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The Impact of Health Expenditure on Economic Growth: A Case Study of Pakistan

*Khalid Mustafa and **Muhammad Afzal Ansari

Abstract: A financial crunch has been a continual factor throughout the history of Pakistan. Hence, Pakistan has been restricted to the expenditure of limited resources on growth. Most governments have a better cushioned to allocate for growth, especially on human capital because of less resources, side by side rising defense and surviving expenditure. The study is based on a skillful inquiry of health on economic growth in Pakistan. Time series data for the period 1971 to 2016 has been obtained while; ARDL co-integration technique has been applied. Economic growth is influenced and brought about, directly by Health indicators in the long run as well as in the short run. This shows that health has far-reaching effects on economic growth. Moreover, education spending by the government is also improving economic activities as it enhances the quality of human resources. Inflation is also positively related to economic growth of Pakistan. According to the major policy implications, a steep level of growth can be obtained by enhancing and making better the stock of human capital; particularly, if available stocks are going to exhaust. In addition, the policy indicates a tiny act of expenses on public health inconclusive economic growth.

Key words: Economic growth, Health expenditure, Defense expenditure

1 Introduction

Health and Education of the masses are two considerable resources for the formation of human capital. Human capital is based on the thing that abound knowledge, skill, experience, the characteristics of work ethic and motivation. Among these, health (physical & mental) is a vital factor that has a significant contribution to enhance the quality of an individual productivity.

*Professor, Department of Economics, University of Karachi
**Assistant Professor, Government Degree College Korangi

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Health is argued to be an engine of economic growth and productive asset that a human possesses (Barro, 1996). Therefore, health can be a critical factor for human capital formation. Health is an asset that nature has endowed with human being. Health has a significant economic value because of its role in the individual's welfare and for economic development (WHO, 1999).

The situation is different and unique in Pakistan. The health expenditures in Pakistan remains really low and insufficient resources in order to give better health to the masses, exclusively in rural areas. 87 infants die and mortality rate below the age of 5 years is 10.1% out of 1000 infants. The development expenditures for the year 2010-11 was Rs.19 billion and the current expenditures were Rs. 23 billion, which is only 0.23% of GDP. However, the GDP (current US$) was $ 177 billion as well as total population was 173 million in the same period[1].

National Health Accounts of Pakistan showed that US$ 20 per capita (around) was spent on health in Pakistan in 2005-06, which is very low as compared to other developing countries. The statistics of WHO of 2009 states that total expenditures on health care were about 2.4 percent of total GDP, while private health spending was 83.6 percent of total health expenditures which is very low in comparison to the South Asian's other countries. Furthermore, insufficient private expenses on health are near about 98 %, comparing Pakistan with the countries having the largest share of out-of pocket payments relative to total health expenditure. The 6 percent allocation of GDP on health has recommended by the World Health Organization in order to abridge the atrophy health conditions of the country.

In Pakistan, health indicator shows improvement over time, but has a much lower rate. Per hundred thousand births, the maternal mortality rate is also high i.e. 260. The births appear under the conventional birth attendance is the major reason of maternal mortality. The low birth weight babies share was 31.6 percent, the rate of child mortality was 86

[1] World Development Indicator

per thousand. The share of under 5 years children suffering from malnutrition was 39 percent, approximately ten million children under 5 years of age suffering from malnutrition due to this 61 percent do not survive, 9 percent out of 39 percent died due to underweight. The health indicators show depressive / dreadful picture when it compares with other countries at the same level.

The less expenditure on health and at the same time poor productivity of labour in Pakistan indicates that economic development and growth is very low. Two argumentative ideas (a) health affects the economic growth which is a long-run aspect (b) whether casualties or casualty between health and per capita Gross Domestic Product is two ways or unidirectional has been examined.

The objectives of this study are to investigate the existence of a trend in health expenditure and economic growth on Pakistan's economy over the period of 1971 to 2016, time series data of Pakistan. Last but not the least it is aimed to find the evidence of health indexes of economic growth and underlying factors for this phenomenon.

The rest of the paper is organized as follows: review of literature is given in section two, section three explains the research methodology, analysis of the relation between economic growth and health expenditure given section four, and conclusions, suggestions and recommendations are given in section five.

2: Review of Literature

Although, studies are contrary to estimating the relationship of health with development nevertheless, a cyclical relation is assumed to exist between health and level of income. Important effect of mortality reduction on economic growth was explained by Sorkin (1977) during the early 20th century, while magnitude of this effect depended on level of development. Developed country has relatively less impact on its growth by improvements in health while improved health has a strong positive relation with economic development in case of low income countries. Grossman (1972) and Bloom and Canning (2000) explained that healthy

individuals are more efficient and therefore highly productive because they are better able to seek knowledge and skills. Bloom and Canning (2000) in cross country analysis, used life expectancy as a variable of health capital. Their objective, using production function framework, is to measure the effect of health on labor efficiency. This approach ensures the robust estimation of the growth determinants rather than overestimating the contribution of one component. The impact of increase in health expenditures in developing health might be justified through the impact on labor efficiency Bloom, Canning and Sevilla (2001). Mason and Miller (2000) and Ainsworth and Over (1994) concluded that life expectancy might be influenced life cycle savings and capital accumulation. Therefore, improvements in health not only increase productivity, but also capital accumulation. Life expectancy appears to be a consistent and a strong predictor of economic growth than any other variable related to health human capital (WHO, 1999) and helps poverty ridden disease prone countries to come out of the trap and can offer better quality life to the majority of its population examples are: East Asia, Ireland and other wealthy developed countries Steckle and Floud (1977) and Bloom et.al (2001).

The study of Rivera and Currais (2004) aimed at estimating the effect of health investment in labor productivity as a significant variable of human capital formation. Direction of interrelationship between health and income is also explored in this study for OECD countries using the augmented Solow model. Studies like Wheeler (1980); Rivera and Currias (1999); Behrman et.al, (1990) and Bloom et.al, (2000) concluded that health status improvements affects labor productivity significantly and positively. Fogel (1994) argued that better health status increases living standard directly and is consistent with increases in income. But Cullis and West (1979) and Easterly and Rebelo (1993) found negative effect of health investment on income per capita. While Cullis and West (1979) suggested that health expenditures should not be considered investment in developed countries. Because, the advantages of investment on health are noticeable only in the long run and simple interrelationship may prejudice the results regarding the relation of health investment and production.

Nevertheless, the function of health status with respect to production is positive.

Life expectancy is a commonly used variable to illustrate the health status of the population as argued by Grossman (1972); Mankiw et.al, (1992) and Barro, (1996). Bhargava et.al, (2001) and Evans et.al, (1994) criticizes that life expectancy does not show the labor productivity accurately and is not reflected by the innovation needs of the labor force.

The study by Rico et.al., (2005) used model based on Bloom, Canning and Sevilla (2001) and tried to improve the specification by including ordinal health index variable, rather than life expectancy, that is a cumulative index of; health services, socioeconomic conditions, life style and environment using panel data from 1970, 1980 and 1990. They concluded that aggregate health index performed better than life expectancy. The inclusion of investment in health as a macroeconomic policy is, therefore, important measure to keep countries out of poverty trap (WHO, 1999). Granger causality test is applied by Mayer (2001) on annual time series data from 18 Latin America countries to estimate the causality between health and income. It is concluded that a conditional Granger causality from health to income in exist. Instead of using common measure of health status i.e. life expectancy this study used a part of health status, which is probability of survival. Brinkley (2001) used data from USA for GNP, expectancy of life (LE), Infant mortality rates (IMR) and investment in medical research and concluded that impact of health on income is important in framing public policies for better health status. It is suggested that increasing health expenditures will definitely increase productivity income and wealth.

Bhargava et.al, (2001) tries to measure the effects of health indicators like survival rate of adult on GDP growth rates at 5 years interval in panel of countries. The relation of life expectancy to income is integrated with economic growth model of Barro and Sala-i-Martin (1995).

Eggoh, Houeninvo and Sossou (2015) searched concerning the association between human capital and economic growth in forty nine African countries for the time span between 1996 and 2010. Education and health

related variables are used as indicators of human capital in this study. Additionally, traditional cross-sectional and dynamic panel techniques are employed in order to investigate the association between variables. The results recommended that economic growth is negatively affected by education and health expenditures. Hence, the authors concluded that since corruption, bureaucracy and underinvestment exist in these countries, and conjointly the expenditures are inefficient, education and health expenditure will have a negative impact on the growth.

Bedir (2016) investigated the link between economic growth and health care expenditure in emerging markets within the region of Europe and Middle East African and Asian countries. He concluded that human accumulation is extremely crucial for growth in an exceedingly country as a result of in endogenous growth models capital accumulation is crucial, and so as to be to boost capital accumulation, healthcare expenditure is sort of authoritative

Halıcı-Tülüce, Doğan and Dumrul (2016) investigated the influence of health expenditure on economic growth. This study contains panel data analysis of low-income and high-income economies between 1995-2012 and 1997-2009.

Atılgan, Kılıç and Ertuğrul (2017) examined whether or not growth and health expenditure are co-integrated or not by using bound test approach, autoregressive-Distributed Lag Approach

Gizem ERÇELİK (2018) investigated the association between both private and public health expenditure on output level in Turkey. The results of bounding test to co-integration represent that the variables are co-integrated, there is a significant relationship between them in the long-run.

Several studies have been conducted for Pakistan to investigate role of health expenditure and economic growth. Zakir and Wunnava (1999) estimated coefficient of health. Data from 117 countries was the study

based and they hypothesized that a positive relation exists between fertility and infant mortality.

Nasir and Nazli (2000) on Mincerian equation, established a human capital model for Pakistan, it was analyzed the return to education at different education level like Primary, Middle, Matric, HSC, Graduation and Professional. It was scrutinized so an added year of education increased seven percent returns for wage worker, and positive relationship between higher education and higher earning was found. The effect of human capital on the regular earning was explored by

For the growth strategy the efficient strategies for human development are essential factors. Poverty may be diminished by using a pro-poor growth strategy and improving human development Kemal (2002). Increase in investment in industrial sector, social (health & education) sector is necessary for high living standards as well as expedite economic growth. Economic growth and human development retaliate and invigorate each other; economic growth build-up human development and human development build-up economic growth. Better health results in increase economic growth and at the same economic growth leads to develop health quality.

Nasir (2002) the data of Pakistan Integrated Household Survey made in 1995-96 was the base of the results. All human capital variables having positive dimension and statistically significant was revealed by the study. Nasir (2002) suggested immediate attention to enhance education mathematics skill, technical education and approach of market orientated to the literacy by means of formal and informal procedure.

Akram, Padda, and Khan (2008) investigated that health indicators have a long run impact on economic growth. They suggested that impact of health is only a long run phenomenon and in the short run there is no significant relationship exists be between health variables and economic growth.

Malik (2006) evaluating health condition by infant mortality rate, rate of expectation of life, rate of natural state of health and Gross National

Income for every person consider of the sign of development of an economy, and a significant relationship is found among the development in economy and status of health, if there is the application of OLS. Thus, significant impact of the indexes of health is examined by the study for the development of economy when 2SLS is used. Abbas and Peck (2007) estimated that during 1990s, 18 percent of the growth in Pakistan economy was attributed to human capital which was more than physical capital growth.

By using primary date of 494 individuals Faridi (2010) studies the effect of health & education on employment in Pakistan. By using the Logistic regression technique, statistical investigation of employment was done in the structure of conventional theory of utility maximization. Direct interrelationship with employment was exhibited by education and health, It was suggested that better education and better health techniques be provided on all levels as without investment economic growth may not be boosted.

Hassan and Kalim (2012) tested a long run relationship and triangular causality among education, health and economic growth for Pakistan by conducting time series analysis from 1972 to 2009, and therefore the variables employed in this study are per capita education expenditures and per capita health expenditures and real GDP per capita. They found no Granger causality between per capita health expenditures and real GDP per capita in the short-run. However, they found two-way causality among real GDP per capita, per capita education expenditures and per capita health expenditures in the long-run.

Conclusively, the health expenditure is a fairly significant effect on economic growth specially a diminutive role of public health expenditure in determining the per capita GDP.

3: Theoretical Model and Econometric Methodology

Loening in 2004 don't forget human capital as an impartial aspect of production that is offered in Cobb-Douglas manufacturing characteristic with constant returns to scale as:

$$Q_t = AK^{\alpha}L^{\beta} \quad (1)$$

Where Q_t is defined as output: A is the state of technology used in capital and Labor used in education and health respectively K is physical capital, L is labor. The logarithmic conversion of equation (1) above yields the structural shape of the production characteristic as:

$$LnQ_t = LnA + \alpha LnK + \beta LnL + \varepsilon_t \quad (2)$$

This examination empirically determines the nexus among growth and health. (Lutkepohl 1982) multivariate version was used to keep away from the causality inference because of lost the concern variable. Theory suggests, if growth rate (Q_t), health expenditure (A_t) is studied to be imaginary traits and if they comply with an unusual long term equilibrium courting, therefore, Q_t and A_t must be co-integrated. A test for equilibrium between non-stationary variable unified similar orders is Co-integration. In 1987, Engle and Granger, co-integrated variables required.

The Long Run Economics growth rate is measured as the parentage change in real gross domestic product (lER) over the constant period of time. Long run real GDP growth rate is assumed as a best indicator of economic performance of a country like Pakistan because in developing countries external sector is not consisting of major part of economy. To assess the impact of public health on country's economic performance and welfare a model is developed which contain the public health expenditure(HE), national defense expenditure(ME), public education expenditure (EE) and average annual price index or inflation rate (P) as explanatory variables. Gross domestic product (GDP) is used as a proxy for income and growth in prices for inflation. These variables are articulated in natural logarithms with the purpose of having their elasticities.

The traditional approach to determining long run and short run relationships among variables has been to use the standard Johansson Integration and VECM framework, but this approach suffers from serious flaws as discussed by Psarian et al. (2001).

The standard Johansson Integration and VECM framework was intensively used to determine the short run and long run relationships among variables but after the invention of autoregressive distributed lag (ARDL) approach all conventional methods are discouraged. ARDL framework is adopted which is popularized by Pesaran and Shin (1995, 1999), Pesaran, et al. (1996), and Pesaran (1997) to establish the direction of causation between variables. The ARDL method has consistent and robust results both for the long-run and short-run relationship among economic growth rate and public expenditures. This approach does not involve pretesting variables, which means that the test for the existence of relationships between variables is applicable irrespective of whether the underlying repressors are purely I (0), purely I (1), or a mixture of both. In order to obtain robust results, we utilize the ARDL approach to establish the existence of long-run and short-run relationships. ARDL is extremely useful because it allows us to describe the existence of an equilibrium/relationship in terms of long-run and short-run dynamics without losing long-run information. The ARDL approach consists of estimating the following equation.

$$\Delta Ln(LGR)_t = \alpha_t + \sum_{i=1}^{n} \partial_i \Delta Ln(LGR)_{t-1} + \sum_{i=1}^{n} \beta_i \Delta Ln(HE)_{t-1} + \sum_{i=1}^{n} \delta_i \Delta Ln(EE)_{t-1} + \sum_{i=1}^{n} \psi_i \Delta Ln(ME)_{t-1} + \sum_{i=1}^{n} \phi_i \Delta Ln(P)_{t-1} + \lambda_1 \Delta Ln(HE)_{t-1} + \lambda_2 \Delta Ln(EE)_{t-1} + \lambda_3 \Delta Ln(ME)_{t-1} + \lambda_4 \Delta Ln(P)_{t-1} + \varepsilon_t \quad (3)$$

The first part of the equation with $\partial_i, \beta_i, \delta_i, \psi_i$, and ϕ_i represents the short-run dynamics of the model whereas the parameters λ_1, λ_2, λ_3 and λ_4 represents the long-run relationship. The null hypothesis of the model is H0: $\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = 0$ (there is no long-run relationship) H1: $\lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq 0$

This starts by conducting a bounds test for the null hypothesis of no co-integration. The calculated F-statistic is compared with the critical value tabulated by Pesaran (1997) and Pesaran et al. (2001). If the test statistics exceeds the upper critical value, the null hypothesis of a no long-run

relationship can be rejected regardless of whether the under lying order of integration of the variables is 0 or1. Similarly, if the test statistic falls below a lower critical value, the null hypothesis is not rejected. However, if the test statistic falls between these two bounds, the result is inconclusive. When the order of integration of the variables is known and all the variables are I (1), the decision is made based on the upper bound. Similarly, if all the variables are I (0), then the decision is made based on the lower bound.

The ARDL methods estimates (p+1) k number of regressions in order to obtain the optimal lag length for each variable, where p is the maximum number of lags to be used and k is the number of variables in the equation. In the second step, if there is evidence of a long-run relationship (integration) among the variables, the following long-run model (Equation 2) is estimated,

$$\Delta Ln(LGR)_t = \alpha_t + \sum_{i=1}^{n} \partial_i \Delta Ln(LGR)_{t-1} + \sum_{i=1}^{n} \beta_i \Delta Ln(HE)_{t-1} + \sum_{i=1}^{n} \delta_i \Delta Ln(EE)_{t-1} + \sum_{i=1}^{n} \psi_i \Delta Ln(ME)_{t-1} + \sum_{i=1}^{n} \phi_i \Delta Ln(P)_{t-1} + \varepsilon_t \quad (4)$$

If the evidence of a long-run relationship is found then estimate the error correction model (ECM), which indicates the speed of adjustment back to long-run equilibrium after a short-run disturbance. The standard ECM involves estimating the following equation.

$$\Delta Ln(LGR)_t = \gamma_t + \Omega_t \Delta Ln(ECM)_t + \sum_{i=1}^{n} \partial_i \Delta Ln(LGR)_{t-1} + \sum_{i=1}^{n} \beta_i \Delta Ln(HE)_{t-1} + \sum_{i=1}^{n} \delta_i \Delta Ln(EE)_{t-1} + \sum_{i=1}^{n} \psi_i \Delta Ln(ME)_{t-1} + \sum_{i=1}^{n} \phi_i \Delta Ln(P)_{t-1} + \varepsilon_t \quad (5)$$

To ascertain the goodness of fit of the ARDL model, diagnostic and stability tests are conducted. The diagnostic test examines the serial correlation, functional form, normality, and heteroscedasticity associated with the model.

Moreover, VDCs and IRFs for further inferences serve as tools for evaluating the dynamic interactions and strength of causal relations among variables in the system. The VDC indicates the percentages of a variable's forecast error variance attributable to its own innovations and innovations in other variables. Thus, from the VDC, it can measure the

relative importance of the Defense expenditure (ME), inflation rate, and national health expenditure fluctuations in accounting for oscillations in the real economic growth rate. Moreover, the IRF traces the directional responses of a variable to a one-standard deviation shock to another variable. This means that we can perceive the direction, magnitude, and persistence of economic growth are to variations in the explanatory variables.

The variables of economics growth rate (LGR), Public Health Expenditure (HE), Public Education Expenditure (EE), National Defense Expenditure (ME) and inflation Rate are taken from World Development Indicators. Data on National Defense Expenditure (ME) is taken from various issues of the Pakistan Economic Survey. The data are annual and spans the time period 1971 to 2016.

4 Empirical Results

Before testing the cointegration relationship, a test of order of integration for each variable using the Augmented Dickey-Fuller (ADF) and Phillips Perron (PP) tests are conducted. Even though the ARDL framework does not require the pre-testing of variables, the unit root test could help in determining whether or not the ARDL model should be used. The results in Table-1 and 2 are the unit root test results of the Augmented Dickey-Fuller and Phillip Perron tests, respectively, showing that there is a mixture of I(1) and I(0) of underlying regressors and that, therefore, we can proceed with ARDL testing. Table 1 and 2 same.

Long run economic growth (LGR), Health Expenditure (H.E) and National Defense Expenditure (M.E) are integrated to the order of one I(1), while the inflation rate (P) and Education Expenditure [E.E] is integrated to the order of zero I(0).

Table 3 contains long run estimated output for ARDL using Schwarz Bayesian Criterion. This is found that health expenditures have positive and significant impact on economic growth. This implies that quality of labour or human capital is a catalyst for vigorous economic activities. Moreover, education is also a pivotal indicator for quality of human capital; it also has a constructive effect on economic growth. Inflation is another factor that enhances economic activities in the country. When

inflation increases due to increased demand of commodities; this results in higher production of that commodity, thus increasing economic growth. Military expenditures have negative and insignificant effect on GDP. It is also found that lag of economic growth and differenced economic growth exerts negative and significant impact on current economic growth.

Goodness of fit is 7.68 indicating that 76 percent of variations in the economic growth are described by these variables in the model. Durban Watson is 2, which indicates no evidence of autocorrelation in the model. Although, when lagged series of the independent variable is taken then it is unimportant to check for auto correlation. In other words, the existence auto correlation may be ignored. F-statistics is 59.46 indicates that model is significant.

ARDL test is applied on the model based on the Akaike Information Criterion and given in table 4. Results indicate that health expenditures increase economic growth. This implies that physically fit human resources are capable of greater economic activities in the long run.

Education expenditures are also positively associated with economic growth in the long run. Inflation, in the long run has equilibrium relationship with growth rate of Pakistan. Military expenditures negatively and insignificantly related to GDP. As military expenses are a great chunk of GDP, because of which budget for development expenditures shrinks, thus results in negative impact of defense budget economic activities are adversely affected.

Goodness of fit is 7.68 which indicate that GDP growth is 70% described by these variables in the model. Overall significance of the model is connoted by F-statistics. For a model to be significant it value must be greater than 10, in our model F statistics is 62.546, it implies that model is highly significant. DW is 1.781 which indicates that no evidence of autocorrelation in the model.

The short run model is captured by error correction representation and exhibit in Table 5. It shows that health expenditures, education expenditures and inflation are positively and significantly related with

economic growth. Defense expenditure is negatively and insignificantly associated with growth rate of Pakistan in the short run as well. R-squared is 7.68 implying that model is good fit. Variables employed in the model 70% describe GD4P in the short run. Overall model is also significant with F statistic of 7.546.

5 Conclusion

The aim of this study is to investigate the impact of health expenditures on economic growth of Pakistan. The ARDL and Cointegration are used to establish the empirical relationship between economic growth and health expenditure, defense expenditure, education expenditure, and inflation, using annual data from 1971 to 2016. The results indicate that the long run and short run estimates are in line with the objective of the research i.e. healthy human capital increases economic growth in the context of Pakistan. It is concluded that a very significant role is played by health in the determination of long term growth. Moreover, education spending of the government is also improving economic activities as it enhances the quality of human resources. Inflation is also positively related with economic growth of Pakistan. Results of The outcome of the study recommend that government and concerned authorities should pay due attention and increase health and education spending so that economic activities could be triggered.

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Appendix

Table 1
Unit-Root Estimation (ADF Test)

VARIABLES	LAG1	LAG2	LAG3
LGR	-4.320*	-3.3202	-4.3202
D LGR	-3.323***	-4.323*	-4.323*
H.E	-5.411*	-3.411***	-2.811**
E.E	-3.131***	-2.812	-3.131**
P	-3.343***	-1.343	-1.343
M.E	-6.232*	-2.232	-3.232***
Notes:*,**,*** represents significant at 1%, 5%,10%.			

Table 2
Unit-Root Estimation (Philips Perron Test)

VARIABLES	LAG1	LAG2	LAG3
LGR	-4.112*	-3.102**	-4.202*
D LGR	-1.923*	-1.823*	-2.323**
H.E	-3.411**	-1.411	-1.112*
E.E	-4.531**	-4.112**	-4.331**
P	-3.343***	-3.343***	-3.343***
M.E	-3.132***	-3.131***	-3.023***
Notes:*,**,*** represents significant at 1%, 5%,10%.			

Table3
Estimated Long Run Coefficients using the ARDL Approach
Selected Model: ARDL (1, 0, 1,0) based on Schwarz Bayesian Criterion
Dependent Variable LGR

VARIABLES	coefficient	T-test	Prob-Values
LGR	-6.565*	-4.343	0.001
D LGR	-2.562*	3.224	0.003
H.E	2.343*	5.232	0.004

E.E	4.312**	2.232	0.016
P	1.611**	3.123	0.019
M.E	-2.234	0.134	0.232
R^2= 8.89 F-statistics (5,23) = 59.546 [0.000]			
Adjusted-R^2= 7.68 Durbin-Watson Stat= 2.001			
Notes:*,**,*** represents significant at 1%, 5%,10%.			

Table 4
Estimated Long Run Coefficients using the ARDL Approach
Selected Model: ARDL (1, 0, 1,0) based on Akaike Information Criterion
Dependent Variable LGR

VARIABLES	Coefficient	T-test	P-Values
LGR	-8.565*	-5.343	0.001
D LGR	-3.562*	2.224	0.003
H.E	1.934**	3.232	0.044
E.E	3.312**	4.232	0.036
P	2.611**	2.923	0.017
M.E	-4.234	2.341	0.223
R'= 8.89 F-statistics (6,28) = 62.546 [0.000]			
Adjusted-R'= 7.68 Durbin-Watson Stat= 1.781			
Notes:*,**,*** represents significant at 1%, 5%,10%.			

Table 5
Error Correction Representation for the selected ARDL-Model
Selected Model: ARDL (1, 0, 1,0) based on Akaike Information Criterion
Dependent Variable LGR

VARIABLES	Coefficient	T-test	Prob-Values
LGR	-5.565	-3.343	0.001

D LGR	-4.562	2.224	0.003
H.E	3.934	3.232	0.044
E.E	4.312	4.232	0.036
P	3.611	2.923	0.017
M.E	-2.234	2.341	0.223
R'= 8.89 F-statistics (5,98) = 7.546 [0.000]			
Adjusted-R'= 7.68 Durbin-Watson Stat= 1.891			
Notes:*,**,*** represents significant at 1%, 5%,10%.			