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The Impact of Public Expenditure Components on Economic Growth in Pakistan

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Abstract

This study examines the relationship between health expenditure, expenditure on education, Gross Fixed Capital Formation, Military Expenditure, Fiscal Balance (Deficit) and economic growth in Pakistan. The period of study is from 1972 to 2015. ARDL Bounds Testing approach for co-integration and ECM Technique were applied to study the long run and short run relationship among the above mentioned variables. "Granger Causality Test" was applied to find out the direction of causality. The results reveal long run relationship between Military Expenditure, Gross Fixed Capital Formation, Fiscal Balance and Economic Growth. The results of "ECM" show the short run relationship among these variables. However there is no long run relationship between Health Expenditure, Expenditure on Education and Economic Growth. The speed of adjustment is high which 62.28% is. "Granger Causality" test reveals that "causality runs from Military Expenditure to Economic Growth". It further reveals causality from health expenditure to fiscal balance and from fiscal balance to Military Expenditure. It is concluded that fiscal policy has an important role in boosting economic growth.

Keywords: Cointegration, Expenditure on Education, Fiscal Balance, Gross Fixed Capital Formation, Growth, Health Expenditure, Military Expenditure

Introduction

The effectiveness of Fiscal Policy for achieving macroeconomic goals remained under discussion amongst the economists. The debate is still continuing. Government Expenditure as one of the tools of Fiscal Policy has an important role in achieving the goals of growth and stability in the economy in many developing countries. The relationship between government expenditure and economic growth is continually under study/ investigation amongst the economists/researchers. Some studies support the Keynesian Hypothesis which propounds that government expenditure contributes towards economic growth. Abdullah (2000), Al-Yousif (2000), Ranjan & Sharma (2008), Cooray (2009) concluded in their studies that government expenditure positively contributes in economic growth. It is argued that government expenditure on socioeconomic activities like health, education enhances labor productivity which results in higher production. Similarly government expenditure on infrastructure development such as construction of roads, communication network and provision of electricity will decrease production cost and encourages private investment which le ads to higher national output and thus enhances economic growth.

Some studies examined the Wagner Law for certain economies, according to which state activities increase over time. New state activities are continually added and the old one is performed more efficiently. These state activities are financed by Government Expenditure. Hence economic growth which enhances over time the state functions such as contract enforcement to protect labor class, maintenance of law and order, development of infrastructure for health and education facilities and where lumpy investment is required such as Railway, Power Projects and can only be undertaken by public sector, necessitates higher government expenditure to perform these functions. So it is evident from the Wagner Law that Economic Growth leads to higher Government Expenditure rather than the converse. Ageli (2013), Ebaidalla (2013), Srinivasan (2013), Lalvani (1995), Singh (1997), Sahoo (2001), Verma and Arora (2010)) conclude in the respective study that Wagner Law exists for the economy under discussion respectively.

Some studies conclude that government expenditure has a negative impact on economic growth. It is argued that in order to finance the expenditure government takes the measure of increase in taxes and / or borrowing. An increase in tax on the individuals like income tax will discourage them to put their labor for long hours in order to avoid higher taxes at higher income level. Similarly tax on firms enhances production cost and tax on profits reduces their profits which discourage to enhance production. The government borrowing reduces availability of credit facility for the private sector. It reduces the private sector investment. Hence government borrowing crowds out the private sector investment. This leads to fall in production and thus economic growth. Sometimes to cover some extra mileage on political front and to gain some unnecessary publicity the politicians undertake such projects which are either unproductive or may be executed more efficiently in private sector. This misallocation of resources and inefficient production inhibits economic growth. Laudau (1986), Barro (1991), Engen & Skinner (1992), Folster & Henrekson (2001) conclude in their studies about the negative impact of government expenditure on economic growth.

The composition of Government Expenditure is also important while evaluating the contribution of Government Expenditure towards economic growth. Many studies have been carried out on this aspect. Casasnovas (2010) conclude that composition of public spending instead of its level is more important for effectiveness of public spending on economic growth. Gupta et al. (2005) studied the impact of composition of Government Expenditure on Economic Growth for 39 low income countries and concluded that in the countries where public spending was on wages they experienced lower growth as compared to the countries where public spending was more on capital and nonwage goods. Barro and Sala-i-Martin (2004) argue that in case public spending has direct impact on economic growth then it is productive expenditure otherwise it is unproductive expenditure if it does not have direct effect on economic growth. Nurudeen & Usman (2010) employed a disaggregated approach to study the impact of Government Expenditure on Economic Growth in Nigeria. Muthui et al. (2013) investigated in their study the impact of composition of Government Expenditure on economic growth in Kenya.

In case of Pakistan, Government Expenditure was undertaken to provide infrastructure like construction of roads, telecommunication, health and education facilities, provision of electricity and Sui gas. The security from external aggression and more recently threat of Terrorism within the country remained on the agenda of high concern issues. A reasonable expenditure was incurred on defense and on maintenance of law and order. This all lead to higher Government Expenditure even more than the Revenue. As given in Table 1, the Government Expenditure in has increased from Rs.18091 Million in 1972 to Rs.4106337 Million in 2015. The Government Expenditure in Real Terms, expressed in constant prices of 2006, has increased from Rs.480575 Million in 1972 to Rs.1683948 Million in 2015. The Real GDP per capita, taken as a proxy for economic growth, has increased from Rs. 23410 in 1972 to Rs. 59440 in 2015. Government Expenditure remained in excess of Revenue during the period of study from 1972 to 2015 as given in Table 2. Pakistan experienced a deficit in all the years of Period under study. The Revenue in 1972 was Rs.9762 Million and Government Expenditure in the same year was Rs.18091 Million resulting in a deficit of Rs.-8329 Million which is -15.41 Percent of GDP. The Revenue in 2015 was Rs. 2961896 Million and Government Expenditure in the same year was Rs. 3971312 Million resulting in a deficit of Rs.

-1009416 Million which is -3.69 Percent of GDP. Table 2 further reveals that highest deficit in percentage terms of GDP was -15.41 in 1972 and the lowest was -3.68% in 2005. The table further reveals that fiscal deficit remained high or low in certain periods instead of following a definite pattern.

The components of Government Expenditure also depicted a rising trend as is evident from Table 3. Health Expenditure was Rs.267 Million in 1972 which increased to Rs. 133934 Million in 2015. In percentage terms health expenditure remained 0.49% of Nominal GDP in 1972 and 2015. However it was highest in 1985 and1990 wherein it was 0.91%, 0.90% of GDP respectively. It was lowest in 2010 and 2011 wherein it was 0.28% and 0.30% of GDP respectively. Education Expenditure increased from Rs.853 Million in 1972 to Rs.728407 Million in 2015. In terms of percentage of GDP it increased from 1.58% in 1972 to 2.66% in 2015. Gross Fixed Capital Formation increased from Rs.1585 Million in 1972 to Rs.844512 Million in 2015. In terms of percentage of GDP it increased from 2.93% in 1972 to 3.08% in 2015. Military Expenditure increased in absolute terms from Rs.4515 Million in 1971 to Rs.1013490 Million in 2015. However it decreased in terms of percentage of GDP from 8.35% in 1972 to 3.70% in 2015. Military Expenditure is continually declining in terms of percentage of GDP from 1990 onwards.

The performance of the economy of Pakistan is not enviable. Higher Government Expenditure has not translated into a meaningful growth. The growth rate is 4.7% in 2016 which is a slight improvement over the growth rate of 4% in 2015, though it is higher in 8 years. The new poverty line set by Government is 29.5 % based on data of FY 2014, which by back casting would have been 64.3% in FY2002. Though poverty has declined more than half over a period of 12 years but it has not transformed into sustained wellbeing of the masses (World Bank (2016)). The unemployment is high, Balance of Payments is negative and Pakistan economy is experiencing Trade Deficit with increase in imports and decrease in exports. The unemployment rate was 5.9% in FY2014-15.Trade Deficit and Current Account Deficit was 4.6% and 0.6% of GDP during FY 2015-16. (Pakistan Economic Survey 2015-16)

Keeping the above issues in view, this study attempts to find out the contribution of Components of Government Expenditure, which include Health Expenditure, Expenditure on Education, Gross Fixed Capital Formation, Military Expenditure, towards economic growth represented by Real GDP per Capita. Fiscal Balance has also been included in the analysis to see the relationship of Fiscal Balance and Economic Growth. The paper is organized as follows. Section 1 is introduction, Section 2 contains Literature Review, Section 3 deals with Data and Methodology, Section 4 depicts the Trend of Real GDP per capita and Components of Government Expenditure in Pakistan, Section 5 contains the Empirical Results and discussion thereon, Section 6 is for Conclusions and Section 7 is for Policy Implications.

Literature Review

The empirical studies attempting to find out the relationship between Government Expenditure and Economic Growth came up with conflicting results. Some studies relate Government Expenditure as a whole to Economic Growth while other employ the disaggregated approach for studying the impact of components of Government expenditure on Economic Growth. The main components of Government Expenditure considered for their impact on economic growth are expenditure on health, expenditure on education, public investment, and expenditure on social and physical infrastructure such as construction of roads, power projects. Barro (1990) carried out the analysis of 98 countries and concluded that economic growth is positively related to human capital and negatively related to initial level of Real Per capita GDP. Bose et al. (2003) examined the relationship of components of Government Expenditure and Economic Growth for a panel of 30 developing countries in the 1970s and 1980s. They conclude that there is significant positive correlation between government capital expenditure and economic growth while there is insignificant correlation between Government Current Expenditure and Economic Growth. They further concluded when considering components of Government Expenditure, only investment in education and total Government Expenditure in education has a positive correlation with economic growth given the budget constraints and omitted variables are taken into account. Jiranyakul & Brahmasrene (2007) reported in their study for the economy of Thailand that there is unidirectional causality from Government Expenditure to Economic Growth, though there is no Cointegration between Government Expenditure and Economic Growth. The period of study was from 1993 to 2006. The result of Ordinary Least Squares shows a strong positive impact of Government Expenditure on Economic Growth for the period of study. Alexiou (2009) reported that in seven Eastern European countries that government spending on capital formation, development assistance, private investment and trade openness has positive impact on economic growth while population growth rate has insignificant impact on economic growth. The period of study was from 1995 to 2005 and panel data techniques were used in the analysis. Maku (2009) studied the impact of private investment, human capital investment, government investment and consumption spending on economic growth in Nigeria. The period of study was from 1977 to 2006. It was concluded that private investment and government investment have insignificant impact on Economic Growth during the period of study. However the variables were cointegrated showing a long run relationship while error correction term turned out unit meaning any disequilibrium will be restored in the next period. Nurudeen & Usman (2010) carried out a study for Nigeria for the period 1970 to 2008 and found that capital expenditure, recurrent expenditure and expenditure on education do not contribute to economic growth while expenditure on transport and communication and health has a positive relationship with economic growth. Akpokerere & Ighoroje (2013) carried out study for Nigeria for the period 1977 to 2009 wherein a disaggregated analysis was carried out to find a relationship between components of Government Expenditure and Economic Growth. The study concludes that government capital expenditure, government recurrent expenditure, expenditure on education and expenditure on Power have a negative impact on the economic growth while expenditure on transport and communication and health contribute positively to economic growth. Muthui et al. (2013) studied the impact of components of Government Expenditure on Economic Growth in Kenya. Expenditure on education, health expenditure, public investment, private investment as components of government expenditure was considered in the study. It has been concluded that Education in general has not a significant impact on economic growth; however training to labor force contributes to economic growth through enhancement in productivity of the labor force. Similarly health expenditure in the form of contribution to human capital influences economic growth positively. The study also concluded that both public investment and private investment enhance economic growth and government needs to strike a balance between the two. It was also deduced that military expenditure has a negative impact on economic growth while expenditure on law and order and security, transportation and communication has a positive relationship with economic growth. Mohapatra & Giri (2016) examined the relationship of components of public expenditure and economic growth in India. They reported a long run Cointegrating relationship between economic growth, development expenditure, fiscal deficit and gross private investment. The study further concluded that there is significant impact of development expenditure on economic growth; however the impact of non-development expenditure and revenue expenditure is insignificant. It was also reported in the study that causality runs from development expenditure and from fiscal deficit to economic growth both in the short run and long run.

While considering Pakistan, studies were carried out to examine the relationship of components of Government Expenditure and Economic Growth. Khilji et al. (1997) studied the relationship between Military Expenditure and Economic Growth for Pakistan economy. They reported that there is negative relationship between military expenditure and GDP Growth. Ghani & Din (2006) reported that Private Investment contribute in economic growth in Pakistan while Public Investment and Public Consumption play no significant role. Akram et al. (2008) concluded that health expenditure has an impact on economic growth in the long run but there is no significant relationship between health expenditure and economic growth in the short run in case of Pakistan. Reza & Valeecha (2012) studied the relationship between expenditure on education and economic growth for Pakistan economy. They concluded that there is no relationship between expenditure on education and economic growth in the short run as well as in the long run. Anwar et al. (2012) reported a long run relationship between expenditure on defense and economic growth for Pakistan economy. They further observed a unidirectional causality running from economic growth to defense spending. Javed et al. (2013) reported that in Pakistan economy there is positive relationship between expenditure on health and economic growth in the short run while there is positive relationship between expenditure on education and economic growth in the long run. They further concluded that there is positive relationship between primary school enrolment and economic growth while there is negative relationship between secondary school enrolment and economic growth in the short run as well as in the long run in case of Pakistan. Shahbaz et al. (2013) reported a negative relationship between military spending and economic growth for Pakistan economy. They reported a causal relationship running from military expenditure to economic growth. Ali et al. (2013) reported that in case of Pakistan development expenditure has a positive impact on economic growth while non-development expenditure has insignificant impact on economic growth. They further concluded that public investment and private investment are complements to each other. Tanveer & Manan (2016) reported a positive relationship between infrastructure development and economic growth in Pakistan. The variables used in the study are GDP, Gross Capital Formation, Electricity Generation, Total Lngth of Roads, Total Telephone Lines, per capita Health Expenditure and CPI. Farooq (2016) reported that both development expenditure and recurrent expenditure contribute to economic growth in Pakistan economy.

Literature covering the relationship between Government Expenditure and economic growth is enormous. However few studies were carried out to find out a relationship between components of Government Expenditure and economic growth for a particular country. The present study is an attempt to fill the gap for a developing country like Pakistan. The present study differs from previous studies relating to Pakistan that it analyzes the impact of health expenditure, expenditure on education, Gross Fixed Capital Formation, Military Expenditure and Fiscal Imbalance together on Real GDP per capita taken as proxy for growth, while earlier studies considered separately the impact of individual or a mix of 2-3 components of Government Expenditure on Economic Growth.

Data and Methodology

The period of study is from 1972 to 2015. The data for this study has been obtained from different sources which include World Development Indicators (WDI) database, State Bank of Pakistan Publication titled “Handbook of Statistics on Pakistan Economy 2015”, SIPRI database and Pakistan Economic Surveys of different years. Data for Real GDP per capita, Expenditure on Education as percentage of GDP has been obtained from WDI. Data for Health Expenditure, Gross Fixed Capital Formation and Fiscal Balance has been obtained from aforementioned Publication of State Bank of Pakistan and Pakistan Economic Surveys of different years. Data for Military expenditure has been obtained from SIPRI database.

ARDL Bounds Testing Technique for cointegration was used to determine the long run relationship amongst the variables. VECM technique was applied to determine the dynamics of Short Run relationship in relation to long run relationship amongst the variables and also to obtain error correction term with its significance. Granger Causality Test was carried out to determine the direction of causality amongst the variables. Diagnostic Tests such as Autocorrelation Test, Heteroskedasticity Test, ARCH Effects Test, RMSE Test, Normality Test, CUSUM Test, CUSUM of Squares Test, were also carried out to determine the robustness of results. These techniques were applied using EViews 9.

Trend of Real GDP per capita and Components of Government Expenditure in Pakistan

Table 1: Natural Log of Real GDP per capita, and Components of Government Expenditure as percentage of GDP.

Year	lrgdpc	Hpc	Edupc	gfcfpc	fbpc	Mpc
1972	10.06	0.49	1.58	2.93	-15.41	8.35
1973	10.10	0.58	1.85	4.01	-14.39	7.52
1974	10.11	0.74	1.90	4.36	-20.05	8.09
1975	10.12	0.88	2.01	4.37	-11.64	7.34
1976	10.14	0.74	2.22	4.55	-10.05	6.25
1977	10.15	0.71	2.12	3.78	-9.63	6.57
1978	10.19	0.69	2.20	3.73	-10.37	6.01
1979	10.20	0.71	2.20	3.51	-8.27	6.56
1980	10.26	0.74	2.13	4.08	-7.09	6.61
1981	10.31	0.73	1.97	4.56	-6.86	6.79
1982	10.34	0.74	2.01	4.05	-8.62	7.71
1983	10.37	0.85	2.00	3.98	-7.61	7.44
1984	10.39	0.80	2.07	3.87	-9.39	7.69
1985	10.43	0.91	2.44	3.91	-9.44	7.62
1986	10.45	1.14	2.68	4.14	-9.43	7.77
1987	10.48	1.25	2.98	4.30	-11.07	8.21
1988	10.52	1.08	2.66	3.84	-9.19	7.55
1989	10.54	0.94	2.36	3.76	-8.16	7.15
1990	10.55	0.90	2.52	4.31	-11.35	7.83
1991	10.57	0.84	2.57	4.23	-10.32	7.77
1992	10.62	0.80	2.56	4.02	-9.05	7.55
1993	10.61	0.79	2.40	3.82	-7.06	7.13
1994	10.63	0.77	2.61	3.75	-7.07	6.92
1995	10.65	0.88	2.82	3.37	-8.03	6.65
1996	10.67	0.87	2.81	2.49	-7.39	6.23
1997	10.66	0.81	3.02	2.45	-8.42	5.81
1998	10.66	0.78	2.82	2.32	-6.69	5.56

Year	lrgdpc	Hpc	Edupc	gfcfpc	fbpc	Mpc
1999	10.67	0.75	2.61	2.24	-7.02	5.31
2000	10.69	0.63	1.84	1.75	-4.70	4.26
2001	10.69	0.60	1.90	1.67	-4.52	4.49
2002	10.70	0.65	1.70	1.96	-4.06	4.54
2003	10.72	0.67	2.10	2.56	-2.67	4.68
2004	10.78	0.67	1.95	2.71	-3.85	4.49
2005	10.83	0.62	2.25	3.05	-3.68	4.51
2006	10.87	0.61	2.63	3.24	-4.59	3.72
2007	10.90	0.65	2.64	3.66	-8.41	3.71
2008	10.89	0.69	2.75	4.07	-6.40	3.69
2009	10.90	0.60	2.59	3.09	-7.04	3.55
2010	10.89	0.28	2.29	2.98	-8.03	3.69
2011	10.90	0.30	2.22	3.26	-9.63	3.57
2012	10.91	0.63	2.14	2.51	-9.15	3.72
2013	10.93	0.77	2.49	2.64	-6.21	3.61
2014	10.96	0.80	2.47	2.97	-5.81	3.75
2015	10.99	0.49	2.66	3.08	-3.69	3.70

Source: State Bank Publication, Economic Surveys of Pakistan (Different Years). WDI and SIPRI

lrgdpc is Natural Log of Real GDP per Capita

hpc is Health Expenditure as percentage of GDP
edupc is Expenditure on Education as percentage of GDP
gfcfpc is Government Fixed Capital Formation as percentage of GDP
fbpc is Fiscal Balance (Total Revenue – Total Government Expenditure) as Percentage of GDP
mpc is Military Expenditure as percentage of GDP.
The data given in Table 1 has been depicted in Graph in the following Figure 1.

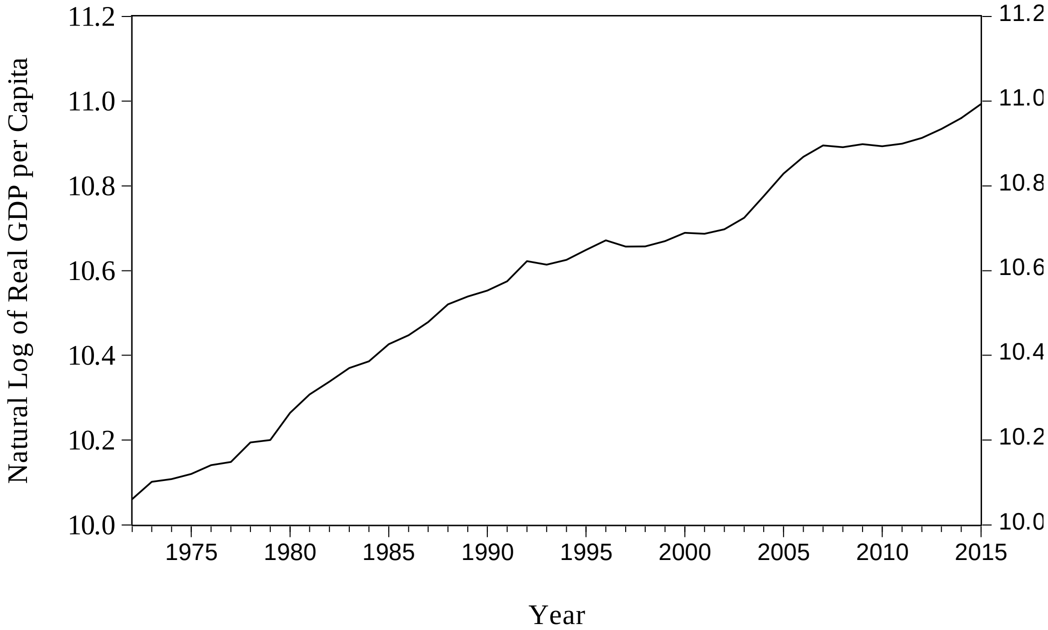

Figure 1 : Trends in Natural Log of Real GDP per Capita

There is persistent increase in Natural Log of Real GDP per capita during the period of study from 1972 to 2015 as indicated in Figure 1. It increased from 10.06 in 1972 to 10.99 in 2015.

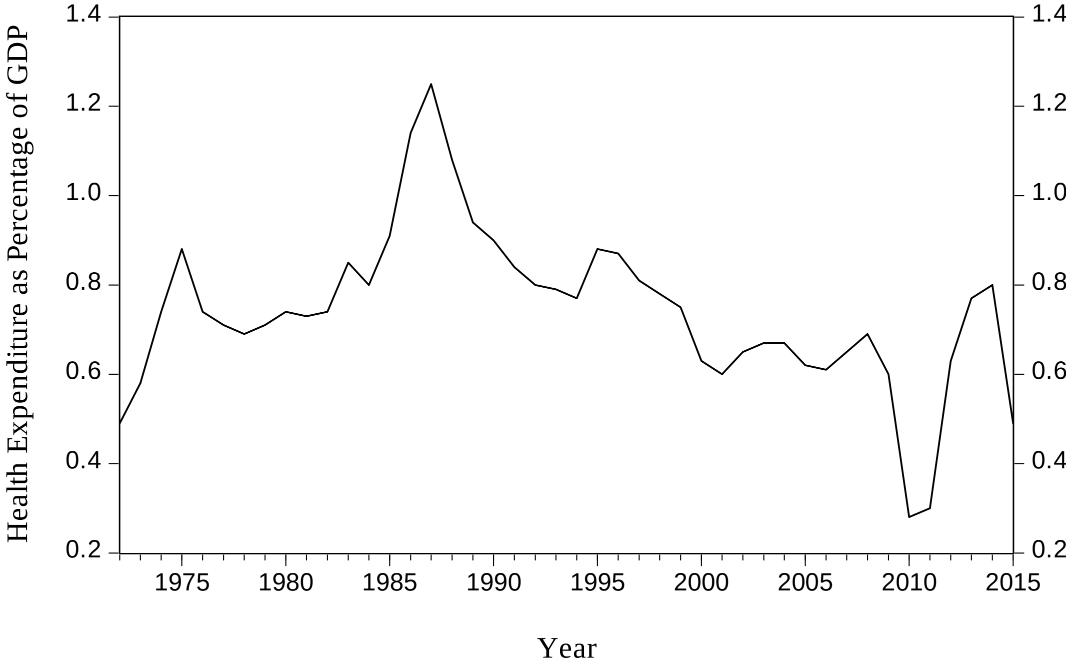

Figure 2 : Trends in Health Expenditure

The pattern of Health Expenditure as percentage of GDP is marred with ups and down throughout the period of study as depicted in Figure 2. The highest percentage is 1.25 in 1987 while the lowest percentage of health expenditure is 0.28 in 2010. However the expenditure has started increasing after 2010 but still lower than its peak in 1987.

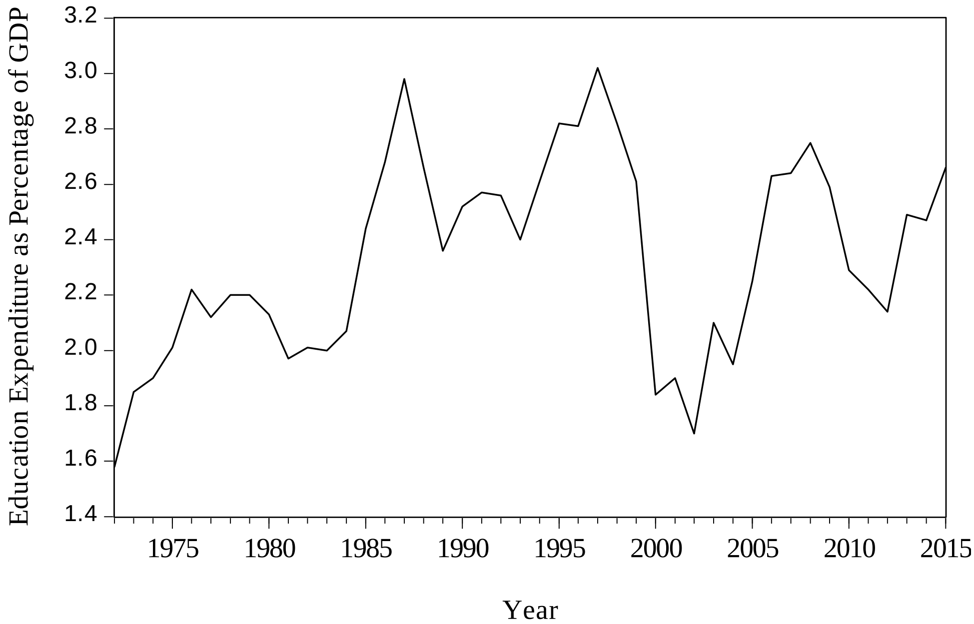

Figure 3 : Trends in Expenditure on Education

Ups and down in Expenditure on Education as percentage of GDP are observed during the period of study as given in Figure 3. The highest percentage of expenditure was 3.02 in 1997. The lowest percentage of expenditure was 1.70 in 2002. This sector may be of low priority for the Military Regime from 1999 to 2002 after which the democratic process was stated with the election in 2002. The expenditure continued to rise and reached the highest in 2008 with 2.75 percent. It continues to decline till 2012 with 2.14 percent in 2012. The education expenditure is increasing since 2012.

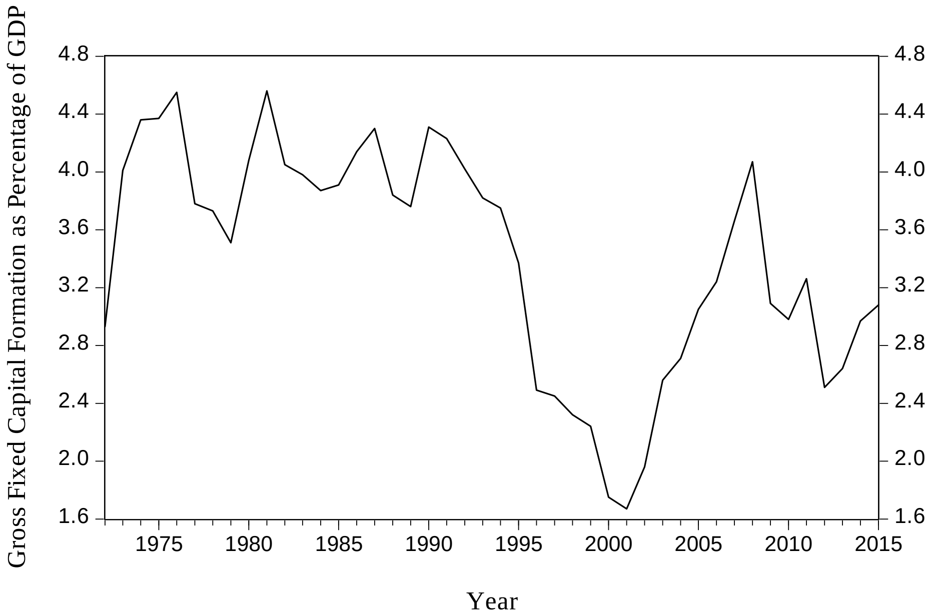

Figure 4 : Trends in Gross Fixed Capital Formation

Gross Fixed Capital Formation as percentage of GDP is highest in 1981 with 4.76 percent. It is lowest in 2001 with 1.67 percent. This fall may be an outcome of military regime since 1999 which did not give priority to this aspect of the economy. It continued to rise to 4.07 percent from 2001 to 2008 after which it is continually declining with sporadic rise in some years.

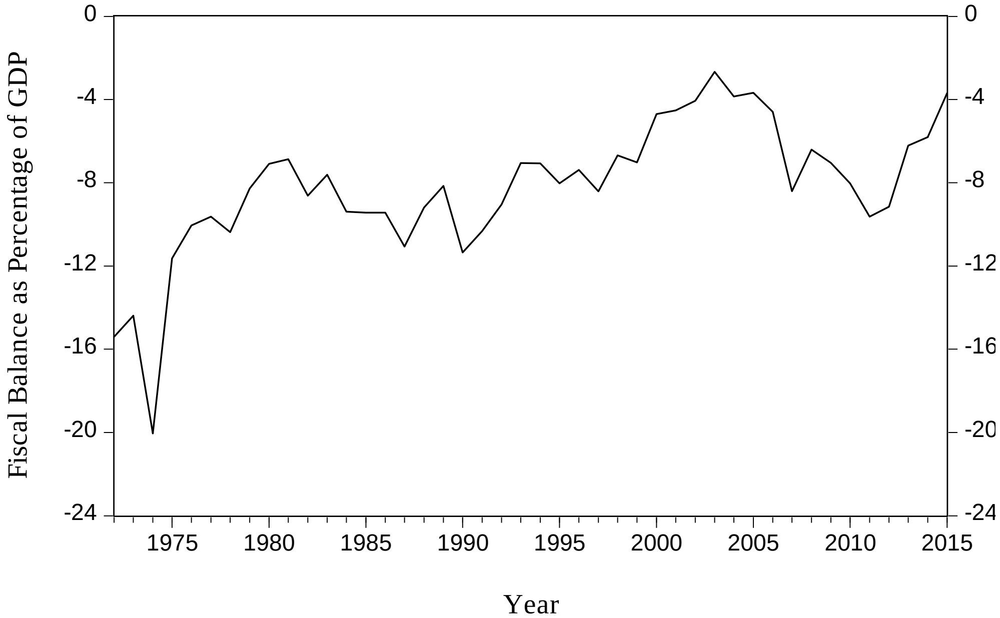

Figure 5 : Trends in Fiscal Balance

The fiscal balance was highest with -20 percent in 1974 and it was lowest with -2.7 percent in 2003. It continued to rise to -9.6 percent till 2011 after which it stated falling. It was -3.7 percent of GDP in 2015. To contain and lower the Fiscal Balance is one of the targets of Policy Makers in line with requirement of Aid Giving agencies.

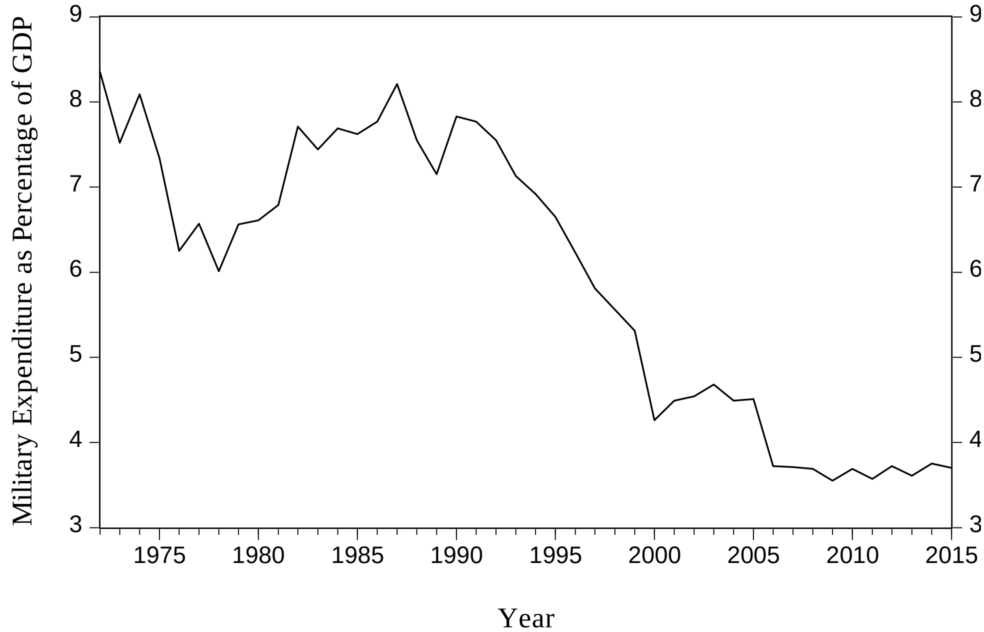

Figure 6 : Trends in Military Expenditure

The military expenditure was lowest with 6.01 percent of GDP in 1978 and continued to rise to 8.2 percent till 1987. This was due to Russian invasion of Afghanistan in 1979 which continued till April 1988. Pakistan was getting military hardware from USA and other countries and spending out of its own resources to boost up its defense capabilities. The military expenditure is continually declining since 1987 and it was 3.7 percent of GDP in 2015 as it is also one of the requirements of Aid Giving agencies to curtail Military Expenditure and allocate more for development expenditure.

The above mentioned pattern of components of Government expenditure do not show a predictable rising or falling trend except that of Military expenditure which is declining since 1987 because of conditions imposed by Aid giving agencies to curtail military expenditure.

The purpose of this study is to explore the impact of these components of government expenditure on economic growth represented by Natural Log of Real GDP per capita.

Empirical Results and Discussion

Summary Statistics

Summary Statistics of the variables included in this study, are given in Table 2.

Table 2: Summary Statistics of the Variables

	LRGDPC	HPC	EDUPC	GFCFPC	FBPC	MPC
Mean	10.56802	0.740227	2.335000	3.407500	-8.216136	5.947045
Median	10.62390	0.740000	2.325000	3.695000	-8.095000	6.405000
Maximum	10.99272	1.250000	3.020000	4.560000	-2.670000	8.350000
Minimum	10.06092	0.280000	1.580000	1.670000	-20.05000	3.550000
Std. Dev.	0.276942	0.181306	0.355655	0.789433	3.255055	1.656183
Skewness	-0.309667	0.121814	-0.056341	-0.508826	-1.160783	-0.225292
Kurtosis	1.949492	4.482020	2.118231	2.214595	5.755936	1.499407
Jarque-Bera	2.726425	4.135518	1.448724	3.029535	23.80557	4.500474
Probability	0.255838	0.126469	0.484634	0.219859	0.000007	0.105374
Sum	464.9928	32.57000	102.7400	149.9300	-361.5100	261.6700
Sum Sq. Dev.	3.297954	1.413498	5.439100	26.79783	455.6014	117.9465
Observations	44	44	44	44	44	44
LRGDPC	1					
HPC	-0.2699562431	1				
EDUPC	0.43958491252	0.43106987475	1			
GFCFPC	-0.5401955087	0.39246074722	0.0682227792	1		
FBPC	0.65779171959	-0.1583615192	0.16070768088	-0.5353655537	1	
MPC	-0.7897531427	0.60373997890	-0.0793124616	0.62658047164	-0.6350614823	1

Table 2 contains the overall Summary Statistics of the variables and correlation amongst these variables. The variables are normally distributed except that of Fiscal Balance (as percentage of GDP) as is evident from the Probability values relating to Jarque-Bera statistics of the respective variable. The correlation matrix at the end of the Table 2 indicates a negative correlation between Real GDP per capita and Health Expenditure, Gross Fixed Capital Formation and Military Expenditure respectively. However there is positive correlation between Real GDP per capita and Expenditure on Education, and Fiscal Balance respectively. There is positive correlation between Health Expenditure and Expenditure on Education, Gross Fixed Capital Formation, and Military

Expenditure respectively. However there is negative correlation between Health Expenditure and Fiscal Balance. There is positive correlation between Expenditure on Education and Gross Fixed Capital Formation, and Fiscal Balance respectively. However there is very weak negative correlation between Expenditure on Education and Military Expenditure. There is negative correlation between Government Fixed Capital Formation and Fiscal Balance while there is positive correlation between Government Fixed Capital Formation and Military Expenditure. The correlation between Fiscal Balance and Military Expenditure is negative.

Econometric Technique

ARDL bounds testing technique for cointegration has been used to determine the long run relationship amongst the variables following Pesaran & Shin (1998) and Pesaran et al. (2001). To apply this technique the sample size should be small as it gives efficient results for small sample. The variables should either be Integrated of order zero i.e. I(0) or Integrated of order one i.e. I(1) or a mix of two i.e. I(0) /I(1). However neither of the variables should be I(2), in which case F-statistic becomes invalid for interpretation of results for long run relationship.

Unit Root Tests

To find out the order of integration of variables Augmented Dicky Fuller Test of unit root, developed by Dicky and Fuller (1979), was applied. The results of order of integration for the variables at levels are given in Table 3_a. The results of order of integration for the variables at First Difference are given in Table 3_b.

Table 3_a: Augmented Dicky Fuller Tests (At Levels)

Sr. No	Variables	Levels with no Intercept and no Trend		Levels with Intercept and No Trend		Levels with Intercept and Trend		Decision (at 5% level of Significance)
		t-Statistic	Prob.	t-Statistic	Prob.	t-Statistic	Prob.	
1.	lrgdpc	3.733204	0.9999	-0.934881	0.7672	-1.667607	0.7479	Not I(0)
2.	Hpc	-0.593550	0.4541	-1.502426	0.5224	-3.898141	0.0208	I(0)
3.	edupc	0.319209	0.7733	-3.579195	0.0106	-3.751035	0.0299	I(0)
4.	gfcfpc	-0.336429	0.5581	-1.778687	0.3858	-2.746449	0.2242	Not I(0)
5.	fbpc	-1.721148	0.0806	-2.696454	0.0829	-3.306509	0.0788	Not I(0)
6.	mpc	-1.826980	0.0649	-0.944703	0.7641	-1.676889	0.7443	Not I(0)
	Critical Values							
	at 1%	-2.621185		-3.59661		-4.19233		
	at 5%	-1.948886		-2.93315		-3.52078		
	at 10%	-1.611932		-2.60486		-3.19127		

Table 3_b: Augmented Dicky Fuller Tests (At First Difference)

Sr. No	Variables	First Difference with no Intercept and no Trend		First Difference with Intercept and no Trend		First Difference with Intercept and Trend		Decision (at 5% level of Significance)
		t-Statistic	Prob.	t-Statistic	Prob.	t-Statistic	Prob.	
1.	lrgdpc	-2.830849	0.0057	-4.993324	0.0002	-4.981501	0.0012	I(1)
2.	Hpc	-6.393912	0.0000	-6.284179	0.0000	-6.330381	0.0000	I(0) as in previous Table
3.	edupc	-5.864633	0.0000	-5.828916	0.0000	-5.739561	0.0001	I(0) as in previous Table
4.	gfcfpc	-6.274563	0.0000	-6.207356	0.0000	-6.083562	0.0000	I(1)
5.	fbpc	-8.392540	0.0000	-8.446594	0.0000	-8.364034	0.0000	I(1)
6.	mpc	-7.246771	0.0000	-7.529881	0.0000	-7.442390	0.0000	I(1)
	Critical Values							
	at 1%	-2.621185		-3.59661		-4.192337		
	at 5%	-1.948886		-2.93315		-3.520787		
	at 10%	-1.611932		-2.60486		-3.191277		

The variables have already been defined in Table 1. The results in Table 3_a and Table 3_b reveal that 2 variables viz. hpc and edupc are I(0) while the remaining 4 variables viz. lrgdpc, gfcfpc, fbpc and mpc are I(1). Hence variables under study are a mix of I(0) and I(1). However none of the variables is I(2). This aspect validates the application of ARDL Bounds Testing Technique for cointegration to determine the long run relationship amongst the variables included in the present study.

Unit Root Test with Structural Break

In order to check the integration of variables with structural breaks, Zivot-Andrews Structural Break Unit Root Test was applied (Zivot & Andrews(1992)). The test finds out the single break point unit root. The results are given in Table-4.

These results also confirm that order of integration of variables is a mix of I(0) and I(1) and none of the variables is I(2).

Since the results of ADF Test and Zivot-Andrews Structural Break Test reveal that the variables under study are a mix of I(0) and I (1) and neither one is of I(2), hence we may apply ARDL Bounds Test for Cointegration to determine the long run and short run relationship of the variables. Accordingly ARDL approach is followed to determine the cointegration among the variables under study.

Following Model is considered for establishing a Long Run Relationship amongst the variables

$$lrgdpc = \beta_0 + \beta_1 * hpc + \beta_2 * edupc + \beta_3 * gfcfpc + \beta_4 * fbpc + \beta_5 * mpc + \mu_t \qquad (\mathrm{M}-1)$$

Lag Order Selection

The next step before applying the ARDL Test is to determine the lag length. The Unrestricted VAR in EViews 9.5, with all the variables as endogenous variables is applied for this purpose.

Following are the results in Table 5:

Table 4: Zivot-Andrews Unit Root Test Results

Null Hypothesis: Variable has a unit root						
Variables	**Test for Break in Intercept**		**Test for Break in Trend**		**Test for Break in Intercept and Trend**	
	Levels	**1st Differences**	**Levels**	**1st Differences**	**Levels**	**1st Differences**
	Test Statistic (Minimum t-Statistic)	Test Statistic (Minimum t-Statistic)	Test Statistic (Minimum t-Statistic)	Test Statistic (Minimum t-Statistic)	Test Statistic (Minimum t-Statistic)	Test Statistic (Minimum t-Statistic)
Lrgdpc	-3.735 at 1980	-5.474* at 1993	-3.627 at 1988	-5.267* at 1981	-3.667 at 1980	-5.547** at 1993
Hpc	-5.037** at 1985	-6.245* at 1988	-4.605** at 1988	-5.457* at 1975	-5.763* at 1985	-6.527* at 1988
Edupc	-6.450* at 2000	-4.485*** at 2005	-4.499** at 1991	-4.226*** at 2001	-6.186* at 2000	-4.473 at 2005
Gfcfpc	-3.879 at 2005	-6.730* at 2002	-3.536 at 2001	-6.133* at 1997	-4.394 at 1996	-6.734* at 2002
Fbpc	-4.944** at 1975	-9.221* at 1975	-4.192** at 1977	-9.221* at 1976	-5.265** at 1975	-10.964* at 1977
Mpc	-3.516 at 1982	-8.455* at 1992 (obs 21)	-3.314 at 1987	-7.713* at 2001	-3.294 at 1995	-8.682* at 1977
Level of Significance	Test critical Values.	Test critical Values.	Test critical Values.	Test critical Values.	Test critical Values.	Test critical Values.
1% level	-5.34	-5.34	-4.93	-4.93	-5.57	-5.57
5% level	-4.80	-4.80	-4.42	-4.42	-5.08	-5.08
10% level	-4.58	-4.58	-4.11	-4.11	-4.82	-4.82

Notes:- i) *, **, * indicate significance at 1%, 5% and 10% respectively**

Table 5: VAR Lag Order Selection Criteria

Exogenous variables: C
Sample: 1972 2015
Included observations: 41

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-657.0669	NA	620498.0	33.20334	33.49890	33.31021
1	-436.8241	352.3885	123.2629	24.64120	27.00563*	25.49611
2	-391.3252	56.87360	184.9937	24.81626	29.24957	26.41920
3	-315.6490	68.10857*	96.99399	23.48245	29.98464	25.83344
4	-209.5876	58.33376	32.06355*	20.62938*	29.20044	23.72841*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

The results suggest lag order is 4 as maximum star appear with the results of lag 4 which suggest the minimum value of the respective criteria.

ARDL Bounds Testing Approach for Cointegration

Model

The following model was used in applying the ARDL Technique for cointegration as presented in a study by Belloumi (2014) :-

$$D((LRGDPC)_t)) = \alpha_{01}+\beta_{11}(RGDPC)_{t-1} + \beta_{21}(HPC)_{t-1} + \beta_{31}(EDUPC)_{t-1} + \beta_{41}(GFCFPC)_{t-1} + \beta_{51}(FBPC)_{t-1} + \beta_{61}(MPC)_{t-1} + \sum_{i=1}^{p} \alpha_{1i} D((LRGDPC)_{t-i}) + \sum_{i=1}^{q} \alpha_{2i} D((HPC)_{t-i}) + \sum_{i=1}^{q} \alpha_{3i} D((EDUPC)_{t-i}) + \sum_{i=1}^{q} \alpha_{4i} D((GFCFPC)_{t-i}) + \sum_{i=1}^{q} \alpha_{5i}\, D((FBPC)_{t-i}) + \sum_{i=1}^{q} \alpha_{6i}\, D((MPC)_{t-i}) + u_{1t} \quad (1)$$

The bounds test is based on joint F-Statistic which has non-standard symmetric distribution under the Null Hypothesis of no cointegration. Firstly the above mentioned equation is estimated using ordinary least squares. The existence of long run relationship among the variables is established through these estimates by testing the joint significance of the coefficients of lagged levels of the variables by applying F test. The Null Hypothesis is H_0: $\beta_{11} = \beta_{21} = \beta_{31} = \beta_{41} = \beta_{51} = \beta_{61} = 0$ and Alternative Hypothesis is H_1: $\beta_{11} \neq \beta_{21} \neq \beta_{31} \neq \beta_{41} \neq \beta_{51} \neq \beta_{61} \neq 0$. The F-statistic which normalizes the function in the given equation is denoted by F_{DV}(DV\IV(List)), where DV is Dependent Variable and IV is Independent Variable(s); List means all the independent variables are to be included in the expression. Two sets of critical values are obtained for a given level of significance (Pesaran et al. (2001)). The set of lower values is called the lower bound which is obtained on the assumption that all variables are of integral order of zero i.e. I(0). The set of higher values is called upper bound which is obtained on the assumption that all variables are of integral order of one i.e. I(1). If the F-test statistic is more than the upper bound of the Critical Values then Null Hypothesis is rejected and it is concluded that there is cointegration amongst the dependent variable and independent variables. If the F-test statistic is less than the lower bound of the critical values then Null Hypothesis is not rejected and we conclude that there is no cointegration amongst the dependent and independent variables. In case the F-test statistic falls between the upper bound and lower bound values then it is indeterminate case; neither the Null Hypothesis can be accepted nor can it be rejected.

ARDL bounds test was carried out with a maximum lag of 4 using Akike Information Criteria. The Restricted Linear Trend was included as exogenous variable. The results are reported in Table 6.

Table 6: Tests Results of ARDL Bounds Testing

	Dependent Variable lrgdpc					
Equation No.	Dependent Variable	Independent Variables	Model (Indicating AIC Lags)*	F-Statistic	K	Decision (at 5% Critical Values of Bounds I0 and I1)
1	**2**	**3**	**4**	**5**	**6**	**7**
1	Lrgdpc	hpc, edupc, gfcfpc, mpc, fbpc (with Restricted Linear Trend)	(1, 0, 1, 4, 2, 3)	4.87792	5	Cointegration
Critical Value Bounds						
Significance	I0 (No Constant) Bound	I1 (No Constant) Bound	I0 (Unrestricted Constant) Bound	I1 (Unrestricted Constant) Bound	I0 (Restricted Constant) Bound	I1 (Restricted Constant) Bound
10%			2.12	3.23	1.99	2.94
5%			2.45	3.61	2.27	3.28
2.5%			2.75	3.99	2.55	3.61
1%			3.15	4.43	2.88	3.99
Significance	I0 (Restricted Linear Trend) Bound	I1 (Restricted Linear Trend) Bound				
10%	2.49	3.38				
5%	2.81	3.76				
2.5%	3.11	4.13				
1%	3.5	4.63				

Note :- * The figures in parentheses in Col 4 indicate the No. of AIC Lags of Dependent Variable and Independent Variables as given in Col 2 and Col 3 respectively, in the same order.

These results indicate that there is long run relationship amongst the variables when Growth represented by Real GDP per Capita in logarithmic form is dependent variable and rest of the variables are dependent variables (Equation 1). Since the F-statistic 4.87792 is higher than the upper bound (I1) at all level of significance for Restricted Linear Trend. Hence Null Hypothesis of no cointegration is rejected for Equation 1. These results reveal that there is robust relationship amongst the variables i.e. Real GDP per capita, Health Expenditure, Expenditure on Education, Gross Fixed Capital Formation, Fiscal Balance and Military Expenditure.

Granger Short-Run and Long-Run Causality Tests

Once the cointegration is established, the long run conditional ARDL model ($p, q_1, q_2, q_3, q_4, q_5$) for the Equation 1 with LRGDPPC (Growth in logarithmic form) as dependent variable is estimated as follows:-

$$(LRGDPPC)_t = \alpha_{01} + \sum_{i=1}^{p} \alpha_{1i}\,(LRGDPC)_{t-i} + \sum_{i=0}^{q1} \alpha_{2i}(HPC)_{t-i} + \sum_{i=0}^{q2} \alpha_{3i}(EDUPC)_{t-i} + \sum_{i=0}^{q3} \alpha_{4i}(GFCFPC)_{t-i} + \sum_{i=0}^{q4} \alpha_{5i}(FBPC)_{t-i} + \sum_{i=0}^{q5} \alpha_{6i}(MPC)_{t-i} + \varepsilon_{1t} \quad (2)$$

The ARDL model selected using Akike Information Criterion (AIC) in Equation 2 is ARDL (1, 0, 1, 4, 2, 3). The results of long run relationship are reported in Table 7.

Long Run Coefficients alongwith Standard Error, t-Statistic and Probability have been given in Table 7 for the equation 1, where cointegration exists among the variables, as given in the above Table 6. The dependent variable is Real GDP per capita in Logarithmic Form while independent variables are Health Expenditure, Expenditure on Education, Gross Fixed Capital Formation, Fiscal Balance and Military Expenditure. All dependent variables are expressed as percentage of GDP. The Lag Order was followed as given in the above Table 5, based on VAR Lag Order Selection Criteria.

The estimated long run coefficients are significant for Gross Fixed Capital Formation, for Military Expenditure and for Fiscal Balance but not significant for Health Expenditure and Expenditure on Education at 5% level of significance.

Table 7: Estimated Long Run Coefficients (Dependent Variable (lrgdpc))

Dependent Variable	Independent Variables	Coefficient	Standard Error	t-Statistic	Probability
Lrgdpc (Equation 1)	HPC	0.032644	0.030403	1.073718	0.2946
	EDUPC	0.004851	0.015688	0.309245	0.7600
	GFCFPC	0.041803	0.011781	3.548248	0.0018*
	MPC	0.031572	0.005016	6.294029	0.0000*
	FBPC	0.012769	0.002966	4.304991	0.0003*
	@TREND	0.024111	0.000596	40.427362	0.0000*

Note: *, **, *** indicate significance at 1%, 5% and 10% level of significance respectively

The results indicate no long run relationship between Health Expenditure and Economic Growth. However in earlier studies the results are mixed one. Odubunmi, et al. (2012) found in the study for Nigeria, a positive long run relationship between Expenditure on Health Care and economic growth amongst the variables viz. Real Gross Domestic Product, foreign aid, Health Expenditure, Population and Total Saving. They further concluded that these variables are connected through transmission mechanism. Georgiou (2013) concluded in the study, using worldwide panel data analysis, that the relationship between Health Expenditure and Economic Growth is positive beyond a critical level of Health Expenditure as Percentage of GDP. Oluwatobi & Ogunrinola (2011) studied the relationship of Capital Expenditure and Recurrent Expenditure on human capital, which includes expenditure on health and education, with level of real output. They concluded that there is positive relationship between Government Recurrent Expenditure on Human Capital Development and economic growth, however there is negative relationship between Government Capital Expenditure on Human Capital Development and economic growth. Akram et al. (2008) concluded that there is no long run relationship between health expenditure and GDP per capita in case of Pakistan. Aurangzeb (2003) reported a long run as well as short run relationship between health expenditure and GDP.

The results in Table 7 reveal that there is no long run relationship between expenditure on education and Real GDP per capita. The results in earlier studies are either supporting this or some studies conclude contrary to this notion. Ghosh Dastidar & Chatterji (2015) carried out a study to measure the relationship between expenditure on primary, secondary and tertiary sectors of education and economic growth for the period 1951 to 2011in case of India. They reported a positive long run relationship between the expenditure on different sectors of education and economic growth after 1980s. However they concluded that prior to 1980s there was no relationship between expenditure on different sectors of education and economic growth. Oluwatobi & Ogunrinola (2011) reported a positive relationship between education expenditure and economic growth in case of Nigeria. Reza & Valeecha (2012) reported in their study that there is no long run or short run relationship between education expenditure and economic growth in case of Pakistan.

Gross Fixed Capital Formation has a positive significant impact on Real GDP per capita (representing Growth) at 1% level of significance. This implies that Gross Fixed Capital Formation contributes towards economic Growth. Ghani & Din (2006) concluded in their study that public investment does not contribute to economic growth while private investment does so in the context of Pakistan economy. Uddin & Aziz (2014) reported a positive relationship between Public Investment and economic growth in Bangladesh.

The above mentioned results indicate a positive long run relationship between Military Expenditure and economic growth. A study carried out by Khilji et al. (1997) concluded that there is negative relationship between defense burden and economic growth in Pakistan. Anwar et al. (2012) found a long run relationship between defense spending and economic growth in Pakistan, but relation is flowing from economic growth to defense spending. Shahbaz et al. (2013) reported in their study a stable long run relationship between defense spending and economic growth, however relationship is negative as defense spending slows down the economic growth.

The results show a long run significant positive relationship between Fiscal Balance (Fiscal Deficit in this study) and economic growth. Mohapatra & Giri (2016) reported in the study that Fiscal Deficit is a bottleneck to economic growth in case of India.

The long run coefficients further reveal that a 1% increase in Gross Fixed Capital Formation will increase economic growth by 0.04%. A 1% increase in Military Expenditure will increase economic growth by 0.03%. A 1% increase in fiscal balance (deficit) will increase economic growth by 0.01%.

VECM

An error correction model associated with the long run estimates is estimated to obtain the dynamic short run parameters following Odhiambo (2009), Naryan & Smyth (2008). The Equation 1 above where Null Hypothesis of No Cointegration was rejected is estimated with the lagged error-correction term following Naryan & Smyth (2008) and Morley (2006).

The Vector Error Correction Model (VECM) is specified as follows:-

$$D((L\text{RGDPC})_t) = \alpha_{01} + \sum_{i=1}^{p} \alpha_{1i} D((LRGDPC)_{t-i}) + \sum_{i=1}^{q} \alpha_{2i} D((HPC)_{t-i}) + \sum_{i=1}^{q} \alpha_{3i} D((EDUPC)_{t-i}) + \sum_{i=1}^{q} \alpha_{4i} D((GFCFPC)_{t-i}) + \sum_{i=1}^{q} \alpha_{5i} D((FBPC)_{t-i}) + \sum_{i=1}^{q} \alpha_{6i} D((MPC)_{t-i}) + \beta_1\, ect_{t-1} + v_{1t} \quad (3)$$

Here $\alpha_{1i}, \alpha_{2i}, \alpha_{3i}, \alpha_{4i}, \alpha_{5i}, \alpha_{6i}$ are the short run dynamic coefficients of the convergence of the model while β_1 is the speed of adjustment.

The results of short run dynamic coefficients associated with long run relationships estimated from Equation 3 are given in Table 8.

Table 8: Estimated Coefficients of VECM (Dependent Variable D(LRGDPC))

Original dep. variable: LRGDPC Selected Model: ARDL(1, 0, 1, 4, 2, 3) Sample: 1972 2015 Included observations: 42					
Selected Model: ARDL(1, 0, 1, 4, 2, 3)					
Model	**Variable**	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
(1, 0, 1, 4, 2, 3) Equation 1 (Dependent Variable lrgdpc)	D(HPC)	0.019441	0.014472	1.343368	0.1928
	D(EDUPC)	-0.015664	0.007762	-2.018096	0.0559***
	D(GFCFPC)	0.020616	0.004500	4.581154	0.0001*
	D(GFCFPC(-1))	-0.007276	0.004619	-1.575377	0.1294
	D(GFCFPC(-2))	0.009167	0.004253	2.155209	0.0424**
	D(GFCFPC(-3))	-0.010987	0.003738	-2.939253	0.0076*
	D(MPC)	-0.009012	0.004347	-2.073402	0.0500**
	D(MPC(-1))	-0.012084	0.006243	-1.935715	0.0659***
	D(FBPC)	-0.000384	0.001048	-0.366070	0.7178
	D(FBPC(-1))	-0.005234	0.001500	-3.489011	0.0021*
	D(FBPC(-2))	-0.002374	0.000983	-2.413711	0.0246**
	C	6.118129	0.922166	6.634522	0.0000
	CointEq(-1)	-0.622793	0.094230	-6.609266	0.0000*
	R-squared	0.999074	-	-	-
	F-statistic	1395.659	-	-	0.0000*
	DW-statistic	1.992238	-	-	-

Note :- *, **, *** indicate significance at 1%, 5% and 10% level of significance

The model is globally significant as Probability of F-statistic is 0.000 implying that underlying ARDL Model of Equation 3 fits well.

The coefficient of Education Expenditure is significant at 10% level of significance and has a negative relationship with economic growth. A 1% increase in Education Expenditure dampens economic growth by 0.01 percent. The impact is though economically negligent but signals misallocation of resources to such projects which are not contributing towards economic growth rather taxing the precious resources.

Gross Fixed Capital Formation (GFCFPC) of current year and that of three year earlier are significant at 1% level of significance and have positive and negative relationship with economic growth respectively, while Gross Fixed Capital Formation 2 year earlier is significant at 5% level of significance and has negative relationship with economic growth. A 1 percent increase in Gross Fixed Capital Formation in the current year, in 2 year earlier and 3 year earlier increase economic growth by 0.020616% and 0.009167% and decreases economic growth by -0.010987% respectively.

The coefficients of military expenditure in the current year and that of in the previous year are significant at 5% and 10% level of significance. However the relationship between Military Expenditure and economic growth is negative in both cases. A 1% increase in Military Expenditure in the current year and in the previous year decrease economic growth by 0.009012% and 0.012084% respectively. The economic impact of military expenditure on economic growth is negligible.

The coefficients of Fiscal Balance in the previous year and that of 2 year earlier are significant at 1% level of significance and 5% level of significance respectively. The relationship of Fiscal Balance with economic growth is negative in both cases. A 1% increase in Fiscal Balance (Deficit in this study) in the previous year and 2 year earlier decrease economic growth by 0.005234% and 0.002374% respectively. This reveals that economic impact of Fiscal Balance on economic growth is negligible.

The coefficient of the lagged error correction term is -0.622793 (with negative sign) and significant at 1% level of significance. It implies that any disequilibrium will be corrected 62.28% in the next year, which implies the speed of adjustment to equilibrium is significant.

Diagnostics Tests

The diagnostics tests were carried out and model passed all the tests. There is no serial correlation, no heteroskedasticity (White), No Arch effects. The functional form is correctly specified as depicted by Ramsey RESET Test. The normality test indicates that residuals are normally distributed. The Tests Results are given in Table 9.

Table 9: Results of Diagnostic Tests

Tests	**F-Statistic**	**Df**	**Prob.**	**CHSQ**	**Prob.**
1. Breusch-Godfrey Serial Correlation LM Test	0.247115	(2,20)	0.7834	0.964623	0.6174
2. White Heteroskedasticity Test	0.653129	(17,22)	0.8132	13.41646	0.7079
3.Ramsey RESET Test	0.162005	(1, 21)	0.6914		
4. ARCH Test	1.986313	(1,37)	0.1671	1.987011	0.1587
5. Normality Test	**Not Applicable**			1.954174	0.376406

Note: - 1. Lagrange multiplier test of residual serial correlation

2. Heteroskedasticity test Based on the regression of squared residuals on squared fitted values

3. Ramsey's RESET test using the square of the fitted values

4. Normality Test Based on a test of Skewness and kurtosis of residuals

Normality Test

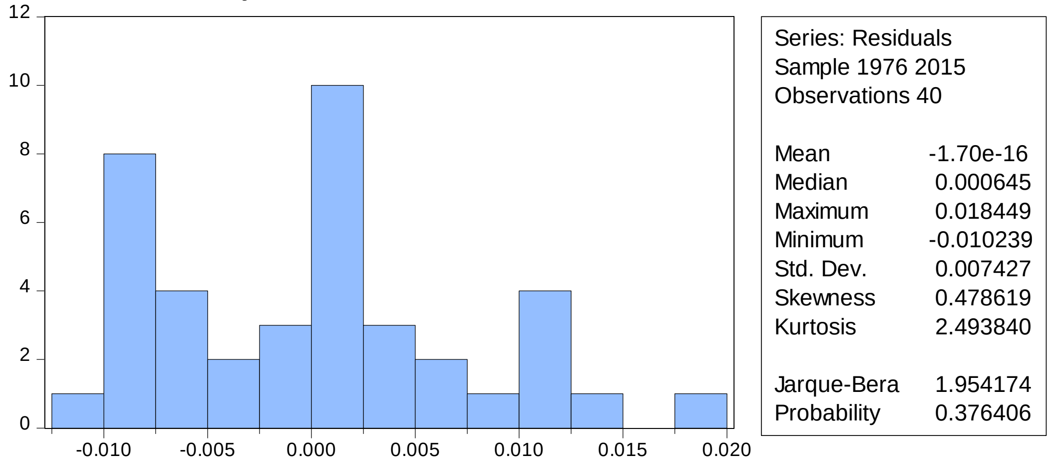

Figure 7 : Normality Test

Recursive Estimates

The stability of long run and short run parameters was checked through CUSUM Test and CUSUMSQ Test. The parameters are stable as plot of Cumulative Sum of Recursive Residuals in Fig. 8 and Plot of Cumulative Sum of Squares of Residuals in Fig. 9 are within 5% confidence interval of parameter stability. This confirms that long run and short run relationship amongst Real GDP per capita, Health Expenditure, Expenditure on Education, Government Fixed Capital Formation, Military Expenditure and Fiscal Balance are stable.

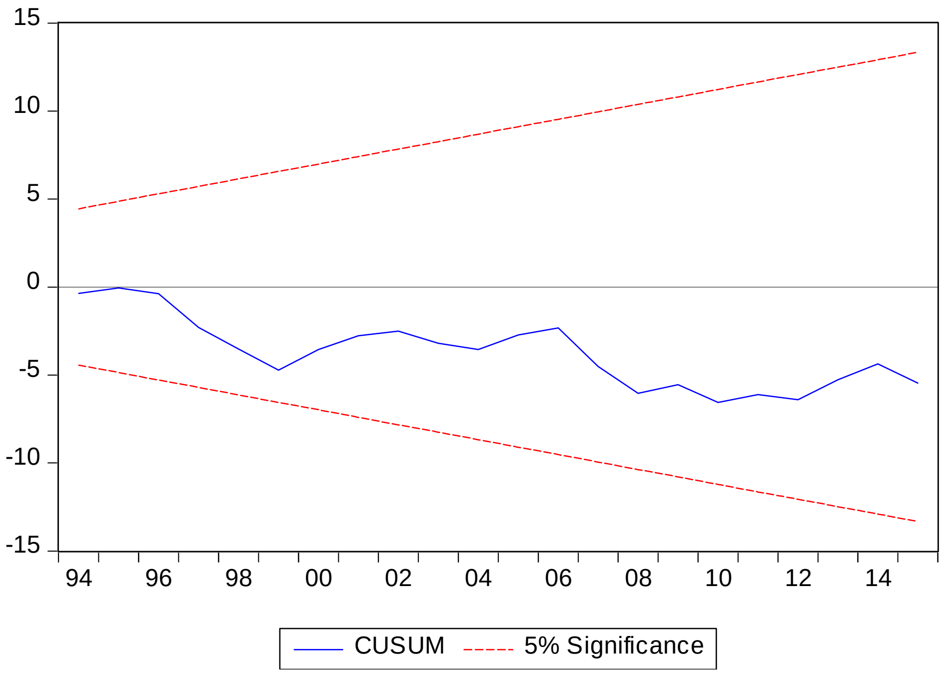

Figure 8 : CUSUM TEST

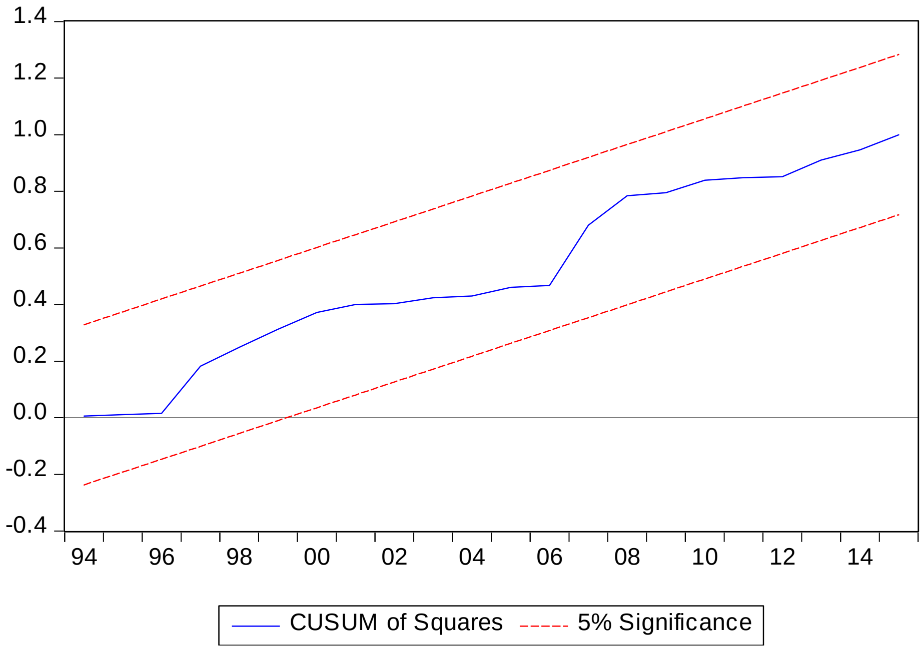

Figure 9 : CUSUM OF SQUARES TEST

Short Run Granger Causality Test

The results of Short Run Granger Causality Test are given in Table 11 which are based on the Pairwise Granger Causality Tests given in Table 10

Table 10: Pairwise Granger Causality Tests

Pairwise Granger Causality Tests
Sample: 1972 2015
Lags: 2
Observations 41

Null Hypothesis:	F-Statistic	Prob.
DHPC does not Granger Cause DLRGDPC	0.72351	0.4920
DLRGDPC does not Granger Cause DHPC	0.27916	0.7580
DEDUPC does not Granger Cause DLRGDPC	1.01387	0.3729
DLRGDPC does not Granger Cause DEDUPC	1.14761	0.3287
DGFCFPC does not Granger Cause DLRGDPC	2.40446	0.1047
DLRGDPC does not Granger Cause DGFCFPC	1.38562	0.2632
DFBPC does not Granger Cause DLRGDPC	0.14809	0.8629
DLRGDPC does not Granger Cause DFBPC	0.96464	0.3908
DMPC does not Granger Cause DLRGDPC	5.96160	0.0058
DLRGDPC does not Granger Cause DMPC	0.76590	0.4723
DEDUPC does not Granger Cause DHPC	1.70076	0.1969
DHPC does not Granger Cause DEDUPC	1.71055	0.1951
DGFCFPC does not Granger Cause DHPC	1.04269	0.3629
DHPC does not Granger Cause DGFCFPC	0.10932	0.8967

DFBPC does not Granger Cause DHPC	0.83570	0.4418
DHPC does not Granger Cause DFBPC	3.21783	0.0518
DMPC does not Granger Cause DHPC	0.18155	0.8347
DHPC does not Granger Cause DMPC	0.68057	0.5127
DGFCFPC does not Granger Cause DEDUPC	0.04558	0.9555
DEDUPC does not Granger Cause DGFCFPC	0.41406	0.6641
DFBPC does not Granger Cause DEDUPC	0.32053	0.7278
DEDUPC does not Granger Cause DFBPC	0.29075	0.7494
DMPC does not Granger Cause DEDUPC	0.11011	0.8960
DEDUPC does not Granger Cause DMPC	0.84269	0.4389
DFBPC does not Granger Cause DGFCFPC	0.18801	0.8294
DGFCFPC does not Granger Cause DFBPC	1.09688	0.3448
DMPC does not Granger Cause DGFCFPC	0.70082	0.5028
DGFCFPC does not Granger Cause DMPC	1.86266	0.1699
DMPC does not Granger Cause DFBPC	0.38443	0.6836
DFBPC does not Granger Cause DMPC	2.91689	0.0670

Table 11: Results of Short Run Granger Causality

Dependent Variable	Independent Variables: F-statistic and P-Value						Direction of Causality
	D(ln(rgdpc))	D(hpc)	D(edupc)	D(gfcfpc)	D(fbpc)	D(mpc)	
D(ln(rgdpc))	--	0.72351 (0.4920)	1.01387 (0.3729)	2.40446 (0.1047)	0.14809 (0.8629)	5.96160* (0.0058)	mpc → lrgdpc
D(hpc)	0.27916 (0.7580)	--	1.70076 (0.1969)	1.04269 (0.3629)	0.83570 (0.4418)	0.18155 (0.8347)	
D(edupc)	1.14761 (0.3287)	1.71055 (0.1951)	--	0.04558 (0.9555)	0.32053 (0.7278)	0.11011 (0.8960)	
D(gfcfpc)	1.38562 (0.2632)	0.10932 (0.8967)	0.41406 (0.6641)	--	0.18801 (0.8294)	0.70082 (0.5028)	
D(fbpc)	0.96464 (0.3908)	3.21783*** (0.0518)	0.29075 (0.7494)	1.09688 (0.3448)	--	0.38443 (0.6836)	hpc→ fbpc
D(mpc)	0.76590 (0.4723)	0.68057 (0.5127)	0.84269 (0.4389)	1.86266 (0.1699)	2.91689*** (0.0670)	--	fbpc → mpc

Note: - 1. *, **, *** indicate Significant at 1%, 5% and 10% level, respectively.

2. The values in parentheses ( ) indicate p-value

The results of Short Run Granger Causality Test given in Table 11 reveal that there is unidirectional causality from Military Expenditure to Real GDP per capita at 1% level, unidirectional causality from Health Expenditure to Fiscal Balance at 10% level and unidirectional causality from Fiscal Balance to Military Expenditure at 10% level.

These results indicate that causality runs from military expenditure to economic growth which is in line with long run relationship between the two variables. The unidirectional causality from health expenditure to fiscal balance may be interpreted that enhanced health expenditure is financed by borrowing from external and/or internal resources which causes fiscal balance to increase. Similarly unidirectional causality from fiscal balance to military expenditure may be interpreted that military expenditure is undertaken even by borrowing and creating fiscal deficit, since enhanced military expenditure is inevitable for keeping the country safe not only from foreign aggression but also from terrorism within the country.

No causality of Health expenditure to economic growth and expenditure on education to economic growth is in line with the long run insignificant contribution of these variables towards economic growth.

No causality from Gross Fixed Capital Formation to economic growth signifies that Public investment has an impact on economic growth in the long run while its immediate impact in the short run is not evident.

Conclusions

This study examined the relationship of components of government expenditure viz. Health Expenditure, Expenditure on Education, Gross Fixed Capital Formation, Military Expenditure and Fiscal Balance on economic growth represented by Real GDP per capita. ARDL bounds Testing Approach in section 5.6 was applied to find out the long run relationship amongst the variables. The results in Table 7 indicate a long-run positive relationship among economic growth, Gross Fixed Capital Formation, Military Expenditure and Fiscal Balance. However there is no long run relationship among economic growth, Health Expenditure and Expenditure on Education.

It may be concluded that increase in public investment increases economic growth and policy makers may target this variable for future planning to enhance economic growth. While considering the positive relationship between economic growth and military expenditure, it may be observed that increase in military expenditure creates an environment of improved law and order situation which is conducive to economic growth. It is evident from long war against terrorism in Pakistan that has either eliminated or curtailed the terrorist attacks in KPK and Karachi in particular and in rest of the country in general. The increased expenditure on defense during Afghan War leads to peaceful environment in Pakistan during that era. This contributed to economic growth. The positive impact of fiscal balance on economic growth leads to the conclusion that fiscal deficit is successfully used for development activities. The development projects are implemented through Public Sector Development Programme of the Federal Government and Annual Development Programme in the Provinces though with deficit financing. The implementation of these development projects result in enhanced economic activities and thus economic growth.

The insignificant long run coefficient of Health Expenditure and Expenditure on Education suggest that policy makers may ensure that the funds for these sectors are not being misallocated and also not misappropriated. The expenditure in Health sector improves the health of the public in general and labor force in particular which leads to higher productivity and economic growth. The productive expenditure in education enhances the human capital with enhanced skills leading to economic growth. The insignificant long run relationship between economic growth and Health Expenditure as well as between economic growth and expenditure on education in case of Pakistan is a matter of concern and needs special attention.

Vector Error Correction Mechanism (VECM) was estimated in section 5.7.1 to examine the short run relationship associated with the long run relationship amongst the variables. The results in Table 8 indicate a short run significant relationship amongst Economic Growth, Government Fixed Capital Formation, Military Expenditure and Fiscal Balance. However the short run relationship among economic growth, health expenditure and expenditure on education is insignificant at 5% level of significance. The error term is 0.622793 with correct negative sing and it is significant. It implies that any disequilibrium in the long run will be corrected 62.28% in the next period. It indicates that speed of adjustment is high.

The model passed through all the diagnostics tests as given in section5.8 and depicted in Table 9. There is no serial correlation, no heteroskedasticity, no ARCH effects, the residuals are normally distributed, and correct functional form and stable parameters as is confirmed from the graph of CUSUM and CUSUM of squares given in figure 8 and figure 9 respectively.

Granger Causality Test was carried out in section 5.9 to determine the direction of causality. The empirical results given in Table 11 reveal that unidirectional causality runs from military expenditure to economic growth at 1 % level of significance. There is also unidirectional causality from Health Expenditure to Fiscal Balance and from Fiscal Balance to Military Expenditure at 10% level of significance. These results support the notion that improved law and order situation as result of military expenditure is conducive to economic growth in case of Pakistan

Military expenditure, Gross Fixed Capital Formation and Fiscal Balance have positive impact on economic growth both in the short run as well as in the long run while Health Expenditure and Expenditure on Education have insignificant impact on economic growth both in the short run and long run at 5% level of significance. It implies that fiscal policy may be geared to boost economic growth by relegating to Military expenditure and Gross Fixed Capital Formation and by manipulating Fiscal Balance in a productive way.

Policy Implications

In the light of above mentioned empirical results and conclusions drawn the following Policy Implications are given for the consideration of Policy Makers:-

i. Government should enhance expenditure on defense to ensure peaceful environment and stable law and order situation which will be conducive to enhanced business and economic activity in the country resulting in higher output. The economic growth will increase with the increase in output.

ii. It may be ensured that development projects undertaken as a result of Gross Fixed Capital Formation, wherein mostly government expenditure is involved, are started and completed on time to avoid any cost escalation. This will ensure that excessive capital expenditure may not become unproductive at the margin.

iii. It may be ensured that Government expenditure may not result in crowding out private investment. Such projects should be undertaken by the Government which does not compete with the projects in the Private Sector. Accordingly misallocation of resources may be avoided.

iv. Fiscal Balance should be regulated in such a way that expenditure in excess of revenue should be carefully undertaken for productive sectors leading to higher output and ultimately higher economic growth.

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