

Impact of Corruption, Defense Spending and Political Instability on Economic Growth: An Evidence from Pakistan

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Abstract- The defense expenditures of the Pakistan economy remain high to sustain a credible deterrence, due to the significant geopolitical position, regional instability as well as a constant conflicting with India since the independence. This study will analyze the effect of defense expenditures on economic growth with some other political factors, such as corruption, defense spending and political-instability. The empirical results of the study observed that there exist positive defense expenditures positive relationship between defense expenditure and economic development which caused expansion of aggregate demand, production and employment generation in the economy which is also suggested by the Benoit (1973, 1978), and Faini et al. (1984). The empirical result shows the negative, statistically significant relationship between inflation, exchange rate and economic growth of the Pakistan economy. The empirical results also show that there exist negative association between political instability and economic growth of the Pakistan. Corruption is the one of the important social factor, which has a positive effect on the economic growth due to weak institutions and function poorly.

Index Terms- credible deterrence, regional instability, political-instability, statistically significant relationship.

I. INTRODUCTION

The neoclassical school had key focused on the supply side policies and explained the positive effect of defence on economic growth in form of modernization positive externalities from infrastructure as well as technological spin offs, while some of them enlighten the negative effect of the defence expenditures on economic growth. There exists inverse relationship between defence expenditures, economic growth, employment and investment in case of developed countries explained by the Smith (1977); Boretsky (1975) and Sivard (1977). The political instability leads to increased defence spending and reduce the share of government expenditures allocated to education as well as other productive sectors were decreased explained by the Ades and Chua (1997). While there were two channels through which defence expenditure may affect economic growth of the economy. Firstly, any positive shock in the defence expenditure may lead to increased total demand for goods in the economy by stimulating output, increased the employment and ultimately lead

to increased economic growth. Secondly, positive shock in defence expenditure may lead to improve the infrastructure in the economy found by the Shahbaz et al (2013).



Figure 1: Defense expenditure and economic growth

The neoclassical based on Feder (1982), Ram (1986) and Biswas and Ram (1986) which explained the relationship of defence expenditures and economic growth. But the Feder-Ram model derived the effect of defence on economic growth based on a single equation aggregate production function, but there were a number of theoretical as well as empirical problem while estimating the Feder-Ram model of defence expenditures on economic growth, like simultaneity problem, identification problem, multicollinearity problem and model is static. While Keynesian which work based on the demand and supply side policies explained the effect of defence expenditures with the seminal contribution of Smith (1980), which overcomes the problem of simultaneity, developed the simultaneous equation model with a Keynesian aggregate demand.

There exists positive relationship between defence expenditure and economic development which caused expansion of aggregate demand, production and employment generation in the economy according to the Benoit (1973, 1978), and Faini et al. (1984). There exist a negative impact of defence expenditures on growth of an economy according to the Smith (1980) and Rasler and Thomson (1988).

Since the beginning of human life, the defence had remained priority of governments in order to protection their citizens. The literature also supports that spending on citizens protection is one of the political mandates of every government. Defence expenditures can be described as a type of expenditures that a country utilizes to internal and external security of the citizens, and the countries which more unstable political environments need higher defence expenditures. Hence defence expenditure had been an important budgetary allocation in the political economy of any country and her economic growth. There diversified available literature that explained the relationship

of defence expenditure and economic growth described by neoclassical and Keynesian school of thought.

The Pakistan military forces are the seventh largest military forces in the world. The Pakistan large portion of GDP is being used for defence expenditures due to regional instability as well as instability in neighbouring countries, hostile relationships and constant conflicting with India. Pakistan and India governments do not accept each other since the independence (Tibbett and Akram-Lodhi, 1997). They were in an arms race allocated large proportion of their budget for defence expenditures. Pakistan and India had risen their defence expenditures continually in real terms, especially the period 1998 to 2010 Pakistan's defence expenditures \$4 billion to slightly more than \$5 billion and India's defence expenditures increased \$20 billion to \$45 billion. The substantial increased in the defence expenditures lowers economic performance beard opportunity cost in form of increased in poverty. There were too many other factors which effect the defence expenditures due to the internal and external security issues of the Pakistan economy, while defence expenditures also support in form of increased in the aggregate demand, production and employment in the Pakistan economy. So in this study we will explore the economic, social as well as political determinants of defence expenditures for Pakistan economy empirically.

Most existing empirical literature focused on the relationship of defence expenditures and economic growth with some economic variables, they explored political factors much less. Present study fills the gap and designed to check the relationship between defence expenditures and economic growth with some economic variables as well as political variables.

II. REVIEW OF LITERATURE

Khilji and Mahmood (1997) empirically estimated the impacts of defense expenditures on economic growth with some other economic variables in case of Pakistan over the period 1972 to 1995. The estimated results of this study based on four different equation models, three single equation models and one model based on system, which explained bi-directional relationship between the defense expenditure and GDP growth of Pakistan. The estimated result shows that savings to GDP ratio is affected positively by the defense to GDP ratio, and negatively by the inflation rate in case of Pakistan economy. But if all these models estimated as a system all above effects are diminished and also statistical significance.

Dunne et al. (2002) estimated the effect of military expenditures and investment on economic growth of Small industrial countries during the period 1980 to 1999. The study estimated the investment and output equations, where investment was a function of growth and military expenditure in the Small industrial economies. To estimate the dynamics of military expenditure, growth and investment, a pooled OLS model was estimated which also followed by Smith (1980) after 2nd world war there were evidence decreased in the defense expenditures and estimated results also suggested that there exist negative relationship between defense expenditures, economic growth and investment.

Dunne et al. (2011) estimated the effect of defense expenditures on economic growth of European Union 15

countries by using augmented Solow-Swan model, during the period 1961 to 2007. The study used log linear re-parameterized general first order dynamic model with dependent variable log of GDP per capita. The study used both time series and panel data estimation methods, using fixed effect and random effect in panel data, long run relationship in time series data. The estimated results suggested that military expenditures did not promote economic growth in European Union 15 countries which also consistent with neoclassical augmented Solow-Swan growth model.

Anwar et al. (2012) empirically explored the effect of the nexus of the defense expenditures and the economic growth of Pakistan during the period 1980 to 2010. The estimated results were obtained by using the Johansen and Juselius (1990) co-integration and Granger Causality tests. The estimated result of the study shows that there exist positive long run relationship between defense expenditures and economic growth of Pakistan with some other variables (total exports, total imports, and gross domestic investment). Gross domestic product (GDP) Grander caused military expenditures but military expenditures did not Granger caused GDP of the Pakistan economy.

Kalim(2013) estimated the long run as well as short run effect of Military expenditure on poverty growth along with some other control variables (Inflation, Industrial sector, services sector and foreign direct investment) which effects the poverty in case of Pakistan during the period 1972 to 2009. The empirical results of the study explained that military expenditure and inflation pro-poverty factors which lead to increase the poverty. Industrial sector growth, services sector and foreign direct investment anti-poverty factor which lead reduced the poverty in the economy of Pakistan.

Shahbaz et al.(2013) estimated the long run and short run relationship between defense expenditures and economic growth of Pakistan by using Keynesian model during the period 1972 to 2008. The empirical results of the study were obtained by using autoregressive distributive lag approach to find out the long run and short run dynamic of defense expenditures and economic growth, as well as Granger causality technique to test the causal relationship between defense expenditures and economic growth. The empirical result found that there exist unidirectional causality between defense expenditures and economic growth, also suggested there exist positive relationship between defense expenditures and economic growth, and increased the growth through increases aggregate demand by stimulating output. And there exist negative relationship between interest rate and economic growth of Pakistan.

Akbulut (2014) empirically investigated the Barro (1990) endogenous growth model also estimated the dynamics of the military and health expenditures in 30 developing economies over the period 1995 to 2011. The results of the study were obtained by two staged system generalized method of moment that were presented by (Arellano and Bover, 1995). The results of the study indicated that military and health expenditures had a statistically insignificant effect on economic growth of developing countries, so the estimated results of the models concluded that expenditures on both military and health expenditures had no effect on economic growth developing economies.

Mosikari (2014) empirically investigated the long run and short run dynamics of defense expenditures and economic growth of South Africa by using Johansen co-integration and Engel-Granger causality techniques over the period 1988 to 2012. The estimated results suggested that defense expenditure effect the per capita gross domestic product, there exist unidirectional relationship. Per capita gross domestic product had not affect the defense expenditures at 5 percent level of significance. The study also concluded that there exists positive relationship between defense expenditures per capita gross domestic product with some other control variables (population growth, general government expenditure on health, general government expenditure on education) in South Africa.

III. DESIGN AND IMPLEMENTATION

3.1 Theoretical Framework

To estimate the dynamics of economic growth and defense expenditures in developing countries have followed different approaches in the literature¹, these models which is used in the literature are based on neoclassical production functions In order to estimate the effect of Corruption, Defense expenditures and Political Instability on political economy of Pakistan, in this study we will extend the neo-classical growth model of Solow-Swan (1956). The production function of the economy depends on the factors of productions Capital (K) and Labor (L) as well as Exogenous technological parameter (A) as:

$$Y = AF(K, L) \quad (1)$$

Where K = Capital

L = Labor (Aggregate Labor)

A = Solow residual or productivity other than labor and capital which is also called Total Factor Productivity.

Now, the Cobb-Douglas Specification is given as:

$$Y = AK^\alpha L^{1-\alpha} \quad (2)$$

Where: $0 < \alpha < 1$ is capital share and $(1-\alpha)$ is Labor share.

Intensive form of the equation (2) is as:

$$y = Ak^\alpha \quad (3)$$

Note that: $f'(k) = \alpha Ak^{\alpha-1} > 0$,
 $f''(k) = -\alpha(1-\alpha)k^{\alpha-2} < 0$.

With standard Inadda-Conditions:

$$\lim_{k \rightarrow \infty} f'(k) = 0 \text{ and } \lim_{k \rightarrow 0} f'(k) = \infty.$$

This shows that Cobb-Douglas production function satisfies the properties of neoclassical production function.

The equation of motion of Capital stock series is given below:

$$\dot{k} = s \cdot f(k) - (n + \delta)k \quad (4)$$

Substitute in the equation (4) $y = f(k) = Ak^\alpha$

$$\dot{k} = s \cdot Ak^\alpha - (n + \delta)k \quad (5)$$

The term $(n + \delta)$ on the Right hand side of equation can be thought as the effective depreciation rate for Capital-Labor ratio. $\bar{k} \equiv K/L$.

Rearranging equation (5) will result in

$$\dot{\bar{k}} = s \cdot A\bar{k}^{\alpha-1} - (n + \delta)$$

Since we know that $y = Ak^\alpha$ or $y' = \alpha Ak^{\alpha-1}$

Rearranging again and get the following equation:

$$y' = \alpha Ak^{\alpha-1} \text{ Or } \frac{y'}{y} = \alpha \left(\frac{1}{k}\right)$$

$$\frac{y'}{y} = s \cdot f'(k) - (n + \delta) \alpha \quad (6)$$

Where $f'(k) = \alpha Ak^{\alpha-1}$

The above model generality mimics the following form of growth rate of output per capita which depends on the parameters of the model as:

$$y'/y = g(s, \alpha, \delta, A, n) \quad (7)$$

In addition Kalim R.(2013), Anwar et al. (2012), Khilji and Mahmood (1997), Shahbaz et al. (2013) it is assumed that aggregate productivity (A) depends defense expenditures , Informal Activities, Corruption, Openness, Education, etc. Therefore, we will assume the following:

$$A = g(\text{Def. exp. CPI. PI. corrup. ER}) \quad (8)$$

Therefore,

$$y'/y = g(s, \alpha, \delta, n, \text{Def. exp. CPI. PI. corrup. ER})$$

Data and Econometric Modelling Framework

3.2 Data

To estimate the model parameters in order to test hypothesis, data over the annual frequencies from 1975 to 2015 will be collect from the websites of World Bank. World Bank and hand book of Statistics published by State Bank of Pakistan, International country risk guide published by IMF and Center for Systemic Peace (CSP) Web site. The variables are: Real Gross domestic product (RGDP), Defense expenditure (Def. Exp), Political instability (PI), Corruption (Corr), Consumer price index (CPI) and exchange rate (ER).

3.3 Econometric Modelling Framework

To test long run and short run dynamics of defence expenditures with its possible deeper determinants, its relationship with growth rate and then its impact on poverty alleviation, we will use Auto Regressive Distributed Lag Model. The beauty of the ARDL modelling approach is that it is irrelevant whether time series or of same order or have different order integration. The detail of this modelling approach is given as: The first test applied to the data is the one suggested in 1999 by Smith. This test is for a long run relationship between the variables and is applicable irrespective of whether the regressors are I (0), I (1) or mutually co-integrated. The test is based upon the estimation of the underlying VAR model, re-parameterized as an ECM (error correction model).

The VAR (p) model

$$z_t = \mathbf{b} + \mathbf{c}t + \sum_{i=1}^p \beta_i z_{t-i} + \varepsilon_t \dots \dots \dots (3.7)$$

Where z represents a vector of variables. Under the assumption that the individual elements of z are at the most $I(1)$, or do not have explosive roots, equation (3.7) can be written as a simple Vector ECM.

$$\Delta z_t = \mathbf{b} + \mathbf{c}t + \Pi z_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta z_{t-i} + \varepsilon_t \dots \dots \dots (3.8)$$

Where

$$\Pi = -(\mathbf{I}_{k+1} - \sum_{i=1}^p \beta_i) \text{ and } \Gamma_i = -\sum_{j=1}^p \beta_j, \quad i = 1, \dots, p-1$$

Where $(k+1) \times (k+1)$ matrices of the long run multipliers and the short run dynamic coefficients. By making the assumption that there is only one long run relationship among the variables, Pesaran, focused on the first equation in (3.7) and divide it into a dependent variable y_t and a set of other variables x . Under such conditions, the matrices \mathbf{b} , $\mathbf{c}t$ and most importantly, the long run multiplier matrix can also be divided comfortably with the division of z .

$$\Pi = \begin{bmatrix} \pi_{11} & \pi_{12} \\ \pi_{21} & \pi_{22} \end{bmatrix} \quad \mathbf{b} = \begin{bmatrix} b_1 \\ b_2 \end{bmatrix} \quad \mathbf{c} = \begin{bmatrix} c_1 \\ c_2 \end{bmatrix} \quad \Gamma_i = \begin{bmatrix} \gamma_{11,i} & \gamma_{12,i} \\ \gamma_{21,i} & \gamma_{22,i} \end{bmatrix}$$

The key assumption, that x is long run variable for y , which implies that the vector $\gamma_{21} = 0$, and that there is no feedback from the level of y on x . As a result, the conditional model for y and x can be written as:

$$\Delta y_t = b_1 + c_1 t + \pi_{11} y_{t-1} + \pi_{12} x_{t-1} + \sum_{i=1}^{p-1} \gamma_{11,i} \Delta y_{t-i} + \sum_{i=0}^{p-1} \gamma_{12,i} \Delta x_{t-i} + \varepsilon_{1t} \dots \dots \dots (3.9)$$

$$\Delta x_t = b_2 + c_2 t + \pi_{22} x_{t-1} + \sum_{i=1}^{p-1} \gamma_{21,i} \Delta y_{t-i} + \sum_{i=1}^{p-1} \gamma_{22,i} \Delta x_{t-i} + \varepsilon_{2t} \dots \dots \dots (3.10)$$

Under standard assumption about the error terms in equations, Pesaran, re-write (3.9) eq. as:

$$\Delta y_t = a_0 + a_1 t + \phi y_{t-1} + \delta x_{t-1} + \sum_{i=1}^{p-1} \psi_i \Delta y_{t-i} + \sum_{i=0}^{p-1} \phi_i \Delta x_{t-i} + \omega_t \dots \dots \dots (3.11)$$

Note that in the given eq., a long run relationship exist among the level of variables if the two parameter ϕ and δ are both non zero in which case, for the long run solution (5.5), Obtain

$$y_t = -\frac{a_0}{\phi} - \frac{a_1}{\phi} - \frac{\delta}{\phi} x_t \dots \dots \dots (3.12)$$

Pesaran, choose to test the hypothesis of no long run relationship between y and x by testing the joint hypothesis that $\phi = \delta = 0$ in the context of above equation. The test which they develop is a bound type test, with a lower bound calculated on the basis that the variables in x are $I(0)$ and an upper bound on the basis that they are $I(1)$. Pesaran, provide critical values for this bounds test from an extensive set of stochastic simulations under differing assumptions regarding the appropriate inclusion of deterministic variables in the ECM. If the calculated test statistic (which is a standard F test for testing the null hypothesis that the coefficients on the lagged level terms are jointly equal to zero) lies above the upper bound, the result is conclusive and implies that a long run relationship does exist between the variables. If the test statistic lies within the bounds, no conclusion can be drawn without prior knowledge of the time series properties of the variables. In this case, standard methods

of testing have to be applied. If the test statistic lies below the lower bound, no long run relationship exists.

Econometric Model is given as:

ARDL Long Run equation for the model

$$\Delta GDP_t = \alpha + \sum_{i=1}^m \beta_{1i} Def.exp_{t-i} + \sum_{i=1}^m \beta_{2i} CPI_{t-i} + \sum_{i=1}^m \beta_{3i} PI_{t-i} + \sum_{i=1}^m \beta_{4i} Corr_{t-i} + \sum_{i=1}^m \beta_{5i} ER_{t-i} + \sum_{i=1}^m \beta_{6i} GDP_{t-i} + \sum_{i=1}^m \beta_{7i} \Delta Def.exp_{t-i} + \sum_{i=1}^m \beta_{8i} \Delta CPI_{t-i} + \sum_{i=1}^m \beta_{9i} \Delta PI_{t-i} + \sum_{i=1}^m \beta_{10i} \Delta Corr_{t-i} + \sum_{i=1}^m \beta_{11i} \Delta ER_{t-i} + \sum_{i=1}^m \beta_{12i} \Delta GDP_{t-i} + \varepsilon_t$$

F test of the null that:

$$\beta_{2i} = \beta_{3i} = \beta_{4i} = \beta_{5i} = \beta_{6i} = \beta_{8i} = 0 \quad \forall i = 1 \text{ to } m$$

ARDL Short Run equation for model:

$$\Delta RGDP_t = \alpha + \sum_{i=1}^m \beta_{1i} \Delta Def.exp_{t-i} + \sum_{i=1}^m \beta_{2i} \Delta CPI_{t-i} + \sum_{i=1}^m \beta_{3i} \Delta PI_{t-i} + \sum_{i=1}^m \beta_{4i} \Delta Corr_{t-i} + \sum_{i=1}^m \beta_{5i} \Delta ER_{t-i} + \sum_{i=1}^m \beta_{6i} \Delta GDP_{t-i} + \beta_7 ECM_{t-1} + \varepsilon_t$$

IV. RESULTS

4.1 Unit Root Results

According to the classical linear model assumption data should be stationary (mean and variance of the series should be constant), otherwise we cannot apply the OLS. For this purpose we have to estimate the relationship among the variables. So the first step in the empirical estimation to investigate the persistence of the unit root (stationarity) in the time series data to overcome the problem of the spurious regression. The unit root problem, presented in the data mostly due to the time trend, sometime due to intercept and sometime due to both time trend and intercept, they are named non-stationary series if they exhibit the trend. That's why first we investigate the stationarity problem in the data as well as their level of stationarity. If they have a unit root (Stationary) at their level $I(0)$ than we can apply OLS, otherwise we will move toward suitable Econometric techniques to obtain the significant and reliable empirical results.

Unit Root Test Results At level I(0)						
ADF Test Result Without trend			ADF Test Result With trend			
Variables		Prob.		Prob.	Results	
GDP	ADF test stat.	3.431		ADF test stat.	1.062	
	1% level	-3.633	1.000	1% level	-4.253	NS
	5% level	-2.948		5% level	-3.548	
	10% level	-2.613		10% level	-3.207	
ADF test						
Def	ADF test stat.	-6.265		ADF test stat.	-3.709	
	1% level	-3.606	0.000	1% level	-4.212	S
	5% level	-2.937		5% level	-3.530	
	10% level	-2.607		10% level	-3.196	
ADF test						
CPI	ADF test stat.	1.410		ADF test stat.	-4.209	
	1% level	-3.639	0.999	1% level	-4.273	S
	5% level	-2.951		5% level	-3.558	
	10% level	-2.614		10% level	-3.212	
ADF test						
PI	ADF test stat.	-1.977	0.295	ADF test stat.	-2.380	NS
	1% level	-3.606		1% level	-4.205	
	5% level	-2.937		5% level	-3.527	
	10% level	-2.607		10% level	-3.195	
Corr	ADF test stat.	-2.903		ADF test stat.	-2.904	
	1% level	-3.633	0.055	1% level	-4.243	S
	5% level	-2.948		5% level	-3.544	
	10% level	-2.613		10% level	-3.204	
ADF test						
ER	ADF test stat.	3.384		ADF test stat.	-0.943	
	1% level	-3.639	1.000	1% level	-4.253	NS
	5% level	-2.951		5% level	-3.548	
	10% level	-2.614		10% level	-3.207	
ADF test						

Table 4.1 ADF Unit Root Results at the Level

The dependent variable (gross domestic product) and all independent variables defence spending, consumer price index (which is the proxy of the inflation, that is used to measure the inflation), political instability, exchange rate, and corruption) examined to test the problem of the unit root over the period 1975-2015. ADF unit root used to check the order of integration among the variables. Table 4.3 presented the results of augmented Dickey Fuller (ADF) unit root test at the Level in case of with constant only, with constant and trend. The null hypothesis of the augmented Dickey Fuller (ADF) unit root test is all dependent and independent variables have unit root problem (data is non stationary at level). The ADF test statistics=3.341(at p=1.000) for variable GDP is significant at level (5%,10%) but not significant at level 1% so we accept the null hypothesis and GDP is non stationary without trend. Same like GDP is also non stationary with trend at all levels (1%,5%,10%).The ADF test statistics =-6.265 (at p=0.000) for variable Defence Expenditure is significant at all levels(1%,5%,10%) so we reject the null hypothesis and Defence spending is stationary without trend and with trend. The ADF test statistics = 1.410(p=0.999) for variable CPI is not significant at all levels (1%,5%,10%) without trend, however CPI is significant with trend at levels (5%,10%) so we rejected null hypothesis and CPI becomes stationary with trend. The ADF test

statistics=-1.977 (at p=0.295) for variable Political instability is non-significant at levels (1%, 5%, 10%) without trend and with trend also so we accepted the null hypothesis and PI still non stationary. The ADF test statistics for variable Corruption is non-significant at all levels, so we accepted the null hypothesis and Corruption is non stationary without trend and with trend. The ADF test for variable Nominal exchange rate is insignificant at all levels and probability more than the criteria so we accepted null hypothesis and Nominal exchange rate is non stationary without trend and with trend. So the results concludes that all variables (RGDP, PI, NER) are non-stationary at their level but log of consumer price index(which is the proxy of the inflation), defense spending and corruption index are stationary at level. This states that three variables are non-stationary at their level but three variables are stationary.

Unit Root Test Results 1st difference I(1)						
ADF Test Result Without trend			ADF Test Result With trend			
Variables		Prob.		Prob.	Results	
RGDP	ADF test stat.	-2.089		ADF test stat.	-3.766	
	1% level	-3.610	0.250	1% level	-4.244	S
	5% level	-2.939		5% level	-3.544	
	10% level	-2.608		10% level	-3.205	
ADF test						
PI	ADF test stat.	-5.877		ADF test stat.	-5.933	
	1% level	-3.610	0.000	1% level	-4.212	S
	5% level	-2.939		5% level	-3.530	
	10% level	-2.608		10% level	-3.196	
ADF test						
NER	ADF test stat.	-0.617		ADF test stat.	-5.896	
	1% level	-3.654	0.853	1% level	-4.253	S
	5% level	-2.957		5% level	-3.548	
	10% level	-2.617		10% level	-3.207	
ADF test						

Table 4.2 ADF Unit Root Test Results for the first Difference

The empirical results of the augmented Dickey fuller unit root test are presented in the above in case of with and without trend. The results shows that the absolute values of the ADF statistics are greater than the critical values at 1%, 5%, 10% level of significance for all reaming variables real gross domestic product (RGDP), nominal exchange rate (NER), and political instability (PI). So we can rejected null hypothesis and concluded that gross domestic product (RGDP), nominal exchange rate (NER), and political instability (PI) are stationary at the first difference with and without trend.

Finally, Augmented Dickey Fuller unit root test result shows that all variables are non-stationary at the level except the consumer price index, defense and corruption; which are stationary at the first difference. In such situation, we can only employ Auto-regressive Distributed Lagged techniques to investigate the long run and short run relationship among the dependent variable (real gross domestic product) and independent variables [nominal exchange rate (NER), political instability (PI), consumer price index (CPI), defense expenditures (Def), and Corruption (Corr)].

4.2 Empirical long run results of the ARDL model

This section explain the Empirical long run results of the ARDL model that shows empirical relationship between foreign direct investment and exchange rate with some other macroeconomic and political variables for Pakistan economy. Nevertheless, Ouattara (2004) exclaimed that during the presence of I (2) variables the computed F-statistics provided by PSS (2001) become invalid because bounds test is based on the assumption that the variables are I (0) or I (1) only. Therefore, it is necessary to ensure that before applying the ARDL method none of the variable is integrated of order I (2) or away from.

4.3 The empirical results of the ARDL model

The table 4.5 presented the results of the autoregressive distributed lag (ARDL) model. The beauty of the ARDL model is it can apply for mix order of integration like 1(0), 1(1). The table 4.5 results based on the three regression models of the ARDL to check the significance of the political situation of the economy and Defence spending. In the first model Defence spending, political instability, Consumer price index, Corruption, Nominal exchange rate are included, but in the second model political instability variable is missing and in the third model Corruption variable is missing to check one by one significance of the Political instability and Corruption. Models run without trend and intercept.

Long Run Coefficients			
Model 1			
Variable	Coefficient	t-Stat	Prob.
LnDEF	3.871	5.554	0.005
LnCPI	-1.925	-1.675	0.169
PI	-0.061	-4.572	0.010
LnCORR	0.485	0.379	0.724
LnER	-2.720	-2.079	0.106
R-Square	0.8012	D.W Statistics	2.0153

There is relationship of the defense spending and economic growth is controversial. According to the Benoit (1973, 1978) and Faini et al. (1984) investigated that there exist positive relationship between defense spending and economic growth. The defense spending expend the aggregate demand of the economy, lead to increase the production as well as employment of the economy. While on the other side Smith (1980), Rasler, Thomson (1988) and Anwar et al. (2012) explains that Defense spending is undesirable expenditures of the economy which deters the resource allocation of that economy from development and negatively affect the economic growth of the economy. The results of my research in the table 4.5 shows that there exist long run positive and statically significant relationship between defense spending and the economic growth of Pakistan. In the model empirical results shows that one percent increase in the defense expenditures lead to increase the 3.871 percent in the economic growth of Pakistan.

Inflation stability is one of the indicator of the macroeconomic stability of a country. High inflation in a country can reduce the investment as well as the economic growth of the economy. So sustained economic growth of the economy with low inflation rate is the fundamental objective of the macroeconomic policy makers. The empirical results of my

research in the model shows the negative, statistically significant relationship between inflation and economic growth of the Pakistan economy. The estimated result shows that one percent increase in the consumer price index which is the proxy of inflation lead to decrease the -1.925 percent in the economic growth of the Pakistan economy.

According to the economists and political thinkers, political instability is one of the factor which seriously affect the economic growth of the developing countries. Political instability is likely to shorten policymakers' horizons leading to suboptimal short term macroeconomic policies. It may also lead to a more frequent switch of policies, creating volatility and thus, negatively affecting macroeconomic performance. Alesina et al. (1996) empirically estimated by using data on 113 countries from 1950 to 1982, the results shows that GDP growth as well as total factor productivity growth is significantly lower in selected countries and time periods with high political instable regimes. The estimated result shows that there exist negative, statistically significant relationship between economic growth and Political instability. According to the estimated results one unit change in the index value of the political instability lead to decrease the 0.061 unit in the gross domestic product of the Pakistan economy?

The debate on the effects of corruption is particularly fervent. The literature shows that corruption affect negatively economic growth through investment and level of efficiency at which the economies perform and the growth rate of total factor productivity. Some economist Shleifer and Vishny [1993] suggest that corruption would lead to lower the economic growth of the economy. Shleifer, and Vishny [1991] empirically estimated that countries where talented peoples are allocated to rent seeking activities tend to grow more slowly.

The estimated results of the model shows that the positive but statistically insignificant relationship of corruption on economic growth of Pakistan, one unit change in the corruption index lead to increase the -0.485 unit in the economic growth of Pakistan economy.

The exchange rate is the one of the policy variables which adversely affect macroeconomic stability, affect export sector competitiveness of the economy and lead to sizeable welfare cost.

Razin and Collins (1997), Rajan and Subramanian (2006), and Johnson, Ostry, and Subramanian (2007) real exchange rate misleading² the economic growth because real exchange rate is believed to be one of the most important relative prices in an economy at international level in case of developing countries. The empirical results of my research in the model shows that exchange rate negatively affect the economic growth of the Pakistan economy. According to the model 1 one percent increase in the exchange rate lead to decrease the 0.0738 percent in the economic growth of the Pakistan.

4.4 ARDL Bound Test:

The table presented the ARDL bounds test empirical results [which explains the existence of the long run relationship between defence expenditures and economic growth with some other macroeconomic variables (corruption,cpi,ner,pi)]. ARDL bounds test based on the tests of the null hypothesis which shows that no long run relationship exist between defence expenditures

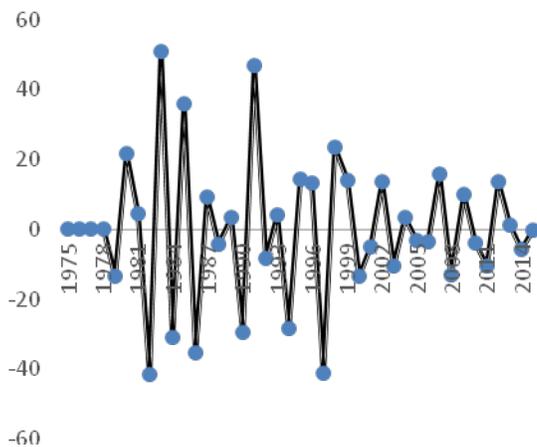
and economic growth with some other macroeconomic variables by using F-Statistics. F-statistics calculated values must be greater than the critical values of upper bound and lower bound test.

ARDL Bounds Test		
Model 1		
Null Hypothesis: No long-run relationships exist		
Test Statistic	Value	K
F-statistic	4.447639	5
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	1.81	2.93
5%	2.14	3.34
2.50%	2.44	3.71
1%	2.82	4.21

K represent the number of parameters.
Table 4.3 ARDL Bounds Test

The above empirical results of the ARDL bound test verified that there exist long run relationship between defence expenditures and economic growth with some other macroeconomic and political variables that is my objective of research work. The value of the F-statistic=4.447639 for Model one at all levels of Bound test (10%,5%,2.50%,1%) is significant shows the rejection of null hypothesis, in the second Model F-statistics=10.07858 at all levels of bound test(10%,5%,2.50%,1%) and in the 3rd model F-statistics=8.26071 at all levels that is greater than the upper and lower bounds ,so we reject null hypothesis and results of F statistics is significant concluded that defence expenditures and economic growth with some other macroeconomic and political variables co-integration in long run exist in the all models, as suggested Pesaran,et al (1999).

Cointegration Graph



Short Run Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
$\Delta \ln GDP_{t-1}$	-0.59	0.26	-2.27	0.09
$\Delta \ln GDP_{t-2}$	-0.86	0.34	-2.50	0.07
$\Delta \ln GDP_{t-3}$	-0.22	0.23	-0.93	0.40
$\Delta \ln DEF_{t-1}$	0.21	0.10	2.22	0.09
$\Delta \ln DEF_{t-2}$	-0.01	0.06	-0.24	0.82
$\Delta \ln DEF_{t-3}$	0.01	0.05	0.21	0.84
$\Delta \ln DEF_{t-4}$	0.05	0.06	0.74	0.50
$\Delta \ln CPI_{t-1}$	-0.26	0.13	-1.96	0.12
$\Delta \ln CPI_{t-2}$	0.17	0.14	1.17	0.31
$\Delta \ln CPI_{t-3}$	-0.02	0.16	-0.15	0.89
$\Delta \ln CPI_{t-4}$	-0.15	0.15	-0.99	0.38
ΔPI_{t-1}	0.00	0.00	1.80	0.15
ΔPI_{t-2}	0.00	0.00	1.15	0.31
ΔPI_{t-3}	0.00	0.00	-1.85	0.14
ΔPI_{t-4}	0.00	0.00	2.11	0.10
$\Delta \ln CORR_{t-1}$	-0.02	0.02	-0.96	0.39
$\Delta \ln CORR_{t-2}$	0.00	0.01	0.29	0.79
$\Delta \ln CORR_{t-3}$	0.02	0.02	1.04	0.36
$\Delta \ln CORR_{t-4}$	-0.05	0.03	-1.45	0.22
$\Delta \ln ER_{t-1}$	-0.04	0.11	-0.34	0.75
$\Delta \ln ER_{t-2}$	-0.19	0.09	-2.12	0.10
$\Delta \ln ER_{t-3}$	0.19	0.09	2.09	0.10
$\Delta \ln ER_{t-4}$	-0.20	0.07	-2.76	0.05
ECM _{t-1}	-0.04	0.04	-2.15	0.05

Table-4.4: Estimated Short run Coefficients using the ARDL Approach model

Interpretation of short run Coefficients using the ARDL Approach model

The above table presented the short run results of the relationship between defence spending and economic growth with some other macroeconomic and political variables. To determine the short run relationship between the variables the study used the Error Correction Model (ECM). The empirical results of table shows that there exist the short run relationship between defence spending and economic growth with some other macroeconomic and political variables in case of Pakistan that's my research objective. Error correction model (ECM) value showed the speed of convergence which was near about -0.04 (4 percent convergence take place in one year).

V. CO-INTEGRATION GRAPH

The graph of the co-integration also verified the existence if the short and long run relationship between the defence spending and economic growth with some other macroeconomic and political variables in case of Pakistan.

VI. CONCLUSION

The main objectives of the study is to explore the association among the economic growth and military spending in case of Pakistan with some other political, economic and social variables (corruption). To achieve the objectives of the study, the study use the secondary data of the defence expenditures, real gross domestic product, consumer price index as proxy of the inflation, political instability index (range from +10 to -10), +10 prefect democracy in the economy, -10 mean prefect autocracy in the economy), corruption index (range from 0 to 6), 0 mean no corruption, and 6 mean prefect corrupt country), nominal exchange rate. The data on these variables collected from various

published sources (international country risk guide, systematic peace web site, and world development indicators) for the period 1975 to 2015. To estimate the relationship between defence expenditure and economic growth with some other variables (Consumer price index, exchange rate, political instability, corruption index) we used autoregressive distributed lag model (ARDL) which is mainly used in time series data econometrics to estimate the non-stationary models with mix order of integration. The estimated empirical results of the study confirmed that existence of the co-integration between defence expenditure and economic growth with some other variables (Consumer price index, nominal exchange rate, political instability, and corruption index) in case of Pakistan economy. The empirical results of the study shows that economic growth and defence expenditure have equilibrium in the long run.

These study demonstrations that the defence spending is not presenting the negative influence on the economic growth while the other hand they play a positive atmosphere for the economy growth. Some studies examined that the causative relationship among the economic growth and military expenditure. The policy maker constructs a better policy and state increase the rate of tax, commercial tax and indirect tax are greatest support for the growth of the economy. Tax is the proper indicator which is support to the economy but the commercial tax ratio is decided with respect to the production of the industry. Secondly rise the income tax at aggregate level for overcome the gap of military spending and the economy growth of the state the addition in the tax ratio are reduce the production of the segment these are implement for the short period of time for eliminating the gap of defence spending and economic growth.

The empirical results of the study evaluated that volatility of the inflation lead to uncertainty which is also suggested by the Able (1980) and negatively affect the economic growth of the under developed consumption expenditures as well as private investment. Because uncertainty directly affects the cost of capital as well as reduce private investor confidence. According to the political thinkers and policy makers that volatility of the macroeconomic variables and political instability lead to uncertainty in the developing economies which has significant impact on economic growth and other economic outcomes (foreign debt, government consumption expenditures and private investment etc). Political stability play a key role for the economic growth of the developing economies, especially in case of Pakistan. Because Pakistan faces frequent government collapse since the independence of the Pakistan which negatively affect the economic growth and governance of the Pakistan economy, which is also suggested in the empirical results of the study. The estimated results of the study show that there exist negative co-integration between political instability and real gross domestic product of the Pakistan economy, so we have to maintain the political stability to enhance growth of economy. The exchange rate play a key role for the determination of economic growth of the Pakistan economy, and volatility in the exchange rate directly affect the economic growth through capital inflow (foreign direct investment, foreign debt, foreign aid and remittances) in case of Pakistan. The estimated result of the study shows that there exist negative relationship between nominal foreign exchange rate and the real gross domestic product in case of Pakistan. Due to the exchange rate

depreciation of Rupee is taken as an incentive by the foreign investors and they are attracted to invest in Pakistan because of their relative increase in worth of their assets. Pakistan is following freely floating exchange rate system since 2000 which makes country more sensitive to the slight variations in the foreign exchange market. Nominal exchange rate volatility acts like a market friction for FDI in Pakistan as evident by our results. Future prone to risk and uncertainty provoked by exchange rate volatility hampers economic growth in Pakistan. This show that exchange rate associated negatively with real gross domestic product in case of Pakistan.

The overall outcomes of research thesis concluded that defence expenditures, political instability (PI), corruption, exchange rate and inflation significantly matters for the determination of economic growth in developing countries like Pakistan. We observed in our study that Pakistan experiences more volatility in political regimes which caused more fluctuation in economic growth and defence expenditure.

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