Federal Urdu University of Arts, Science and Technology Islamabad, Pakistan.

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Arslan Khalid[1]

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Abstract

This study has been conducted to analyze the impacts of Financial Development on Investment in Pakistan. The objectives of this study are to generate Financial Development Index for Pakistan and to analyze the impact of Financial Development on Investment along with key explanatory variables. The time period for this study is from 1975 to 2011. An index has been constructed for exact measurement of financial development by using five main indicators, and for calculation of financial development index weighted average method has been used. In our investment's model VAR model has been for results because of different order of integration and no proves of cointegration in our data, we have also applied the causality test on our model. It has been observed by the causality test that during the period of our study financial development cause investment and investment causes financial development. By the help of impulse response function it has also been observed that the impulse of financial development has decreased the investment in Pakistan and it could be due to a fact that Pakistan is at early stage of financial development and the saved resources are not properly mobilized to investment.

Keywords: financial development, investment, foreign direct investment, principal component analysis, vector autoregressive model, augmented dickey fuller test

JEL Classifications: E22, E44, G21

[1]Department of Economics, Federal Urdu University of Arts, Science and Technology Islamabad, Pakistan.
Email: arslaneconomist89@gmail.com
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1. Introduction

The empirical studies have proved that the financial development is not only a variable, measured by using a proxy, but it is a long process of development of financial systems in a country. It includes development in all types of financial markets. The process of development cannot be truly measured by proxies; the optimal measure for financial development is generating financial development index by using main indicators. The set of indicators must include the credit intermediation, liquidity management and the risk management features of financial system in a country. The five main indicators which have been used in many studies for calculation of the financial development are quantity measures, structural measures, financial measures, range of products and the cost of transactions. (Lynch, 2002)

The development of financial system in a country is the most important factor for stimulating economic growth and it will affect the economic variables as well. Financial development can significantly affect the velocity of money on which the money supply level in a country depends. Financial development may affect the domestic savings and domestic investment in the country. Interest rate may also change due to the development of financial sector. The agricultural output, poverty, income inequality and so many other key economic factors depend directly or indirectly and positively or negatively on the development of financial system in the country.

Bagehor (1962) was from those economists who had done the empirical work on the role of financial system; they claimed on the basis of their work that capital markets which were well organized had increased the allocation of resources to investment which were also considered as productive. There are also many other economists; Schumpeter (1943), Hicks (1969) and Goldsmith (1969), who emphasized on the role of banking system of the country and also considered it crucial in encouraging the savings and organizing them towards the productive investment. Hicks (1969) presented his research in context with the industrial revolution in a country and according to him the financial development makes the adoption of new technology and innovation much easier. Goldsmith (1969) found that there is an empirical positive significant relation between the financial development and economic growth.

McKinnon (1973) had given model of financial repression and he said that the repression of financial system in a country reduces both qualitative and quantitative investments in the economy. He argued that lower deposit rate does not encourage the household from holding deposits, which then cannot be used to finance the productive investment. The government policy which is considered as repressive such as the interest rate ceiling, high reserve ratio and credit control, decrease financial development and so do the economic growth and other interrelated variables specially the velocity of money.

Financial development plays a dominant role in setting the prices of financial assets and their returns in country, which further allocates the credit to various production sectors and develops a broader mechanism of financial instruments and intermediaries. The expected role of a developed financial sector is improving the efficiency of financial intermediaries which may raise the savings, investment and stimulates the economic growth.

Investment is the integral factor for the growth of each and every economy, either the investment is made through domestic infrastructure or by foreigners, and it is impossible for an economy of a country to grow sustainably with the low level of domestic and foreign investment. Analyzing the role of investment made clear that an increase in the investment increases the employment and alleviates poverty. But it could only be possible when the level of investment in a country is sustainable and due to this fact it remained a topic of discussion for every economist. It has been 100 years that the economists from various parts of the world are debating that from two available options, the banking system and the stock market system, which one is the best applicable option for the sustainable growth of the economy.

The financial development in a country can remarkably enhance the level of investment banking and stock market system either they are fully developed or not, because the two institutions play an essential role in the mobilization of the resources. There could be an increase in the investment due to financial development because of the fact that when a country financially develops, the saving level regularizes in a way that the saving plays a role of capital generating machines in an economy. The concept of portfolio diversification is only possible in a country when risk on investment decreases due to the

developments in financial sector, so after the diversification of the portfolios the level of investment also increases.

When the data of gross capital formulation is analyzed in Pakistan in comparison with the growth rate of Gross domestic product, it is found that during the fiscal year of 1980-1981 the growth rate of GDP was 6.4% and the growth rate of gross capital formulation or total investment was 9.3%. Then the coming fiscal year 1981-1982 brought some good news for the economy and the growth rate of the GDP was 7.56% and in response to the growth of GDP the growth rate of investment eminently increases and reached the growth of 19.63% with a hundred percent increase as compared to the previous year. Then in fiscal year of 1982-1983 the growth rate of investment decreases from the level of previous year and reaches the level of 9.63%, which is almost half of the growth in investment which we have seen in previous year.

In the decade of 1980s, the growth rate of investment showed a consistent behavior and on average the growth rate of investment was 12% with the standard deviation of 3.64 and the mean was 13.10. Same trends continued and during the decade of 1990, the average growth rate was 12% to 13% but the standard deviation increased to 7.84 as compared to the previous decade. The sustainable level of growth continues till 2003 and after that we have seen a lot of inconsistency in the growth of investment. From 2005 to 2008 the growth of investment was in double digits and then we have seen negative trend in the growth of investment in Pakistan due to so many social, economic and demographic factors. (Chaudhary, 2012)

Our main objectives are;

1. To generate Financial Development Index for using vast set of quantitative variables.
2. To analyze the impact of Financial Development on investment in Pakistan.

The significance of this study is that it investigates and analyzes the impacts of financial development on investment in Pakistan by using an index for the development of financial sector instead of a proxy. Financial development is one of the most important variables that effect the investment and due to this significant factor Financial Development Index for Pakistan has been generated. The generation of

index and broader spectrum of variables for investment function differs this study from other studies conducted on velocity of money, savings and investment. This study is an attempt to analyze how financial development in a country can affect the investment along with other key variables.

2. Literature Review

Khan and Hassan (1998) conducted a study on financial liberalization, saving and economic development in Pakistan. The objective of their study was to analyze that how financial development effected saving and economic development in Pakistan. They have chosen the data from 1959 to 1995 from various sources and then applied cointegration technique on it for the estimation of results. Their study concluded that the data set and the empirical results fully support the McKinnon hypothesis in Pakistan.

Bynoe-Mayers and Craigwell (2002) measured the financial development in Barbados during the time period of 1978-1998. In their study they constructed a comprehensive index for measurement of financial development in Barbados quantitatively. They used qualitative and quantitative data for the construction of financial development index by using a new approach. They found in their study that during the year from 1978 to 1998 the financial sector of Barbados eminently developed and it was due to financial innovations and new financial products in Barbados.

Ndikumene (2005) examined the financial development, financial structure and domestic investment dynamics by choosing a panel of countries. The objective of their study was to examine that either banking system or stock market system is best for stimulating the investment in countries. They also confirmed on the basis of their results that the financial intermediaries eliminated the hurdles and enhanced the investment in reply of the increment in output. They concluded that financial development had no independent effect on investment and also recommended that authorities should decrease the cost of financial intermediaries to facilitate the investment.

Nasir,Khalid and Mahmood (2004) investigated the saving and investment behavior in Pakistan, according to their study there were two key macroeconomic variables which had further some microeconomic foundations and those two variables were saving and

investment. They had chosen the data from 1971-2003 and applied ordinary least square technique. As per their study, savings and investment played a significant role in economic growth, inflation stability and other economic variables. Their study concluded that saving and investment in Pakistan remained unsuccessful in achieving significant and sustainable growth rate during the period chosen for study. It had also been concluded that remittances played a significant role in encouraging the saving and interest rate played a significant role in enhancing the investment in Pakistan.

Dutta and Roy (2001) investigated the impacts of financial development on the domestic investment by using quartile regression approach. In their study they analyzed the role of financial development in enhancing domestic investment in the country. They also found that according to the investment opportunities in country the financial development affects the domestic investment. Their study also concluded that in those countries that had low level of investment must constitute such policies which could enhance the strength of financial system in the country.

Love and Zicchino (2006) analyzed the investment behavior dynamics and financial development by a panel VAR. In their study they used the firm's panel data from 36 countries of the world for the attainment of their objective. For the estimation of results with the help of VAR, they had orthogonalized impulse response function through which the factors had influenced the level of investment. They concluded in their study that financial development is mandatory for improving capital mobility and economic growth.

Chaudary (2012) analyzed the financial liberalization and macroeconomic performance empirically in Pakistan. In their study, they examined the effects of financial liberalization in Pakistan by using a dataset of 1972-2006 by applying bivariate and multivariate analysis. They found that the financial development in a country was positively and significantly related to economic performance in Pakistan. Their study concluded that there was a need to constitute such policies through which the performances of financial sector stabilized by enforcing political stability and good governance.

3. Methodology

Various economists have used various approaches and measures for measuring the financial development index. In our research we are going to use the approach of Bynoe-Mayers and Craig well (2002) with relevant changes especially in context with Pakistan.

This study focused on four indicators, mainly used for determining the level of financial development in the country and the indicators are;

- Quantity Measures
- Structural Measures
- Financial Prices
- Product Ranges

Each of the indicators further based on quantitative variables from the financial system of the country. We are going to generate an index based on the above mentioned indicators and variables. For calculation of index we will take weighted average of all the variables in each year.

For the calculation of index we converted the quantitative data into ranks 0 – 100, rank zero shows nil financial development and 100 shows extremely high financial development. The approach of Bynoe-Mayer and Craigwell (2002) will be used for the conversion of quantitative data into ranks and the following formula will be used;

$$d_j = \left(\frac{(k_j - \min)}{(\max - \min)}\right) * 100 \quad (1)$$

where;

d_j= Measurement of attribute j (quantitative variable of each indicator e.g narrow money).
k_j= The value of attribute j in an specific year (e.g volume of narrow money in 1997).
min = Minimum value in whole series of attribute j (e.g initial value of narrow money).
max = Maximum value of attribute j.

For the financial development index the quantitative variables where chosen by following the approach of Lynch (1996) with some relevant changes in context of Pakistan. After the conversion of each quantitative variable of each indicator into rank by following the above

approach, we will then multiply the rank of each variable of every indicator with its weight and will take the average for measuring the index. We are going to use principal component analysis to assign weights to each of the quantitative variable in each indicator. The principal component analysis uses correlation among the variables and assigns weights on the basis of correlation among them.

Among the researches which have been conducted empirical relationship between financial development and investment, Becker and Sivadesan (2006) have analyzed financial development and investment cash flows, likewise Chaudhary (2012), Dutta and Roy (2001), and many other economists analyzed the relationship between financial development and investment. We have emphasized on financial development in our thesis, explained for so many times in our study that financial development in a country is the integral factor which influences real economic variables like investment, saving, interest rate and others. In our thesis we are going to follow the approach of Chaudhary (2012) with some relevant changes as per the requirement of our study.

$$Inv = f (FD, i, DC, TO, FDI)$$

$$Inv_t = \gamma_0 + \gamma_1 FD_t + \gamma_2 i_t + \gamma_3 DC_t + \gamma_4 TO_t + \gamma_5 FDI_t + \delta_t \qquad (4)$$

where;

Inv = Investment.
FD = Financial Development Index.
i = Interest Rate.
DC = Domestic Credit to private sector.
TO = Trade Openness.
FDI = Foreign Direct Investment.

This study has used annual time series data of all the above variables from 1975 to 2011. Financial development has been captured by financial development index and remaining data from following sources;

- Hand Book of Statistics on Pakistan Economy
- International Financial Statistics
- World Development Indicators

4. Results

This study used following variables for the calculation of index;

- Broad Money
- Narrow Money
- GDP per capita
- Credit to private sector
- Ratio of broad money to narrow money
- Interest rates
- Exchange rates
- National saving schemes
- Bank branches per population

The generated financial development index is given in table 4.1;

Table 4.1: Financial Development Index of Pakistan

Year	Index	Year	Index
1975	20.82047431	1994	36.50053537
1976	15.77860652	1995	41.11276797
1977	21.46026084	1996	46.64627834
1978	20.23562861	1997	46.61805164
1979	20.62020326	1998	45.81849074
1980	21.52657516	1999	43.51801908
1981	24.27544656	2000	43.57022927
1982	23.47220608	2001	44.8487622
1983	25.24333754	2002	42.28772004
1984	24.62995444	2003	40.86890296
1985	26.08518125	2004	47.82659993
1986	24.98525168	2005	49.71293023
1987	24.00261512	2006	53.98622211
1988	25.4095997	2007	59.55782876
1989	22.54164643	2008	71.7934415
1990	24.05667047	2009	63.47658593
1991	25.09236107	2010	67.56855834
1992	27.83133685	2011	66.91399658
1993	36.70302043		

In this model, the estimation have been started with augmented dickey fuller test in order to check the stationarity of our time series data. The results of ADF are given in table 4.2.

Table 4.2: ADF Unit Root Test

Variable	Order of Integration	Critical Value	T-Stats
Inv	Level	-2.6307	-3.2552
	1st Difference		
FD	Level	-3.5577	-3.6412
	1st Difference		
I	Level	-3.5806	-4.077
	1st Difference		
TO	Level		
	1st Difference	-1.9506	-5.9554
DC	Level		
	1st Difference	-1.9506	-4.8581
FDI	Level	-3.5683	-5.9344
	1st Difference		

The estimated results of ADF test have shown that there is order of integration I(0) and I(1). We have tried to apply ARDL Model for the estimated coefficient and opted first step of using bound testing approach. The value of f-stats calculated by Wald test was 3.21 which show that the value is in inconclusive zone but we continued our technique to find out co integration among our series. By applying ARDL and estimating error correction result we found that there is no co integration as the value of ECM coefficient is insignificant. So we stopped applying ARDL model further. Due to the above mentioned reason we have decided to use vector auto regression on our model for empirical results. Before apply VAR we have applied Granger causality test to determine the cause and effect relationship among the set of variables. The causality test has been applied by choosing 1 lag on basis of Schwarz criterion. The results are given in appendix.

The VAR is commonly used for forecasting of interrelated time series data and for analyzing the dynamic impact of random disturbances of variables. The mathematical form of VAR is;

$$y_t = A_1 y_t + ... + A_p y_{t-p} + \beta x_t + \varepsilon_t \quad (8)$$

where y_t is a k vector of endogenous variable x_t meanwhile "A"s are the matrices coefficient and ε_t is vector innovation.

The vector autoregressive from of our model of investment with one lag value based on schwarz criterion is as follows;

$$Inv_t = a_{11}Inv_{t-1} + a_{12}FD_{t-1} + a_{13}i_{t-1} + a_{14}TO_{t-1} + a_{15}DC_{t-1} + a_{16}FDI_{t-1}$$
$$FD_t = a_{21}Inv_{t-1} + a_{22}FD_{t-1} + a_{23}i_{t-1} + a_{24}TO_{t-1} + a_{25}DC_{t-1} + a_{26}FDI_{t-1}$$
$$i_t = a_{31}Inv_{t-1} + a_{32}FD_{t-1} + a_{33}i_{t-1} + a_{34}TO_{t-1} + a_{35}DC_{t-1} + a_{36}FDI_{t-1}$$
$$To_t = a_{41}Inv_{t-1} + a_{42}FD_{t-1} + a_{43}i_{t-1} + a_{44}TO_{t-1} + a_{45}DC_{t-1} + a_{46}FDI_{t-1}$$
$$DC_t = a_{51}Inv_{t-1} + a_{52}FD_{t-1} + a_{53}i_{t-1} + a_{54}TO_{t-1} + a_{55}DC_{t-1} + a_{56}FDI_{t-1}$$
$$FDI_t = a_{61}Inv_{t-1} + a_{62}FD_{t-1} + a_{63}i_{t-1} + a_{64}TO_{t-1} + a_{65}DC_{t-1} + a_{66}FDI_{t-1}$$

For the estimation we have applied unrestricted VAR on E views with the 1 lag interval based on the Schwarz criterion. In empirical application, VAR has been used to generate impulse response analysis and variance decomposition.

In figure 1A, due to shock of the investment, the stock of investment has shown decline and it continued till 11th period. In 11th period, investment absorbs its own shock and moved toward convergence.

In figure 1B, investment responded to a shock of financial development negatively and with a shock of financial development the investment decreases by –1 standard unit till two periods. Investment has taken 9 periods to absorb the shock of financial development and moved toward convergence. It has also been explained that role of financial development in economy is very much essential, it also mobilizes savings to investment but as it has been shown in impulse response that financial development reduced investment, it means that during 2 periods, due to financial development resources do not mobilize from savings to investment and as per literature it has also been seen that at early stage financial development has decreased the investment in country.

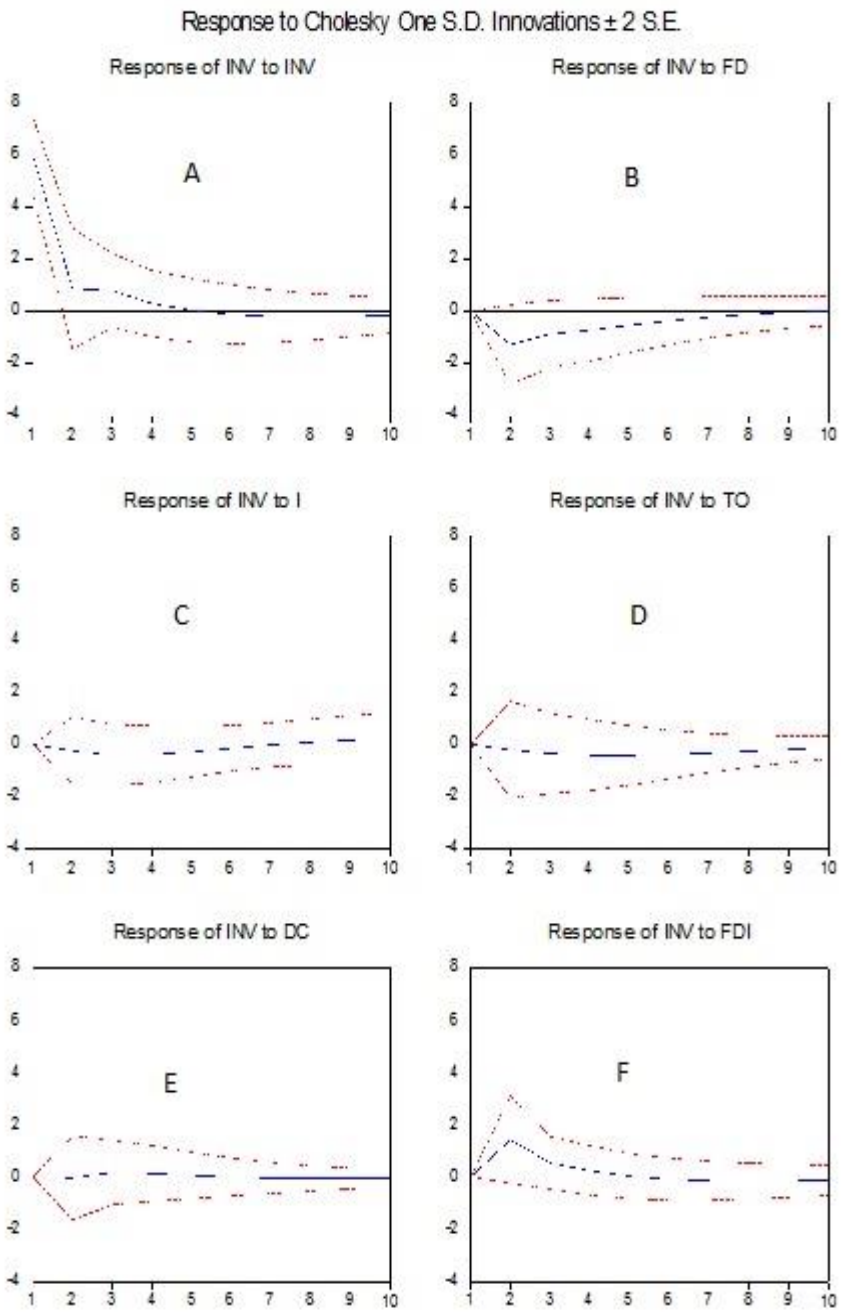

Figure 1: Response of Investment to Impulses

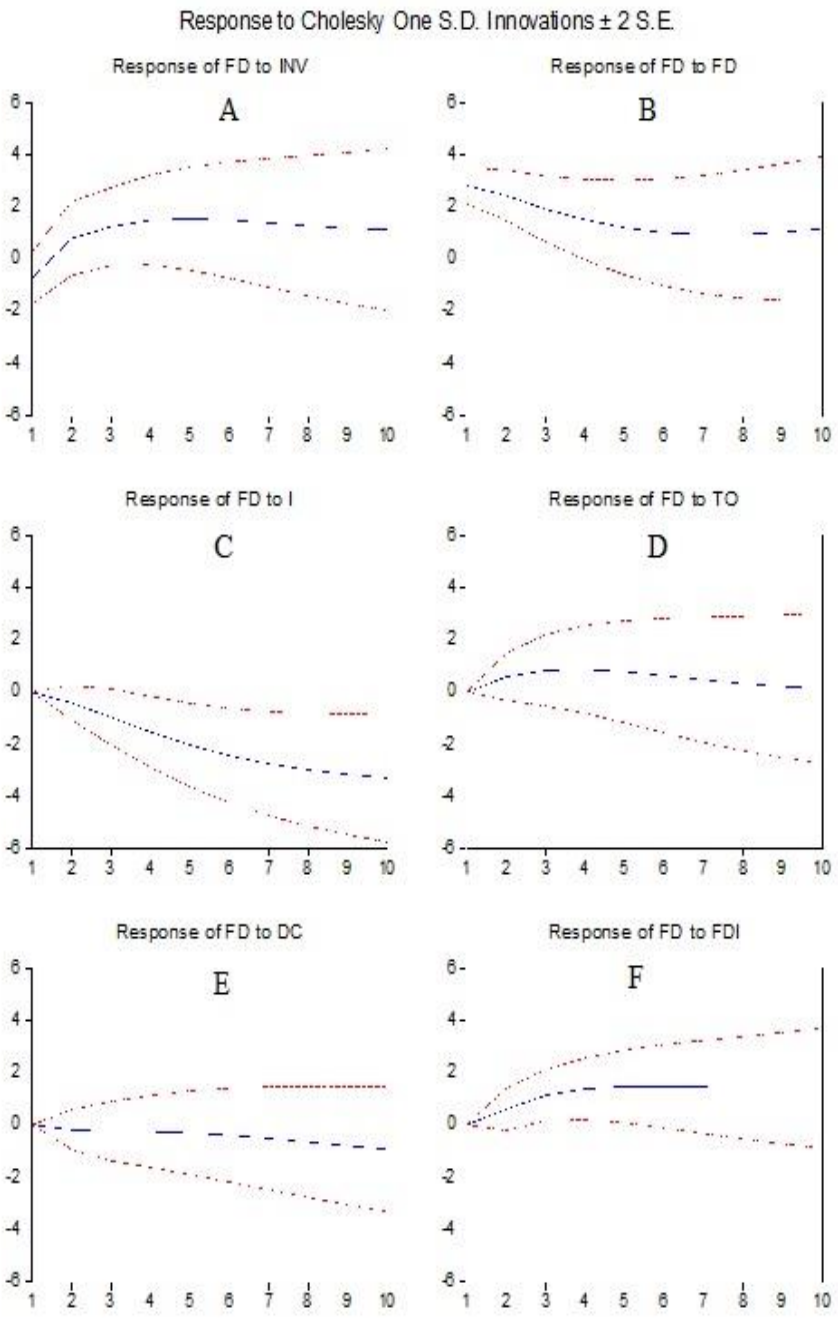

Figure 2: Response of Financial Development to Impulses

In figure 1C, investment has shown fluctuating response towards the shock of interest rate, interest rate has decreased investment by less then -1 standard units till 8th period and after 8th period the negative response of the shock has been absorbed by investment. After 8th period investment has shown slight positive response due to a shock of interest rate and after two period's investment has stabilized but divergence has been found. This may depend upon the income and substitution effect of interest rate, when income effect out weights the substitution effect then interest may have positive impact on investment and vice versa.

In figure 1D, investment has responded negatively to a shock of trade openness and has shown a decline of less than -1 standard unit due to the shock. Impact of shock continues till 12th period and after that the shock has been completely absorbed and investment has shown convergence. This is due to a fact that with trade openness, restriction on imports and exports decreases. In this situation, the level of imports rises more than exports, the amount which should be invested to enhance export, shifted to imports of good.

In figure 1E, investment has shown a positive response towards the shock of domestic credit as expected. After the shock, investment has increased and this shock has been absorbed in 6th period. It has also been expected that due to domestic credit the investment increases because due to domestic credit the shortage of capital reduces for those investors who are willing and ready to invest.

In figure 1F, investment has responded to a shock of foreign direct investment positively. It takes 10 periods by investment to completely absorb the shock of FDI and after that it has shown convergence. This could be due to a fact that with FDI the growth of economy fastens which lead to increase in per capita income and the well-being of people also enhances the circulation of capital which also increases domestic investment. Another fact behind this positive response is that due to inflow of FDI the domestic small businessman is also encouraged to invest more and crowding in impact is created while the negative response could be due to political instability and crowding out impact in Pakistan.

In figure 2A, financial development has shown significant positive response towards a shock of the investment. It has also been observed that financial development is not able to absorb the shock and

it has shown divergence. Investment has positive significant impact on the growth of economy and from this channel the determinants of financial development also rise so do the development of financial sector.

In figure 2B, financial development responded to its own shock negatively and after 10th period financial development absorbs its own shock. Though the shock has been absorbed in 10th period but financial development has not converged back rather it has shown an obvious divergence which means that in later periods financial development may fluctuate again due to shock either positively or negatively.

In figure 2C, financial development responded negatively to the shock of interest rate, soon after the shock the financial development has shown an eminent decline and it is not in position to absorb the shock and likewise previous two shocks this shock also diverged the financial development. This negative response is due to a fact that most of indicators of financial development are theoretically having negative relation with the interest rate and this might be a fact behind the decline in financial development.

In figure 2D, financial development has responded positively to shock of trade openness and due to a shock the financial development has shown clear rise till 4th period. After the 10th period the financial development moved to a position at which it has absorbed the shock. But at this point financial development has not shown any convergence rather it has shown divergence which means that the shock may affect financial development in later periods.

In figure 2E, financial development has shown negative response to the shock of domestic credit in 2nd period and has a slight and continuous decline due to this shock. Financial development has not been able to absorb this shock and it has shown the divergence.

In figure 2F, financial development has shown a positive response towards the shock of foreign direct investment and it tends to rise. This shock has not been absorbed by financial development and we have seen clear divergence here. The reason is same as in the case of investment because foreign direct investment possibly has positive impacts on most of indicators of financial development.

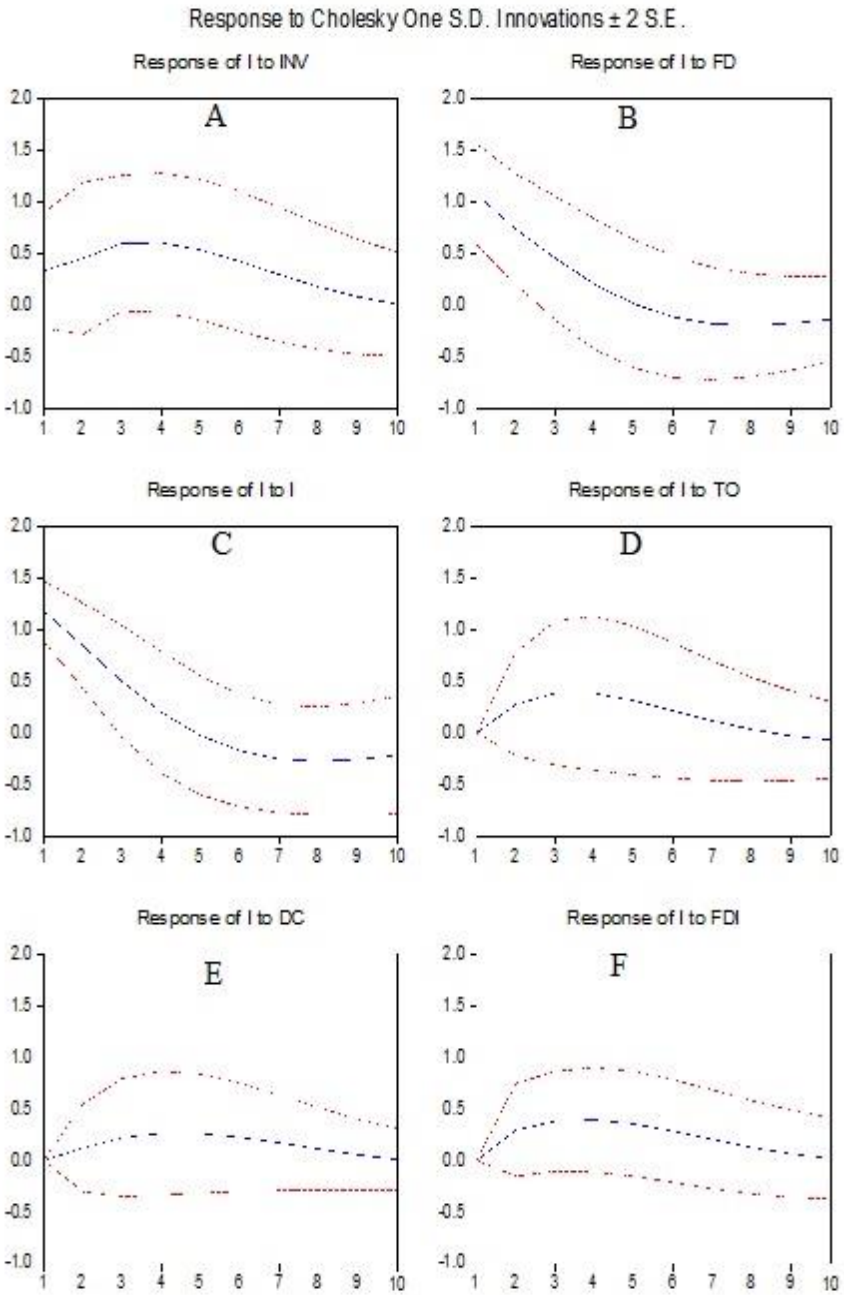

Figure 3: Response of Interest Rate to Impulses

In figure 3A, Interest rate has shown positive response towards the shock of investment for 3 periods and after 3rd period it starts to decline and continues till 10th period and at 10th period the shock has been absorbed by interest rate completely and it has also moved towards convergence. In figure 3B, Interest rate has responded to the shock of financial development negatively. The decline in interest rate due to shock has been started from 1 standard unit on graph and continues till it reaches near to -0.25 standard units on graph in 10th period. Interest rate has taken more than 10 periods to absorb the shock of financial development and it has also shown convergence.

In figure 3C, Interest rate has responded negatively to its own shock, the decline has started from 1.2 standard units and it continued till it reaches -0.25 standard unit in 10th period. After 10th period the speed of decline slows down but the shock has not been absorbed and interest rate has also shown divergence due to its own shock. In figure 3D, Interest rate has shown fluctuating behavior toward the shock of trade openness. Initially due to the shock interest rate has shown a clear rise which continued till 5th period and after that it started declining and till 10th period it moves near to -0.2 standard units on the graph. Till 10th period interest rate was not able to absorb the shock of trade openness but it has shown convergence which means the shock will completely be absorbed in later periods.

In figure 3E, Interest rate has shown positive response towards the shock of domestic credit. It tend to rise due to the shock till 5th period and after that the impact of shock has decreased and interest rate has started absorbing the shock, in 10th period the shock has been absorbed completely and interest rate has also shown convergence. In figure 3F Interest rate has also shown a positive response towards the shock of foreign direct investment. Due to shock, the interest rate rises till 4th period and starts absorbing the shock in later periods. By the 10th period, the shock has been absorbed completely by interest rate which has also shown convergence.

In figure 4A, Trade openness has shown a negative behavior towards the shock of investment. Initially it declines due to the shock and this decline in trade openness takes it below the zero standard line. Trade openness has not been able to absorb the shock in 10 periods but as it has shown convergence it is expected that trade openness will absorb the shock completely in later periods.

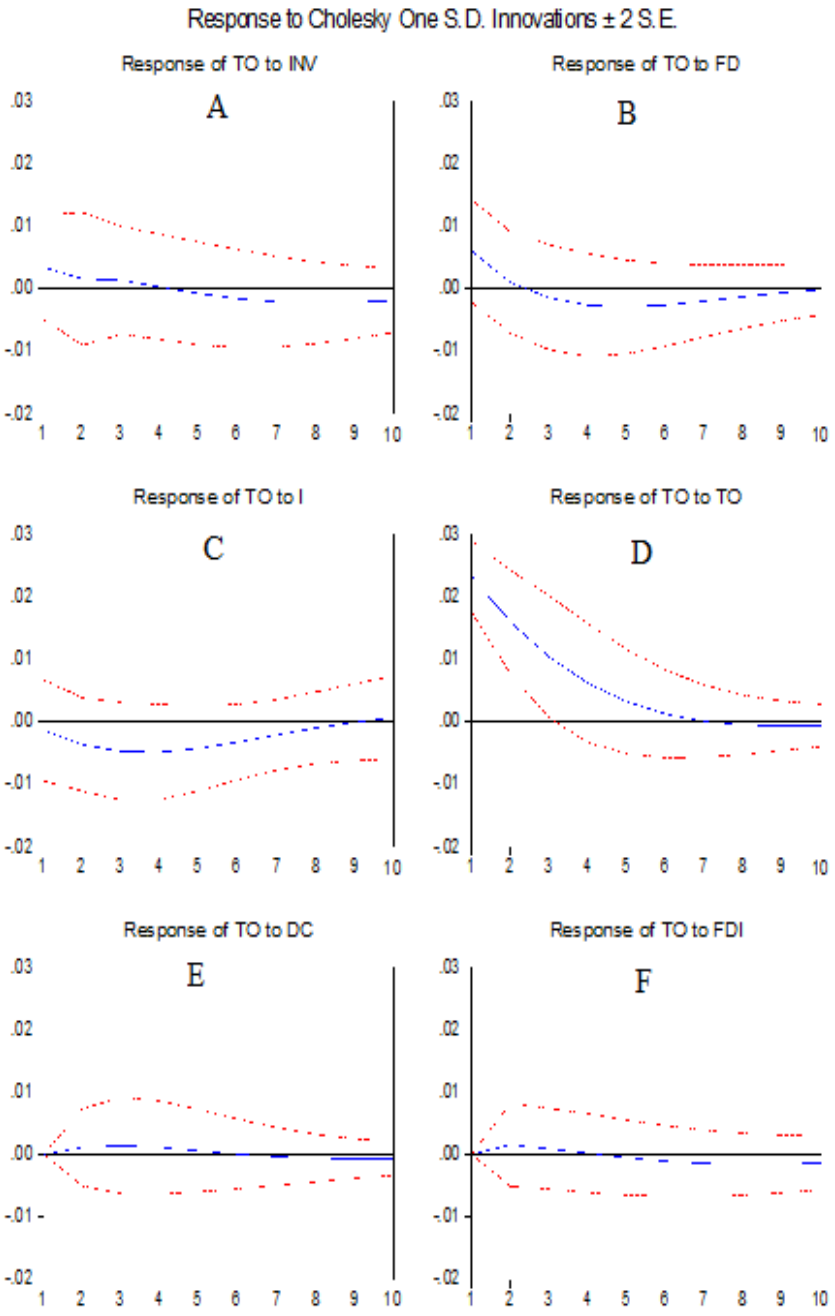

Figure 4: Response of Trade Openness to Impulses

In figure 4B, Trade openness has shown negative response towards the shock of financial development and it continued till negative standard units in graph. Trade openness has absorbed the shock completely in 10th period and converged. Trade openness has been negatively affected by its own shock, the shock has been absorbed in 10th period by trade openness and the convergence has also been shown.

In figure 4C. Trade openness has shown fluctuating behavior towards the shock of interest rate. Initially trade openness has shown a decline due to the shock and in 5th period it starts increasing and intersects the origin line in graph in 9th period and continued the increasing trend. The upward movement of trade openness is due to a fact that trade openness has shown divergence which means that initially trade openness declines due to shock of interest rate and then it has shown a rise and might show fluctuating behavior again in later periods.

In figure 4D, Trade openness has been negatively affected by its own shock, the shock has been absorbed in 10th period by trade openness and the convergence has also been shown. In figure 4E, Trade openness has shown relatively smaller but fluctuating behavior towards the shock of domestic credit. It has shown positive response to the shock till 6th period and after that we have seen decline in trade openness. The shock has been absorbed completely in 12th period and convergence has also been found.

In figure 4F, Likewise the shock of domestic credit, trade openness has shown fluctuating behavior towards the shock of foreign direct investment. Initially the shock has increased the trade openness and after 4th period trade openness has shown a decline due to the shock. The shock has been absorbed in 12th period and convergence has also been shown in graph. Again trade openness has shown a fluctuating behavior towards the shock of foreign direct investment. Initially it tend to increase due to the impact of shock but this impact remains only for 4 periods, after that trade openness has started showing a declining trend due to the shock and crossed the origin line. The shock has been absorbed by trade openness in 12th period and convergence has also shown.

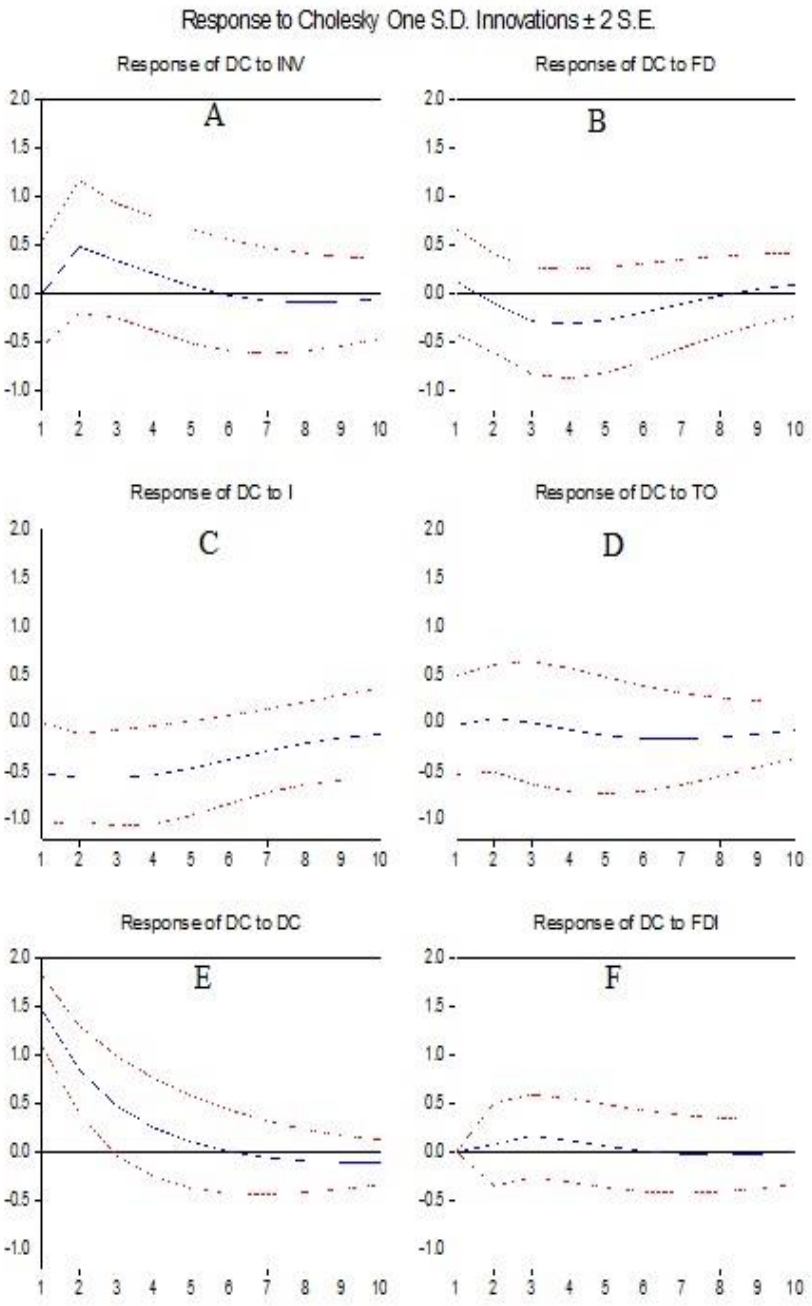

Figure 5: Response of Domestic Credit to Impulses

In figure 5A, Domestic credit has shown fluctuating behavior towards the shock of investment. Due to initial shock it has shown an increase, it continued till 3rd period only and after that domestic credit declines by reaching the negative standard unit on the graph. The shock has been completely absorbed in 10th period and the convergence has also been observed.

In figure 5B, Domestic credit again fluctuates due to a shock of financial development. Initially the credit started declining due to the shock till the 5th period and soon after that, the 5th period domestic credit started rising and this rise continued till 10th period and during these periods the shock has not been absorbed but as convergence has been observed it could be expected that the shock will be absorbed in later periods.

In figure 5C, Due to the shock of interest rate domestic credit has shown a very slight decrease which has been started from -0.5 standard units but the negative response was just for 3 periods and after that it has started increasing due to the shock.

In figure 5D, A slight fluctuating behavior has been observed due to a shock of trade openness. A slight increase has been observed due to shock which continued for a single period and after that decline in domestic credit has been observed due to the shock. The convergence has also been observed and on basis of convergence we concluded that the shock would be absorbed completely in later periods.

In figure 5E, likewise other variable, domestic credit, has faced a decline due to its own shock. Domestic credit has stabilized in 9th period and convergence has also been observed.

In figure 5F, Domestic credit has shown a positive response towards the shock of foreign direct investment. The increase continued till 4th period and after that domestic credit has started absorbing the shock and convergence has also been observed.

In figure 6A, Due to the shock of investment, foreign direct investment has increased for just two periods and after that the decline has been observed due to the shock and in 9th period it stabilizes. Though the shock is not eminently absorbed and sign of divergence has also been found.

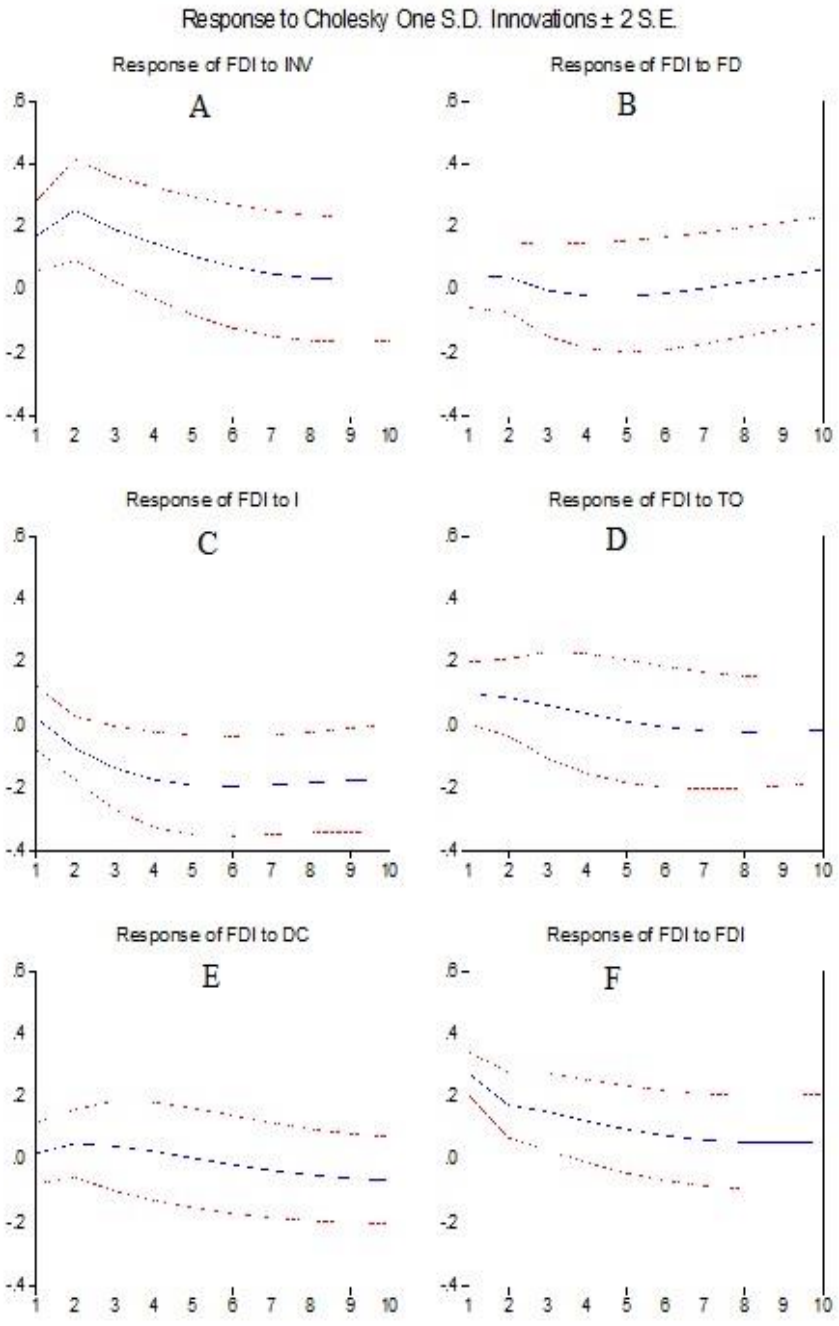

Figure 6: Response of Foreign Direct Investment to Shocks

In figure 6B, Fluctuating behavior has been observed in foreign direct investment due to the shock of financial development. Initially FDI decreases due to financial development and after 7th period FDI started to respond the shock positively and it rises. Though the shock has not been absorbed but the signs of convergence are slightly visible in graph so we could expect that the shock would be absorbed completely.

In figure 6C, Due to the shock of interest rate a decline in foreign direct investment has been observed and it continued. The divergence has also been found and shock has not completely absorbed by FDI.

In figure 6D,E and F, Due to the shocks of trade openness, domestic credit and FDI itself, FDI has shown the decline, neither the shocks have not been absorbed and nor the convergence has been observed.

4.1. Variance Decomposition

4.1.1. Investment

The second application of VAR is the decomposition of variances of variables. As per the Cholesky decomposition of the variance of investment it has been found that investment has 100% share in decomposition of its variance in 1st period. Meanwhile FDI, Financial Development and Trade openness are three variables which have major share in decomposition of the variance of investment with the major percentages of 18, 16 and 14 respectively.

We have used causality test in our model in order to check the causal relationship among our variables. The table of causality test is given below and the variables showing causality are given in bold letters.

Table 4.3: Granger Causality Results

Pairwise Granger Causality Tests: Lags: 1

Null Hypothesis:	Obs	F-Statistic	p-value
FD does not Granger Cause INV	36	4.3086	**0.0458**
INV does not Granger Cause FD		5.4626	**0.0256**
I does not Granger Cause INV	36	0.9672	0.3332
INV does not Granger Cause I		1.4092	0.2445
TO does not Granger Cause INV	36	0.6177	0.4375
INV does not Granger Cause TO		0.0861	0.7710

Table 4.3: Granger Causality Results

Pairwise Granger Causality Tests: Lags: 1

Null Hypothesis:	Obs	F-Statistic	p-value
DC does not Granger Cause INV	36	0.0708	0.7919
INV does not Granger Cause DC		7.2508	**0.0110**
FDI does not Granger Cause INV	36	1.3605	0.2518
INV does not Granger Cause FDI		2.5961	0.1167
I does not Granger Cause FD	36	0.9361	0.3410
FD does not Granger Cause I		0.4575	0.5040
TO does not Granger Cause FD	36	1.9151	0.1757
FD does not Granger Cause TO		0.1670	0.6855
DC does not Granger Cause FD	36	0.3964	0.5333
FD does not Granger Cause DC		3.7005	0.0631
FDI does not Granger Cause FD	36	4.8580	**0.0346**
FD does not Granger Cause FDI		0.4035	0.5297
TO does not Granger Cause I	36	2.8646	0.1009
I does not Granger Cause TO		1.7533	0.1955
DC does not Granger Cause I	36	2.9312	0.0972
I does not Granger Cause DC		1.3917	0.2474
FDI does not Granger Cause I	36	4.1084	0.0516
I does not Granger Cause FDI		5.2379	**0.0293**
DC does not Granger Cause TO	36	0.7696	0.3867
TO does not Granger Cause DC		0.1273	0.7236
FDI does not Granger Cause TO	36	0.3318	0.5685
TO does not Granger Cause FDI		0.0500	0.8244
FDI does not Granger Cause DC	36	0.2680	0.6081
DC does not Granger Cause FDI		1.1864	0.2839

According to the results of causality test financial development in Pakistan cause investment and investment also cause the financial development. It could be interpreted as financial development stimulates the economic growth which further rise investment. Due to investment demand for bank branches also increase, money supply also increases, GDP per capita rises and many more which are also the factors of financial development. Investment also causes the domestic credit. When investment in country increases it builds the trust of people and encourages small investor to invest.. Foreign direct investment also causes financial development in Pakistan as FDI would have almost some impact as investment on economy due to which the financial sector develops. Interest rate also causes foreign direct investment inflow because if there is a positive relation between saving

and interest rate then with the increase in interest rate, saving rises by decreasing the investment, which further creates crowding out impact in country competition less environment for investor in foreign country.

Conclusions

The first objective of our study was the generation of financial development index which has been successfully achieved. It has also been found that Pakistan is at early stages of financial development and the process is a bit slow. After 2005 Pakistan has shown relative increase in financial development as per the results of financial development.

We have used Granger Causality approach and VAR technique. It has been observed that during the period of 36 years financial development causes investment and investment causes financial development, FDI causes financial development, investment caused domestic credit and interest rate causes the FDI. By the help of impulse response function we have also observed that the impulse of financial development has decreased the investment in Pakistan. It could be due to a fact that Pakistan is at early stage of financial development and the saved resources are not properly mobilized to investment. We have also observed that due to impulse of interest rate, the investment has shown a fluctuating behavior, initially it has decreased the investment and then in longer period it has increased the investment in Pakistan. While the impulses of trade openness has decreased the investment in Pakistan and the impulses of FDI and domestic credit have enhanced the investment in Pakistan. It has also been found that financial development and foreign direct investment have a vital part in decomposition of variance of investment in Pakistan.

5. Implications

On basis of our causality test result we can suggest that in case of Pakistan financial development may increase the investment in country. Financial development can be used as a tool to enhance the investment which can further stimulate the performance of economy. There could be a situation in which the effect of financial development may not enhance the investment in country and this situation would be due to early stages of financial development. Along with that the domestic credit has also been observed as second important tool to enhance the investment in country and by creating easy mechanism for provision of domestic credit could enhance the level of investment in country. On

the basis of our result, we suggest that the policy makers may consider financial development and domestic credit as strong tool for enhancing the level of investment and for rapid growth in economy.

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