THE INTERACTION EFFECT OF DEVELOPMENT AND NON-DEVELOPMENT EXPENDITURES ON THE RELATIONSHIP OF PUBLIC DEBT AND ECONOMIC GROWTH IN PAKISTAN

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Abstract
The current study tries to investigate the effect of public debt on the economic growth of the Pakistan with the moderation effect of development and non-development expenditures on the relationship of public debt and economic growth. The econometric technique Ordinary Least square (OLS) is used for the time series data over the period of 1972-2021 in this study. After conducting the OLS Method for the period of 49 years, the empirical findings of this study show that PD, NONEXP, DI, FDI, LFPR has statistically significant and positive impact on the GDP of the Pakistan. While the DEXP has statistically significant and negative impact on the economy. The moderation impact of PD*NONEXP and DI*NONEXP have statistically significant and negative impact on the GDP of the Pakistan. Results of the study suggest that governments and policymakers would made those policies in which further income could be generated and pay the debt services. When the excessive income is spent on the development projects then its impact become to start inverse on the economic growth of the country. So, there is also a need to be consideration to made the required expenditures on the development projects by the governments and policymakers.
Keywords: Gross Domestic Product, Public Debt, Development Expenditures, Non-Development Expenditures, Debt Service, Domestic Investment, Foreign Direct Investment, Pakistan.

INTRODUCTION
The term economic growth is used as an economy's average income rise, while development economics is used as the person's welfare of that economy. The role of the debt remains an important issue in the economic development for the researchers and policymakers of the country now a days. The main focus of the policy discussion is on the effects that the developing countries faces when the public debt spends on non-development expenditures rather than development expenditures. Owing to that country not be able to generate further income nor be able to repayment of their debt (debt servicing). Pakistan has two components of the public debt, domestic debt that is primarily used to finance the fiscal deficit and

external debt that is mostly generated for the funding of the development expenditure (Pakistan Economic Survey 2014-15). Pakistan is facing the grim debt difficulties, report of the World Bank 2000-2001 shows that Pakistan is one of the Highly Indebted Countries (HICs) because Pakistan's existing and upcoming liability condition is very unpleasant. Total public debt stood at Rs 22,820 billion at end December 2018.Pakistan recorded total public debt equivalent to 66.3 percent of the country's Gross Domestic Product (GDP) in 2018. (State Bank, 2018).

The budget deficit generates due to high expenditure and fewer revenues that creates the problem for all the governments to run their country and cannot fulfill the required achievements to increase the economic growth and development of the economy. To fill the gap between the revenues and expenditures, the government has to borrow the money that may be either from the within the country or from the outside of the country to achieve the development plans. Domestic investment is a productive factor for economic growth. Hence, domestic investments and capital formation increase economic growth. Economic model advocates that rise in investment leads to boost the capital formation which enhances the economic growth. When the role of investment is exploring to the direction of economic growth, we find that these economies will grow with the support of in cooperation of the foreign direct investment and the fixed capital formation, but openness contributes to the prosperity of the developing markets (Shabbir, 2013). Economic growth will decrease due to an increase in external debt when debt servicing will rise, there will be less opportunities for economic growth. (Malik, Hayat & Hayat 2010). The foundation of native debt is to defend developing countries from opposing foreign shocks and foreign exchange threats and incentives the development of domestic monetary marketplaces (Barajas, Steiner & Salazar 1999, 2000).

Determination of the economic growth depends on the role of the public debt that may be positive or negative especially in the developing countries. When the government used the public debt in the development expenditures and investment related plans such as infrastructure, manufacture and agriculture sectors, power sector, health, and education, then the effect of the public debt is positive in the economy. The public debt has a negative effect when its utilization is on the non-development expenditures such as defense, law and order, social and economic services, subsidies and debt servicing. Furthermore, the low level of the debt has a positive effect on economic growth, while a high level of debt has a negative effect on economic growth. Importance of Foreign Direct Investment (FDI) inflows in the

developing states has become major element in the economic works (Adefeso & Agboola, 2012).

Research Objective

General Objective

To check the impact of Development & Non-development Expenditure on the Relationship among Public Debt, Domestic Investment and GDP in Pakistan.

Specific Objective

o To investigate impact of public debt on the economic growth of Pakistan.

o To investigate the impact of Development Expenditure on the Relationship among Public Debt and GDP in Pakistan.

o To investigate the impact of Non-development Expenditure on the Relationship among Public Debt and GDP in Pakistan.

o To investigate impact of domestic investment on the economic growth of Pakistan.

o To investigate the impact of Development Expenditure on the Relationship among Domestic Investment and GDP in Pakistan.

o To investigate the impact of Non-development Expenditure on the Relationship among Domestic Investment and GDP in Pakistan.

Research Gap

Many scholars have observed the consequences of public debt on economic growth since the start of the new era. Many studies focused on debt-related issues but they completely concentrated either on development expenditure or on non-development expenditure. While both are very important parts of the expenditures, to examine the effect of one part, the other cannot be ignored on the country's economic growth. The interaction impact of development and non-development expenditures on the relationship of public debt, domestic investment and GDP is not checked in the literature in the context of the Pakistan, the current work is trying to fill the gap which exist in literature. The study trying to check the interaction effect of development expenditure and non-development expenditures on the relationship of public debt, domestic investment and economic development of Pakistan.

Background of the study

There have been an excessive number of studies on the relationship of public debt and economic growth in the developing countries. These studies have attained mixed findings. Most of the studies have found a negative relationship between public debt and economic growth such as,a negative relationship exists between public debt and economic growth (Panizza and Presbitero, 2014; Cecchetti, Mohanty & Zampolli, 2011; Nersisyan and Wray, 2011; Checherita and Rother,

2010: Qureshi and Ali, 2010 and Rais and Anwar, 2012: Guei,2019), While some researchers found that a positive relationship exist between public debt and economic growth (Gómez-Puig & Sosvilla-Rivero, 2017; Burhanudin, Muda, Nathan & Arshad, 2017; Chui & Lie, 2017) While some researchers identify insignificant results in their studies (Kempa, & Khan, 2017; Arčabić, Tica, Lee, & Sonora, 2018).

Ali and Mustafa (2012) explored that in Pakistan economic growth is affected of external debt in the long run and short run for the time frame of 1970-2010 by applying the "Johansen co-integration test" to check long run relationship among the variables while "Vector Error Correction Model" are used to get short run results. The empirical outcomes of the study exposed that effect of the external debt on economic growth is negative. It's mean that debt overhang condition exists in Pakistan. An important factor of production is capital which has a positive effect on the growth of economy. Zaman and Arslan (2014) explored that gross capital formation (GCF) and outdoor debt stock has important and progressive impact on the Gross domestic product (GDP) of Pakistan however gross domestic saving have insignificant effect on Pakistan GDP by applying the Ordinary Least Square (OLS) regression. Akram (2016) examined the relationship between the public debt and pro-poor countries of the South Asian nations. Albeit open obligation negatively affects monetary development. In any case, domestic obligation has a positive association with monetary development and a negative association with the GINI coefficient, demonstrating that local obligation is expert poor.

Gómez-Puig and Sosvilla-Rivero (2017) explore the association between the public debt and economic growth by applying the Autoregressive Distributed Lag (ARDL) limits testing approach. Results propose distinctive examples crosswise over EA nations and will in general help the view that open obligation dependably negatively affects the long-run execution of EA part states, while its short-run impact might be sure contingent upon the nation. Isibor et al. (2018) explore the impact of foreign debt on the economy of Nigeria. For the principal condition, both inward and outer obligation and their slacks were relapsed against GDP; the outcome demonstrated that outside adversely impacts the economy while inner obligation emphatically does likewise. For the second condition, GDP, absolute funds stores in the Nigerian store cash banks and capital use were relapsed against interior obligation, the outcome demonstrated that every one of the factors have noteworthy association with inside obligation.

Theoretical Framework
Solow Growth Model

By Robert M. Solow (1956) output is produce with the help of two factors of production, capital and labor, whose rate of input is L (t). Technological possibilities are represented by a production function:

Y= F (K, L).

Romer give extension to Solow Growth Model and production function in 1992 takes the

Form Y (t) = F (K (t), A (t), L (t))

In this equation (t) denotes time and (A) represents "Knowledge" or "Effectiveness of labor". Solow growth model is extensive version of the Harrod Domar growth model. This model introduced a new variable which is technology in growth equation with the addition of labor. Model assumes that if the capital and labor consider independently than these factors of production have diminishing return to scale. Although together these factors of production have constant return to scale. Third factor technological process measured as independent factor and due to this Solow neo classical growth model known as exogenous model.

A General Theory of Public Debt

James M. Buchanan in his book, Public Principles of Public Debt, has struggled to present the general theory of public debt. Buchanan presents a theory of public debt which is applicable both to periods of full employment and periods of unemployment. Professor Buchanan argues that we must reject three commonly accepted propositions in debt theory: first, that the primary real burden of debt is borne by the current generation; second, that public debt is different in nature from private debt; and third, that external debt is different in nature from internal debt. The author argues, the creation of public debt to finance additional government expenditure will simply mean that some people who would have lent funds to the private sector will lend instead to the public sector. It is concluded therefore, that the burden of the debt must rest on tax-payers in future years, who will have to pay more in taxation than would otherwise have been the case. But the additional income generated thereby will be exactly offset by external interest payments, and so it is concluded that external and internal loans are essentially similar in nature.

METHODOLOGY

Time series data is used for the single country data analysis over the period 1972-2021. World Bank, Handbook of Statistics on Pakistan Economy, Pakistan Economic Survey and International Monetary Fund (IMF) are the main secondary data source that are used to collect the data. Current study used the methodology approach as OLS regression analysis. Gross Domestic Product (GDP) is used as a proxy of the Economic Growth. Gross Fixed Capital Formation (GFCF) is used as proxy of Domestic Investment (DI). GDP is dependent variable but PD, DEXP,

NONEXP, DSRV, DI, FDI, and LFPR are independent variables in the mode. Moderating variables are DEXP and NONEXP.

Theoretical Framework
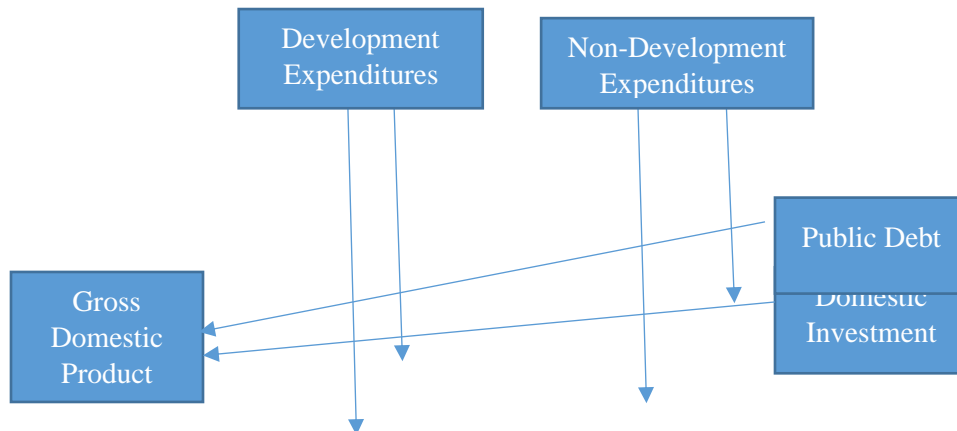
Econometric Model

After the generating the theoretical model, we have created the following econometric

model to investigate the effects of the public debt on the economic growth of the Pakistan.

First of all, we construct the following mathematical models for analysis.

GDP = f (PD, DI, DEXP, NONEXP, DSRV, FDI, LFPR)

The econometric equation specified in linear form is given:

$GDP_t = \alpha 0 + \alpha 1\ PD_t + \alpha 2\ DI_t + \alpha 3\ DEXP_t + \alpha 4\ NONEXP_t + \alpha 5\ DSRV_t + \alpha 6\ FDI_t + \alpha 7\ PD_t * DEXP_t + \alpha 8\ PD_t * NONEXP_t + \alpha 9\ DI_t * DEXP_t + \alpha 10\ DI_t * NONEXP_t + \alpha 11\ LFPR_t + \varepsilon$

GDP= Gross Domestic Product (US$ in millions)

PD=Public Debt (% of GDP)

DI=Domestic Investment (% of GDP)

DEXP=Development Expenditure (US$ in millions)

NONEXP=Non-development Expenditure (US$ in millions)

DSRV= Debt Service (US$ in millions)

FDI=Foreign Direct Investment (US$ in millions)

LFPR=Labor Force Participation Rate (Total)

t = time series

ε=Error term

* = Sign of multiplication

By taking the natural logs (ln) on both side of the above econometric equation;

ln GDP$_t$=α0 + α1 ln PD$_t$+ α2 ln DI$_t$+ α3 ln DEXP$_t$ + α4 ln NONEXP$_t$ + α5 ln DSRV$_t$

+ α6 FDI$_t$ + α7 ln PD$_t$* ln DEXP$_t$+ α8 ln PD$_t$* ln NONEXP$_t$+ α9 ln DI$_t$* ln DEXP$_t$ +

α10 ln DI$_t$* ln NONEXP$_t$ + α11 ln LFPR$_t$ + ε

Result and Discussion

Multicollinearity Analysis

There are two types of analysis applied to check the multicollinearity in this study. First is Correlation Matrix and second is Variance Inflation Factor (VIF).

Correlation Matrix

Correlation matrix is used to identify statistical relationship between variables. If engaged any two variables value rise or decline together then they have positive relationship or positively correlated. But if one variable value rise and other decline then variable have negative correlation. Sign of correlation negative and positive identify the nature of relationship.

Table:1 Correlation Matrix

	PD	DEXP	NONEXP	DI	FDI	DSRV	LFPR
PD	1						
DEXP	-0.12581	1					
NONEXP	0.092601	0.550588	1				
DI	-0.122	-0.11791	0.037491	1			
FDI	-0.00044	0.561274	0.88308	0.093961	1		
DSRV	-0.02355	0.577479	0.857855	0.017331	0.779574	1	
LFPR	-0.21217	0.487418	0.58889	0.125531	0.508472	0.48625	1

Source: software E-Views 9.0

Correlation matrix is used to check out the multi-collinearity and there is no multi-collinearity exist in the data. All the values of the variables in the table are less than the rules of the thumb that is 9.

Variance Inflation Factor (VIF)

Table: 2 VIF

	Coefficient	Centered
Variable	Variance	VIF
PD	0.056217	1.251568
DEXP	0.002944	1.812553
NONEXP	0.004591	8.859412
DSRV	0.000946	4.250547

DI	0.076555	1.110062
FDI	0.001303	5.033184
LFPR	0.160581	1.908802
C	4.081332	NA

Source: software E-Views 9.0

Results of the table show that multicollinearity no present in data of the study because all values of the variables are less than the rule of thumb that is 10 for VIF.

Auto-Correlation Analysis

According to the assumption of the classical linear regression model (CLRM) that correlation should not be exist in the error terms. To check the whether the error terms are correlated or not, we applied the Breusch-Godfrey Serial Correlation LM Test, if the probability value is greater than 5% then it shows the absence of the auto-correlation.

Table: 3 Lagrange Multiplier Test (LM)

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	1.172494	P. Value	0.3205

Source: software E-Views 9.0

Table shows the Breusch-Godfrey Serial Correlation LM Test results for analysis. The results display that F-statistic 1.172494. The probability value is 0.3205, which is more prominent than 0.05. It implies that no Auto-correlation exist in the data.

Homoscedasticity Analysis

If the value of the probability is more than 5% then heteroskedasticity absence would be shown in the data but if the value of the probability is less than 5%, it would indicate that presence of the heteroskedasticity in the data.

Table: 4 Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	5.727974	P. Value	0.0001

Source: software E-Views 9.0

Table shows the results for Heteroskedasticity test Breusch-Pagan-Godfrey analysis. The results show that F-statistic 5.727974. The probability value 0.0001, which is less than 0.05 and indicate the presence of the heteroskedasticity in the data.

Ordinary Least Square (OLS) Analysis

Regression analysis is used to check the impact of all the independent variable on the dependent variable. The current study uses the Gross Domestic Product (GDP) as dependent variable and Public Debt (PD), Development Expenditures (DEXP), Non-development Expenditures (NONEXP), Debt Service (DSRV), Domestic Investment (DI), Foreign Direct Investment (FDI) and Labor Force Participation Rate (LFPR) are as independent variables. After checking the multicollinearity that is data problem and error terms problems such as auto correlation and heteroskedasticity. In this study, heteroskedasticity exist. So, after removing this problem, now we can run the regression analysis.

Table: 5 Regression Results of PD on Economic Growth

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PD	0.642795	0.142775	4.502146	0.0001*
DEXP	-0.19676	0.059637	-3.29932	0.0021*
NONEXP	0.107454	0.045771	2.347622	0.0241**
DSRV	0.038911	0.020574	1.891247	0.066
DI	0.669937	0.265574	2.522601	0.0158**
FDI	0.134106	0.029785	4.502531	0.0001*
LFPR	1.345206	0.210842	6.380149	0.0000*
PD*DEXP	-1.16457	0.647949	-1.79732	0.08
PD*NONEXP	-0.21965	0.047413	-4.63273	0.0000*
DI*DEXP	-0.19839	0.239612	-0.82798	0.4127
DI*NONEXP	-0.35726	0.086326	-4.13854	0.0002*
R-squared	0.982396		F-statistic	401.7861
Adjusted R-squared	0.979237		Prob(F-statistic)	0.0000
Durbin-Watson stat	1.652963			

Source: software E-Views 9.0

Note: Significance level at 1% and 5% showed by the "*" and "**" respectively.

This table of the study show the regression results of the Public Debt (PD) on the economic growth of the economy of Pakistan. Coefficients of the variables show the strength of the variables but positive and negative signs of the coefficients show the direction of the variables either they are working in the same direction or opposite.

Results of the table show that the coefficient of the Public Debt (PD) is 0.642795 and p-value is 0.0001. Its means that when PD will increase by 1 percent then GDP will be increased by 0.642795 percent. PD has statistically significant and positive impact on the GDP of the Pakistan. This result is consistent with other researcher's findings such as (Gómez-Puig & Sosvilla-Rivero, 2017; Burhanudin, Muda, Nathan & Arshad, 2017; Chui & Lie, 2017). The coefficient of the Development Expenditures (DEXP) is -0.19676 and p-value is 0.0021. Its shows that when DEXP will increase by 1 percent then the change in the GDP will be decreased by 0.19676 percent. DEXP has statistically significant and negative impact on the GDP of the Pakistan. This result is consistent with other researcher's findings such as (Devarajan, Swaroop & Zou,1996: Barro,1991). The value of coefficient of the Non-Development Expenditures (NONEXP) is 0.107454 and p-value is 0.0241. It indicates that when NONEXP will increase by 1 percent then the GDP will be increased by 0.107454 percent. NONEXP has statistically significant and positive impact on the GDP of the Pakistan. This result is consistent with other researcher's findings such as (Devarajan, Swaroop & Zou,1996: Nurudeen & Usman, 2010: Maingi, 2010). The coefficient value of the Domestic Investment (DI) is 0.669937 and p-value is 0.0158. Its means that when DI will increase by 1 percent then the GDP will be increased by 0.669937 percent. DI has statistically significant and positive impact on the GDP of the economy of Pakistan. This result is consistent with other researcher's results such as (Aschauer, 1988; Adams, 2009; Ghazali, 2010; Osinubi & Amaghionyeodiwe, 2010; Ullah, Shah & Khan, 2014; Tang, Selvanathan & Selvanathan, 2008; Johnson, 2006; Choe, 2003). The coefficient value of the Foreign Direct Investment (FDI) is 0.134106 and p-value is 0.0001. Its means that when FDI will increase by 1 percent then the GDP will be increased by 0.134106 percent. FDI has statistically significant and positive impact on the GDP of the economy of Pakistan. This result is consistent with other researcher's results such as (Batten & Vo, 2009; DIMELIS, 2005). The coefficient value of the Labor Force Participation Rate (LFPR) is 1.345206 and p-value is 0.0000. Its means that when LFPR will increase by 1 percent then the GDP will be increased by 1.345206 percent. LFPR has statistically significant and positive impact on the GDP of the economy of Pakistan. The coefficient of the combined impact of (PD*DEXP) is -1.16457 and p-value is 0.08. When combine effect of PD and DEXP (PD*DEXP) is checked, the results show, it is not participating in the development of the economy due to insignificant value of the probability. The coefficient of the (PD*NONEXP) is -0.21965 and p-value is 0.0000. That show, when combine effect of PD and NONEXP (PD*NONEXP) is increased by the 1 unit then the GDP will be decreased by the 0.35726 percent. The combine effect of PD and NONEXP

has statistically significant and negative impact on the GDP of the Pakistan. The coefficient of the combined impact of (DI*DEXP) is -0.19839 and p-value is 0.4127. When combine effect of DI and DEXP (DI*DEXP) is checked, the results show, it is not participating in the development of the economy due to insignificant value of the probability. The coefficient of the (DI*NONEXP) is -0.35726 and p-value is 0.0002. That show, when combine effect of DI and NONEXP (DI*NONEXP) is increased by the 1 unit then the GDP will be decreased by the 0.35726 percent. The combine effect of DI and NONEXP has statistically significant and negative impact on the GDP of the Pakistan. While Debt Service (DSRV) is insignificant variable. That means this variable has no contribution in the development of the economy. The value of the R-squared is 0.982396 that means 98% variation in the model is explained by the independent variables for the dependent variable. Because the R-squared is defined as a goodness of fit measure for the OLS regression but the exogenous factors works only 2% from outside the model that only enclosed by the error term. Durbin-Watson stat is 1.652963 which is near to the 2 because this value is consider as ideal value of it. F-stat show the over all fitness of the model, its value should be positive that is 401.7861 and its probability value should be 0 that is (0.000) present in the model.

Conclusion

The basic goal of the current study is to check the moderation effect of development and non-development expenditures on the relationship of the public debt and economic growth (GDP) in the context of the Pakistan over the period 1972-2021 by applying econometric technique of ordinary least squares (OLS). Owing to the low living standard, currency devaluation, high poverty level, poor infrastructure structure, more expenditures than the revenues and low level of GDP, Pakistan has to face the many problems that become the cause of the high debt level to fulfill these requirements in the country. In the current study we checked the impact of all the variables individually like FDI, DI, DEXP, DSRV, NONEXP, PD are the independent variables and the DEXP and NONEXP are used as moderators in this study.

According to the main results, PD, NONEXP, DI, FDI, LFPR has statistically significant and positive impact on the GDP of the Pakistan. While the DEXP has statistically significant and negative impact on the economy of the Pakistan. The moderation impact of PD*NONEXP and DI*NONEXP have statistically significant and negative impact on the GDP of the Pakistan. While Debt Service (DSRV) is insignificant variable. Similarly, the moderation impact of PD*DEXP and DI*DEXP are also insignificant. That means that these variables have no contribution in the development of the economy. Results of the study suggest that

governments and policymakers would made those policies in which further income could be generated and pay the debt services. When the excessive income is spent on the development projects then its impact become to start inverse on the economic growth of the country. So, there is also a need to be consideration to made the required expenditures on the development projects by the governments and policymakers.

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