The Effectiveness of External Debt: An Empirical Analysis of Pakistan Economy

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Abstract

This paper empirically examines the impact of external debt on socio economic development in Pakistan. Pakistan has been accruing external debt over the last many years considered being one of the potential threats to curb the issues and challenges of poor masses around. This research applies the time series data ranging from 1981 to 2017. Johansen co-integration method is applied to discover the long run association among economic growth, money supply, poverty, external debt and population growth in two different models and results show one cointegrating equation in both models. Vector Error Correction Model (VECM) is used to analyze the speed of adjustment when economy faces any disequilibrium in short run. VECM indicates 31% speed of adjustment for economic growth model and 29% for poverty model. The Variance decomposition analysis and Impulse response function reveal that economy has witnessed debt-led-economic growth whereas on the other side it also results rise in poverty in Pakistan.

*Keywo*rds: Economic growth, external debt, poverty, money supply, population growth

Introduction

The main premise of the classical economist is that foreign borrowing assists the economy to foster the economic development. The classical economists consider its role the most foremost and significant for the developing countries provided that it is deployed in lucrative economic activities (Sheikh *et al.,* 2015). After the World War II, increasing trend towards external borrowing was observed in both reconstruction and development as well. The double edge findings of the empirical studies regarding external debt can be split into two versions; one has more optimistic approach and concludes foreign borrowing functions as a catalyst for the economic development specially in East Asian Countries whereas the other stream of economist considers it impediment rather it worsens the economic situation of the some countries of Africa and Latin America (Ali *et al*., 2013).Since independence Pakistan has been facing social, economic and structural challenges. The major issue for Pakistan since its inception has been the availability and accessibility to the financial resources to cope up with fiscal deficit and balance of payment. To finance the deficit dilemma, Pakistan has been approaching to national, regional and international financial institutions. Pakistan has also been involved in bilateral aid agreements with various countries specially United Sates of America (USA), United Kingdom (UK), China, Germany and others. It is imperative that with the passage of time most part of external debt was financed to Pakistan on the commercial rationale rather humane. Public debt accrued over the longer time and economy experienced growth in interest payments side by side. The external debt is defined as total external debt of a country stems from bilateral and multilateral aid agreements plus external liabilities (Pakistan Economic Survey, 2017).

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Many developing countries have opted external debt to overcome fiscal deficit and expanded their economic activities. The classical theorist's main wisdom behind external debt holds that it leads to an increase in the availability of funds into the country which in turn fills the gaps of infrastructure requirements of the economy, covers the investment gap and encourages the technology in country. In addition to this, external debt assists the economy to witness handsome level of economic growth, improvement in level of employment and increasing trend in the living standard of poor masses (Akram, 2011; Cockroft *et al.*, 1994; Mankiw *et al.*, 1992; Todaro, 1977). The economic fruits of the public debt spray its effects in form of shaping the quality of life of the poor in a country. Mostly, poverty level in a country is connected with the economic growth of an economy. It is generally thought that higher the economic growth leads to mitigation of poverty. In Pakistan, external debt has been reported $55.1 billion in 2016 while total external debt to GDP ratio stood at 29.8% which highlights the alarming condition in term of poverty and in term of less leftover amount to be spent on poor masses (Pakistan Economic Survey, 2016). Accumulated external debt erodes the income of a country which should be spent on the wellbeing of people of a country. External debt carries forward pressure on the economy when not used in a productive way and not amortized well in time. As a result, it gives birth to poverty. External debt and growing population squeeze the resources which could have been used for the better living standards of the population in the country (Ehrlich & Holdren, 1971; Lahariya, 2008; Todaro, 1977). All the developing countries are mustering their energy to cope up with the phenomenon of poverty.

Objective of the Study

The core objective of this paper is to examine the economic and social effectiveness of external debt. The study finds the empirical evidence of the theory constructed in objectives through examining the proposition whether external debt hinders improving the economic growth and living standards of poor or it leaves the positive effect in case of Pakistan.

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Literature Review

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External debt deployment and its cost reduce the substantial share of government revenues. Accumulation of external debt and interest payments erode the income share of the government to spend on the poor masses of the country. For the repayment of external debt, economy has to manage the amount by imposing the taxes. Therefore, amortization of foreign debt complemented with the imposition of taxes leave the adverse impact on the living standard of poor masses.

Abdullahi *et al.* (2017) explained that the association of external debt with growth can either be direct or indirect. Direct relationship means when externally generated funds are used for social programs such as education, unemployment benefits, old age security allowance or health. Indirect connection implies investments which results in economic growth where external borrowing is used to fill the domestic resource gap. Due to low rate of savings in most LDCs and in an attempt to stimulate economic growth, developing countries has often relied on external funding to complement the

shortages of domestic resources. Sheikh *et al.* (2015) explored that rise in foreign debt causes financial pressure on the public budget because rising debt servicing cost normally leaves little amount for developmental expenditure for the social sector. Mbah *et al*. (2016) supported the stance based on the results of their studies of Nigerian economy, found the negative impacts of external debt on economic performance.

Loko *et al*. (2003) investigated the issue of indebtedness for poverty in low income countries and concluded that in low income countries there is negative connectivity of external debt with poverty as external debt was not appraised and utilized on the economic rationale. The economists hold different findings regarding external debt and development when discussing its implication in short run and long run. Akram (2011) explored that external debt and development in a panel of developing countries are negatively and significantly associated. Ali *et al*. (2013) examined that burden of external debt dilutes the capacity of country to invest in social sector. They also explored that external debt resulted rise in national income but has not been beneficial to mitigate the poverty.

Saungweme and Mufandaedza (2013) examined the impact of external debt on poverty in Zimbabwe and found that government borrowing by using external channels could not mitigate the poverty from country. It was argued that external debt and debt servicing shift the priority of public policy from expenditures on education and health to retirement of accumulated debt of a country (Fosu, 2007). Pattillo *et al.* (2004) concluded the negative and significant effects of external debt on shaping out good human capital in country. He also mentioned that improper investment in human capital reduces the total factor productivity which further weakens the economic conditions of an economy. Page (2006) highlighted that rise in the national income causes increase in the per capita income which further results reduction in the poverty which is definitely benefiting for the poor masses. Ahmad (2011) described the poor debt management along with policies of creditors are also accountable for the surge in the external debt crisis in Pakistan. He also pointed out that more resources are allocated to development activities when government expenditures are financed through foreign resource flows rather domestic resources.

Economic Growth and Poverty

Some economists argue that traditional measures of economic development do not portray the exact conditions of the poor masses in the society. A country which is experiencing handsome economic growth does not constitute good quality of life of the poor masses (Meier, 1995; Page, 2006; Todaro, 1977). There is need to explore such channels which could measure the transfer of economic fruits to poor masses rather only focusing on the aggregation of macroeconomic indicators. Notwithstanding the above arguments, economic growth role in shaping out the batter life of the poor cannot be refuted. Economic growth assures the growing demand of goods and services strengthens the factor market, and empowerment of consuming and producing unit of economy which further can mitigate the poverty in a country. Therefore, appropriate application of

external debt and economic growth can help in the reduction of poverty in country. For the long term, reduction of poverty necessitates the sustainable economic growth supported by deploying the external resources in long term lucrative projects which yield the high expected rate of return.

Quantifying Poverty

Poverty has been defined in multifarious manners. It generally takes two forms all over the world, absolute poverty and relative poverty. Absolute poverty is defined as people living below the income $1.25 per day or $2.00 with respect to purchasing power parity (PPP). $1.25 income is estimated to satisfy the basic requirement of an individual like clothes, shelter, drinking water, health care and security. The World Bank defines the extreme poverty below the $1.90 per day in PPP and modest poverty prevail when individuals lives beneath the $3.00 per day in PPP. Relative poverty is defined when people of a country experience dearth of minimum income in line with maintaining the average living standards in society. The poverty can be measured in many ways. The development economists are very keen and ardent regarding measuring the poverty. Absolute poverty is measured by the Headcount Index. The Headcount index measures the number of people living below the poverty line that is $1.25 per day in a country. According to the World Bank Report 2014, 21% of population of Pakistan is living in poverty in accordance with Headcount ratio. Some economists' uses another way to measure absolute poverty termed as total poverty gap Meier and Rauch (1995).Total poverty gap estimates the aggregation of the difference between the poverty line and realized income levels of the people, living below that line. Therefore, it provides the true picture of the conditions of the poor masses and exactly asses the differentiation between poverty line and people actual income. According to World Bank Indicators 2017, the poverty gap is reported to be $1.90 in Pakistan. It can be mathematically expressed as $TPG = \sum_{i=0}^{H} \left[Y_p - Y_i \right]$.The new method was introduced to measure poverty in recent time is termed as Multidimensional Poverty Index. It identifies the poor people applying dual cutoffs for number and level of deprivations and then requires multiplying the percentage of number of people living beneath poverty line times the percentage of the proxies used for poverty for which poor are deprived from.

Sometimes, income equality is also taken as an important measure of poverty. It implies that absolute poverty provide the information of an individual while relative poverty assess the overall conditions of the society. To measure the relative poverty, there are many approaches to deal with. One of the most vital approaches to measure relative poverty or income inequality is personal distribution of income. The income distribution from the class of people in a country, without taking into consideration the sources of income of individuals, the part of income going to the poorest with specific percentage or richest specific percentage of people in a county. Using the quintile method which divides the whole population into five groups ranging from the low income to high level by grouping the population in ascending order of income level, Therefore, it describes that first quintile presents the bottom 20% of population receiving the lowest share of income is compared with upper 20% of population enjoying high level of income to make the assessment of poverty prevailing in the economy. Lorenz curve is also used

to demonstrate the situation of poverty of nation. Lorenz curve is simply a graphical presentation of Personal distribution of income. In which one equality line is drawn and then personal distribution of income is illustrated. The higher the gap takes place between equality line and personal distribution of income, Lorenz curves implies higher the poverty will prevail in an economy. Relative poverty is also measured through GINI coefficient which is derived from the Lorenz curve. GINI coefficient measure the space between equality lines divided by number of people living below equality line. Functional distribution divulges that when income from any economic activity is distributed among factors of productions without consideration of their ownership of factors ((Meier, 1995; Todaro, 1977).

Data and Methodology

To obtain the empirical evidence based on the theory whether external debt fosters the economic growth and help mitigating poverty in Pakistan or it hinders both, results are estimated through different econometric techniques. By convention, it is thought that external debt executes as catalyst in a way it results increasing the economic growth which further assist the country to reduce poverty. The model framed in this paper is a modified version of growth model discussed by Loko *et al.* (2003) and Mankive *et al.* (1992) which are based on Harrod-Domar growth model.

The general form of a model is written as follows:

$$EG = \alpha_0 + \alpha_1 ED + \alpha_2 MS + \varepsilon_t \dots\dots\dots\text{Eq. (1)}$$

$$MPI = \beta_0 + \beta_1 ED + \beta_2 PG + \mu_t \dots\dots\dots\text{Eq. (2)}$$

Eq.(1) indicates economic growth (EG) as function of external debt (ED) and Money supply (MS).This study considers Per Capita Income as proxy for the economic growth. In mountain of literature, per capita income has been used as measure of economic growth Cockcroft *et al.* (1994), Karoos and Badeaux (2007). Money supply is taken as control variable. According to traditional macroeconomic theory, money supply also affects the economic growth in a way when monetary authority plans to increase (or decrease) money supply, it results decline in the domestic interest rate which further enhance demand for loanable funds for the economic activities.α_0 is intercept, α_1 presents contribution of external debt in economic growth whereas α_2 indicats share of money supply. Multidimensional Poverty Index (MPI) is used as proxy to examine poverty. Equation (2) implies MPI is impacted by ED and population growth (PG). β_0 Indicates intercept, β_1 and β_2 indicate the responsiveness of external debt and population growth.ε_t and μ_t imply the error terms in these models. Johansen Co-integration is applied to analyze the long run relationship among the variables. The data for analysis span from 1981 to 2017. The Error correction model, impulse response function and variance decomposition function are also applied to further analyze the model.

Results and Discussion

For the empirical analysis, it is essential to primarily conduct primitive diagnostic tests when dealing with time series nature of data. In fact, concrete findings of Co-integration model depend on establishing the assumption of the stationarity of variables.

Univariate Analysis

It is important to estimate the stationarity to avoid spurious results and that can be carried on by conducting Augmented Dickey- Fuller test (ADF Test). Stationarity test increases the rigor of scientific research by selecting the appropriate model. The ADF test results are reported in the table below which implies that all the variables of model are non-stationary at level and integrated at order one. Therefore, results lead to the presence of co-integrating association among the variables in question.

Table 1: *Augmented Dickey-Fuller Results*

Variables	Level	Probability	1st -Difference	Probability	Stationarity
EGL	2.016	.999	4.313	.001	I(1)
EDL	.060	.987	4.397	.001	I(1)
MSL	.722	.830	5.238	.000	I(1)
MPI	1.627	.999	5.318	.000	I(1)
PGL	1.340	.812	4.102	.000	I(1)

Long Run Analysis

Johansen co-integration is applied to examine the long run association among the policy variables. After the absence of stationarity at level, it also supports the justification for the application of Johansen Co-integration test which is useful and appropriate because it not only confirms the number of co-integrating equations, but also provides the normalized long run coefficients. Johansen co-integration test implies the existence of 1 co-integrating equation at 5% level for the model 1. Unrestricted co-integration rank test (Trace) indicates one integration equation at 5% level and confirms the rejection of Null hypothesis. Johansen Co-integration results of Model 1 depicts in Table 2-a, below:

Table 2-a: *Johansen Co-integration Results Unrestricted Co-integration Rank Test (Trace) Model 1*

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistics	.05 Critical Value	Prob.**
None *	.623	44.772	35.192	.003
At most 1	.229	13.549	20.261	.321
At most 2	.153	5.201	9.164	.262

Trace Test implies one co-integration equation at .05 level.

The results of unrestricted co-integration rank test (Maximum Eigenvalue) also imply one co-integration equation in the same model-1 at 5% level. The findings are demonstrated in Table 2-b below:

Table 2-b: *Johansen Co-integration Results Unrestricted Co-integration Rank Test (Maximum Eigenvalue)*

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	.05 Critical value	Prob.**
None *	.623	31.222	22.299	.002
At most 1	.229	8.348	15.892	.506
At most 2	.150	5.201	9.164	.262

Max- Eigenvalues indicates one co-integration equation at .05 level.

Unrestricted co-integration rank test (Trace) directs one integration equation in Model-2 at 5% level and holds the evidence of acceptability of alternate hypothesis. Johansen Co-integration results of model-2 are shown in Table 3-a, below:

Table 3-a: Johansen Co-integration Results Unrestricted Co-integration Rank Test (Trace) Model-2

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistics	.05 Critical Value	Prob.**
None *	.623	44.772	35.192	.003
At most 1	.229	13.549	20.261	.321
At most 2	.152	5.201	9.164	.321

Trace Test implies one co-integration equation at .05 level.

The findings of the unrestricted co-integration rank test (Maximum Eigen-value) imply one co-integration equation in the model-2 at 5% level. The outcomes are demonstrated in Table 3-b below:

Table 3-b: *Johansen Co-integration Results Unrestricted Co-integration Rank Test (Maximum Eigenvalue)*

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	.05 Critical value	Prob.**
None *	.680	42.123	28.688	.005
At most 1	.288	9.184	15.892	.561
At most 2	.169	6.145	9.164	.213

Max- Eigen-values indicates one co-integration equation at .05 level.

Short Run Dynamics:

Table 4-a, demonstrates the results of Vector Error Correction (VECM) for Model-1. Error correction term for this model for external debt ensures existence of error correction. The value -0.313 depicts that in case of disequilibrium in short run policy variables will adjust towards equilibrium by the annual adjustment speed of 31% approximately.

Table 4-a: Vector Error Correction Estimates Model 1

Error Correction:	D(EGL)	D(EDL)	D(MSL)
CointEq1	-.313 (.048) [5.324]	.374 (.089) [2.109]	.004 (.018) [.911]

Error correction term for Model-2 ensures existence of error correction. The value -.294 indicates that when economy witnesses any disequilibrium in short run and will converge to equilibrium level at the annual speed of almost 29%. The results are posted in Table 4-b as follows:

Table 4-b: Vector Error Correction Estimates Model 2

Error Correction:	D(MPI)	D(EDL)	D(PGL)
CointEq1	-.294 (.038) [6.441]	.1787 (.077) [2.190]	.0178 (.003) [1.809]

Variance decomposition analysis (VDA) assists to determine the relative significance of dependent variable in line with explanatory variables. In this paper, variance decomposition results are shown in Table 5-a, for Model 1 over a 10 periods. In results Standard error columns refers to forecast error and in other columns expected variation in percentage is estimated. The results indicate that shock to economic growth accounts for 100% variation of fluctuation in economic growth itself in period 1, 59.34% in period 4, 19.29% in period 7 and 8.16% in last period 10. Concerning to shock of external debt, the findings imply that innovation/shock to external debt contributes nil

fluctuation in economic growth in first period. In period 4, shock to external debt causes 32.04% variation in economic growth, 66.69% in period 7 and 75.08% fluctuation in period 10. The results depict that external debt significantly influence the economic growth. In the analysis of money supply, results reflect that any shock to money supply causes no variation in economic growth in period 1, 8.62% in period 4, 14.02% in period 7 and 16.76% fluctuation in economic growth followed by change in money supply. It implies that money supply does not have significant impact on economic growth. Variance decomposition analysis of external debt, the finding demonstrates that shock to economic growth causes 0.82 percent variation in external debt in first period and 5.48% in period 4 which is negligible but its variation becomes impressive in period 7 and 10 and reported to be 79.29% and 72.16%. It implies that shock to economic growth is irresponsive in short term while has substantial influence in long term. The shock to Money supply does not show any considerable fluctuation in external debt. Variance decomposition of money supply shows that any shock to economic growth accounts for 7.22 percent variation money supply in period 1, 25.59 percent in period 4, 23.81 percent in period 7 and 22.52 percent in period 10. It means that economic growth leads to rise in money supply followed by more spending by the agents like household, business and government. Any shock to external debt results show negligible variation in money supply.

Table 5-a: Variance Decomposition Analysis Model 1

Periods	S.E	EGL	EDL	MSL
Decomposition of EGL				
1	.064	100.000	.000	.000
4	.132	59.342	32.041	8.616
7	.180	19.286	66.693	14.020
10	.214	8.160	75.079	16.759
Decomposition of EDL:				
1	.060	.817	99.182	.0000
4	.143	5.482	93.702	.8152
7	.180	79.289	6.692	14.020
10	.214	72.160	11.079	16.759
Decomposition of MSL:				
1	.057	7.225	16.531	76.242
4	.127	25.593	5.490	68.916
7	.168	23.816	3.648	72.535
10	.200	22.516	2.571	74.911

The results of the Variance decomposition of poverty are reflected in Table 5-b, explains that shock to poverty accounts for 100 percent fluctuation in poverty itself in period 1 whereas its self-fluctuation remains 33.34 percent in period 4, 11.28 percent in period 7 and 1.16 percent in period 10. Any shock to external debt results no variation in poverty in very first period whereas fluctuation in poverty is reported to be 58.04%, 69.69% and 71.13% in 4th, 7th and 10th period respectively followed by a shock in external debt. It indicates that external debt serves as potential threat for poverty. On the other side, any change in population growth results nil fluctuation in poverty in period 1.

Whereas shock in population growth causes fluctuation in poverty 8.61%, 19.02% and 27.75% in period 4 , 7 and 10 respectively. It means that increasing population leaves substantial effects on poverty in long term. Variance Decomposition analysis of external debt unfolds that a shock to poverty is not substantial. In the same way shock to external debt does not hold significant fluctuation in population growth. The results indicate that population growth reflects that any shock to population growth starts effecting poverty in long run. In regard to external debt, results indicate that shock to external debt causes insignificant variation in population growth. The findings are also well matched with results of Loko *et al*. (2003) and Akram (2011) who also concluded that external debt holds impact on economic growth along with the adverse effects on poverty as well.

Table 5-b: Variance Decomposition Analysis Model-2

| Decomposition of MPI				
Periods	S.E	MPI	EDL	PGL
1	.064	100.000	.000	.000
4	.132	33.342	58.041	8.616
7	.180	11.286	69.693	19.020
10	.214	1.160	71.133	27.759
Decomposition of EDL:				
1	.043	7.784	92.215	.000
4	.069	10.706	86.934	2.358
7	.108	18.384	65.536	16.075
10	.148	10.455	66.826	22.718
Decomposition of PGL:				
1	.007	1.000	.679	98.320
4	.072	3.451	4.461	92.087
7	.174	6.555	5.273	88.171
10	.275	9.179	6.139	84.681

Impulse response function analysis assists to describe the dynamics of the policy variables. The response of economic growth is positive against the shock of external debt in the earlier time period and start moving towards convergence in subsequent periods. Any shock in money supply, causes economic growth to be positive for all the time periods which indicates that rise in money supply lowers down the domestic interest rate which raises the demand for loanable funds for economic activity. The response of external debt to shock in economic growth is found to be substantial, because high nominal economic growth allows the country to seek more foreign assistance to fulfill the economy economic requirement in the long run. The external debt remains irresponsive against any change in the money supply. The effectiveness of money supply is found to be less responsive but positive when any shock is received by both external debt and economic growth. The results of Model 1are depicted in Figure 1-a below:

Figure 1-a: Impulse Response Function (IRF) Analysis Model 1
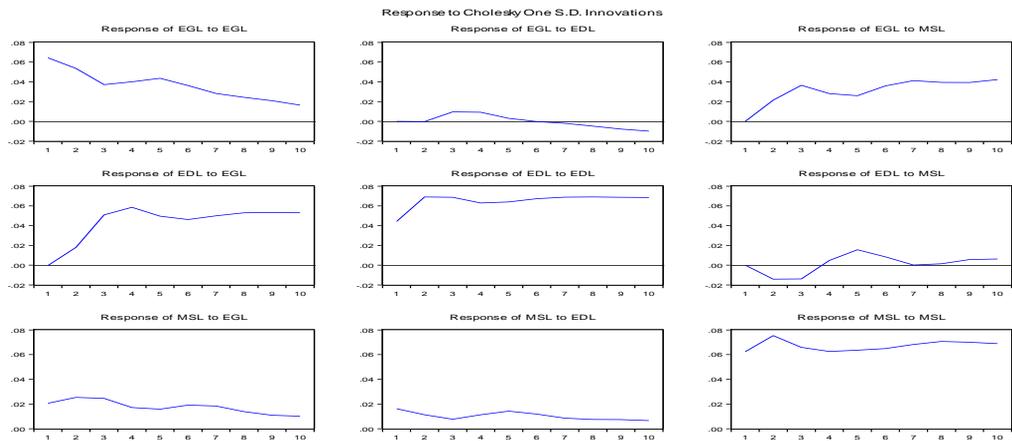
The response of poverty against any change in external debt remains positive and significant and moves towards convergence in ninth period. It implies that external debt effect poverty in short term and get stable over the time period if managed well. Response of the poverty is profound as change takes place in population growth. The similar results have also been found by Ehrlich and Holdren (1971) and Lahariya (2008). Against any change in poverty, external debt becomes positive after period 3 means that to tackle the issue of poverty government relies on foreign borrowings. The response of external debt to population growth remains positive which implies that increasing population growth lead the economy to opt foreign borrowing to offset the increased requirements. Population growth and poverty are positively related. The responsiveness of population growth against any change in external debt is positive which implies that increasing population requirement can only be satisfied through external debt.

Figure 1-b: Impulse Response Function (IRF) Analysis Model 2
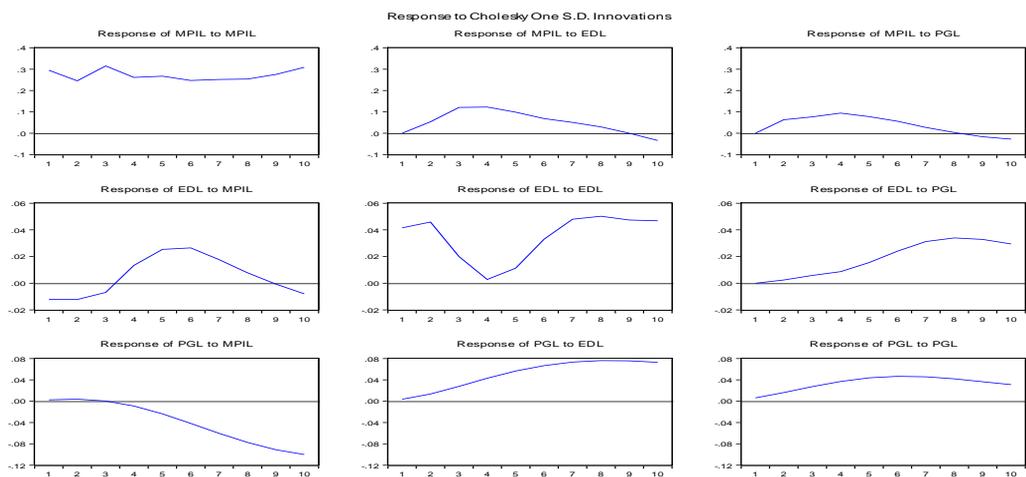
Conclusion

This Paper examines the effectiveness of external debt on economic growth and poverty in Pakistan. The study is segmented into two models, in the first model economic growth is effected by the external debt and money supply while second model describes poverty is influenced by the external debt and population growth. Johansen cointegration results indicate one cointegrated equation in each economic growth and poverty Model. Error correction model estimate 31% speed of adjustment for economic growth Model and 29% annual adjustment speed for poverty model. Variance decomposition analysis indicates that external debt leaves positive influence on economic growth and poverty as well. Impulse response Function highlights that rise in the external debt attributes increase in economic growth along with rise in poverty. Therefore, government needs to design pro poor growth rather a simple version of economic growth. Dealing with the indebtedness phenomenon, government may consider the economic and social factors side by side to share economic fruits of external indebtedness.

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