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OPTIMUM FISCAL SPENDING AT AGGREGATED AND DISAGGREGATED LEVEL IN PAKISTAN

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ABSTRACT

This study analyzed the relation between public spending and economic growth. Endeavors have been made to check whether or not there is any inverted U shape connection between government expenditures and economic growth. In theory, the connection amongst optimum government expenditures and economic growth has been linked with the Armey Curve. Armey curve shows the role of government in economic activities. The simple reason at the back of Armey curve is that the relation among government expenditures and growth is positive until it reaches a specific point, after that this link turns into negative. In this study the optimum level of government expenditures for various categories such as development spending, current spending (non-development) and overall government spending which maximize economic growth are calculated. The results show that, given the present structure of the economy, the maximum size of overall government spending, current spending & development spending are 22.41 %, 14% & 8.3 % of GDP, respectively. It may be noted that tax to GDP ratio need to be enhanced, development expenditures need to be significantly improved and current expenditures need to be curtailed, if at all Pakistan has to put on the path of sustainable economic growth. Pakistan is far away from the optimal expenditures listed above. Its economic performance is very poor at present.

INTRODUCTION:

The role of fiscal policy has much contentious/controversial debate concerning its efficacy on economic growth. Economic theory suggests that in some cases lower levels of public expenditure would increase growth whereas in other cases higher public expenditure is considered desirable. In fact in literature, there is "inverted U" connection among economic growth and the share of public sector which can be examined from Scully (1998, 2003), Rahn *et al.* (1996), Armey *et al.* (1995) and Barro (1989). In this perspective it is important to explore what level of public spending would be productive for an economy, because due to resource constraint there is a need to achieve optimum level of spending for the economy.There is an ample body of literature [Rubinson (1977), Ram(1989), Barro (1990), Bairam (1990), Gwartney *et al.* (1998), Vedder and Gallaway (1998)], which was focused to find optimum level of public spending for developed and developing countries. Such a literature is barely found in case of Pakistan. This aspect of fiscal policy is ignored in research pertaining to Pakistan. It is the very reason that this study is aimed to explore optimum allocation of fiscal resources at aggregated and disaggregated level in Pakistan. It will help to formulate a policy to attain the desired goals of sustained economic growth.A bird's eye view of Pakistan's economy show that fiscal performance of the country has shown many ups and down in previous years. A comparison between different time periods is given in the Table 1 below. Expenditures have always outpoured public revenues i.e. budget deficits have persisted for years and often unsustainable (Ishfaq and Chaudhary, 1999). In Pakistan, there is an upward trend in current expenditures and these expenditures predominantly consist of defense expenditures, public administration, and debt servicing. On the other hand development expenditures have declined to 4.7% of GDP in 2017-18, as compared to 9.27% of GDP in 1980-81. The declining trend in public development spending can potentially influence GDP growth in three ways. First, decreased public expenditures on social services, education, and health influence human capital, which is considered as an essential prerequisite for economic growth and sustainability of the economy. Second, reduction in government investment, mainly in infrastructure like roads, water supply, electricity, and natural gas etc., will enhance the cost of doing business. Third, decreased development spending discourage private investment. Development expenditures are 3.1% of GDP in the fiscal year 2019. Such a scenario exhibit not merely incapability of fiscal system to fund development spending, but also points out government preferences and its priorities to develop the country. Figure 1 in the appendix illustrates the trend in GDP Growth, Current, and Development Expenditures as percentage of GDP from 1976 to 2018.There is a downward trend in total public spending and it decreased to 21.8 % of GDP in 2017-18, in comparison with 22.88% in 1980-81. Despite such trend in government spending and fiscal deficit, economic growth cannot be accelerated in comparison with 1980's. Large fiscal deficits were used to fund current spending's and that's why increased fiscal deficits could not contribute much towards economic growth. In this given scenario, it is important to find out threshold level of aggregate public

expenditures, current expenditures, and development expenditures so that economic growth of the country could be enhanced and sustained over time.

Table:1 Selected fiscal indicators of Pakistan (% of GDP) 1981-2018						
Years/ Variables	GDP Growth	Fiscal Deficit	Current Exp.	Development Exp.	Total Govt. Exp.	Tax Revenues
1980-81	6.8	5.25	13.6	9.27	22.88	13.53
1990-91	5.4	8.74	19.17	6.4	25.57	12.7
2000-01	1.96	4.27	15.34	2.13	17.05	10.5
2008-09	0.361	5.15	15.47	3.64	19.18	9.5
2017-18	5.79	6.6	17	4.7	21.8	13
Average Share*	4.06	6.002	16.11	5.22	21.296	11.846
Source: Estimated by the author from the data of Pakistan Economic Survey, (Various Issues)						

Keeping in view the fluctuating trend in economic growth, public spending and tax revenue, this study estimates the optimum level of aggregate public expenditures, along with current expenditures and development expenditures in Pakistan. There is hardly any study which explored the optimum level of these categories for the economy of Pakistan. This will help the policy makers to bring the government spending for the above mentioned categories close to the optimal level which is necessary to achieve maximum growth rate. Besides, this study will also help to fill the gap in research.

LITERATURE REVIEW
This section explores literature regarding optimal size of public spending and highlights the current research gap especially pertaining to the economy of Pakistan.Ram (1989), Rubinson (1977) described that large public spending facilitates the economic growth. Bairam (1990) explored the relation between growth and public spending for many countries and found that it has a positive relationship for many countries, while negative for others. While Landau (1986), Barro (1991), Vedder and Gallaway (1998) and Gwartney *et al.* (1998), are of the view that public spending reduces the per capita income after some point, instead of improving the growth. As developed above,

actually in literature there is inverted U relation between economic growth and share of public sector. Armey (1995) described that absence of government creates a state of lawlessness and in such a state there is minute motivation for investment and saving because of the danger of confiscation. Likewise, when entire production choices are formed by the government, production will also be at a lower level. But, when there is a mix of public and private decision making on the distribution of resources, we get higher production. Production increasing activities of government will prevail when size of government is limited and growth of government goes along with increase in production. However, at one point production increasing aspects of government will decline and additional increase in expenditures of government do not support increase in production/output, for example, as government expenditures increase, extra ventures funded through governments will turn to be less fruitful because debt and taxes imposed to support government activities would create many problem. According to author, at one point, the additional gains from increased government expenditures would turn into negligible. If so, then question arises that what should be the level of government spending which would be productive for an economy, because due to resource constraint there is not a single optimum level of spending for all economies. Hence in such a scenario there is dire need for the estimation of optimum level of aggregated public expenditures, along with current and development expenditures in Pakistan.According to Gwartney et al (1998), as government goes beyond their main obligations, they would negatively influence the growth rate because (i) greater amount of taxes discourage incentive to work and crowding out influence of government investment (ii) law of diminishing returns sets in because government embarks on functions which are unsuitable for them and (iii) an intrusion in money making process since governments are not proficient as compared to markets in regulating varying conditions and discovering innovative techniques for enhancing the worth of resources.Heitger (2001) described that growth of government size due to increased consumption restricts the economic growth, but increase in government investment generates positive effect on economic growth. The key idea in this study was that the government expenditures on public goods (rule of law, internal and external security etc.) may influence GDP growth in a positive manner, though the positive influence of government expenditures have a declining trend or even this could be overturned if government expenditures rises above specific threshold value. The study professed two important reasons of negative influence of extreme government spending on economic growth; first, taxation discourages inducement to work, second, crowding out impact on private producers.Vedder & Gallaway (1998) explored optimum level of public expenditures of USA economy by using Armey Curve. They found optimal level of federal public expenditures as 17.45 % of GDP in 1990's but in real it was about 22 %, which was much greater from the desired level and it was anticipated that it is limiting the growth rate of USA. It was also established that the optimal size of various categories of federal public spending's showed the style of Armey Curve in states. The authors also examined the optimum levels of government spending in Canada, Denmark, Italy, Sweden, and United Kingdom as 21.36, 26.15,

22.22, 19.44, and 20.96 percent of GDP correspondingly. It was stated that real level of public expenditure is much greater in these economies against their estimated optimum level. However, in this study, the data set of countries has overlooked Pakistan. Moreover, no diagnostic tests have been carried out to check stationary of data. Last but not the least; the authors have not applied any sound econometric modeling to determine the significance of variables. Christie (2011) explored the long term connection between GDP growth & public expenditures. Generalized method of moments (GMM) technique has been utilized to find relationship among these said variables for 136 nations with both emerging and advanced nations, for the time span of 1971 to 2005. According to the study, public expenditures after certain maximum point will affect economic growth adversely. The outcomes of study show that the maximum level of public spending for advanced economies is between 26-32% of GDP while emerging economies threshold level is 33 % of GDP.In this study, optimum level of aggregate public expenditures as well as current and development expenditures will be analyzed to provide future policy guidelines for the economy of Pakistan. Existing literature investigates the optimum level of public expenditures but barely any comprehensive study explores public expenditures at aggregated and disaggregated level in Pakistan. It's important to confine to the optimum level of public spending for sustained growth.

Theoretical Framework

Following the Barro (1990) model, Devarajan *et al.* (1996) developed a model to find the optimum level of public spending. This model adopts a constant elasticity of substitution technology. If k is capital, Y is output and E_1 and E_2 show two different categories of public expenditures, then the model will be written as:

$$Y = [\alpha k^{-\varphi} + \beta E_1^{-\varphi} + \gamma E_2^{-\varphi}]^{-1/\varphi} \quad\quad (1)$$

The budget constraint of government is as follows:
$$tY = E_1 + E_2 \quad\quad\quad (2)$$
Here 't' is a tax ratio.

The share of public expenditures for E_1 (θ) and E_2 $(1 - \theta)$ are
$$E_1 = \theta tY \quad \text{and} \quad E_2 = (1- \theta)tY$$
To check the relationship among public spending and growth, Vedder & Gallaway (1998), Pevcin (2004) and Davies (2009) use simple quadratic equation e.g.

$$GDP = \alpha + \beta (E_1) + \gamma (E_1)^2 \quad\quad (3)$$

The anticipated sign for the term E_1 is positive and it indicates favorable impact of public spending on production. In contrast, sign of squared expression, E_1^2, is likely to be negative and measures unfavorable effects related with enlarged government size.Vedder and Gallaway (1998) used squared and linear terms for public expenditures. To find optimum level of

government expenditures, Barro & Sala-i-Martin (1999) and Levine & Renelt (1992) use trade openness as one of the control variable. In accordance with Solow growth model, study also includes capital-labor ratio as a regressor. Furthermore, ample body of literature establishes the impact of foreign direct investment (FDI) on economic growth (Zaman *et al*., 2012), (Malik, 2015), and (Saqib *et al*., 2013). Hence, on the basis of previous studies, the following, three, equations are tested for optimum level of aggregate public expenditure, as percentage of GDP, current expenditure as percentage of GDP, and development expenditure as percentage

of   GDP.$LOLR = \alpha_0 + \alpha_1 LRTE + \alpha_2 LRTE^2 + \alpha_3 LCSLR + \alpha_4 LRFDI + \alpha_5 LRTRADE + \varepsilon$ (1)

$LOLR = \alpha_0 + \alpha_1 LCG + \alpha_2 LCG^2 + \alpha_3 LCSLR + \alpha_4 LRFDI + \alpha_5 LRTRADE + \varepsilon$ (2)

$LOLR = \alpha_0 + \alpha_1 LDG + \alpha_2 LDG^2 + \alpha_3 LCSLR + \alpha_4 LRFDI + \alpha_5 LRTRADE + \varepsilon$ (3)

Detailed description of above variables is given in the table 2 below:

Table 2: Description of Variables	
LOLR	Following Solow growth model, log of output labor ratio is used as a proxy for growth. In Solow growth model, production function, Y= f (K, L) is given in the form of output per worker, y= f (k).
LCSLR	Log of capital stock to labor ratio. It shows capital intensity of firms. Here capital stock is measured in million rupees.
LRFDI	Log of real foreign direct investment.
LRTRADE	Log of real trade where trade is (imports + exports)/2/GDP.
LCG	Log of public consumption expenditures which represent non-development or current expenditures. Data is in million rupees.
LDG	Log of public investment and this represent public development expenditures. Data is in million rupees.
LRTE	Log of real aggregate public expenditures.
Y	GDP at constant factor cost of 2005-06. Data is in million rupees.
CPI	Consumer price index.
YC	GDP at current prices. It is measured in million rupees.
Labor	Labor force participation rate.

The Optimum level of aggregate public expenditures of a country, which increase economic growth positively, is observed when we differentiate the quadratic result with regard to government expenditures.

$LRTE^*: -\alpha_1 / 2\alpha_2$

Where, α_1 shows the co-efficient of linear aggregate public expenditures while α_2 exhibits co-efficient of quadratic term associated with aggregate public

expenditures. Similarly, the optimum level for current, and development spending can be found by employing the same technique. The data for above mentioned variables is obtained from Pakistan Economic Survey (Various Issues), Handbook of Statistics on Pakistan Economy, World Development Indicators, and Labor Force Survey. The data for that analysis is time series and it covers the period from 1974-2018. Stationarity of variables will be examined first because a non-stationary time series estimate the spurious regression with highly significant t-values of co-efficients, high value of R^2 (coefficient of determination) but lower value of Durbin Watson Stat.

Unit Root Testing

In this section stationary of data is checked to avoid spurious and unreliable results. Economic theory explains that stationary series is subject to short-term shocks and over time series will get back to mean level. The stationarity of data is checked with the help of Unit Root test. This study uses ADF test to find the Unit root of all variables. Table 3 shows that all the variables are stationary at first difference. It is also clear that each variable is integrated at first difference.

Table 3: Results of Unit Root Test (ADF)				
Variables	**LEVEL**		**1st DIFF.**	
	Intercept	**Trend & Intercept**	**Intercept**	**Trend &Intercept**
LOLR	-0.95	-1.23	-5.82*	-5.83*
LCSLR	0.74	-4.83*	-4.13*	-4.84*
LRTE	-1.32	-2.58	-7.71*	-7.73*
LCG	-1.47	-2.45	-7.73*	-7.75*
LDG	-1.72	-2.10	-5.33*	-5.23*
LRFDI	-2.37	-3.02	-8.14*	-8.05*
LRTRADE	-1.66	-1.37	-6.34*	-6.65*
Note: *shows significance at 1% level Author's own calculations				

Empirical Findings and Results

In resemblance with methodological framework discussed earlier, this study investigates three regression equations, which are derived on the basis of previous studies and apply OLS estimation technique to obtain the maximum threshold of various types of public spending.To obtain the optimum level of aggregate public expenditures, following equation is regressed.

$$LOLR = \alpha_0 + \alpha_1 LRTE + \alpha_2 LRTE^2 + \alpha_3 LCSLR + \alpha_4 LRFDI + \alpha_5 LRTRADE + \varepsilon$$

Table 4: Estimated results for Total Public Expenditures

Dependent Variable Economic Growth	OLS Technique	
Regressors	**Co-efficient**	**S.E**
Const.	-0.0011	0.0027
DLRTE (log of real aggregate public expenditures)	4.0520*	0.5783
LRTE^2	-0.1406*	0.0207
DLCSLR (log of capital stock to labor ratio)	1.2326*	0.1012
DLRTRADE (log of real trade)	0.0688*	0.0260
DLRFDI (log of real foreign direct investment)	0.0232*	0.0038
Adjusted R^2	0.82	
DW-stat	2.01	
Note: *, ** and *** shows variable significant at 1%, 5% & 10%, respectively. Author's own calculations. Model- Equation 1: LOLR= f (LRTE, LRTE^2, LCSLR , LRFDI, LRTRADE)		

The results presented above in table 4 show that aggregate public expenditures have positive and significant effect on growth, while the quadratic expression shows that the influence of real aggregate public expenditures on growth is significant and negative, which implies the application Armey Curve in Pakistan's Economy. Real public spending as percentage to GDP which maximizes economic growth can be determined by differentiating the quadratic function with respect to public spending:

$LRTE = - \alpha 1/2 \ \alpha 2$
$LRTE = - 4.0520/2(-0.1406)$
$LRTE = 14.41$

The calculated optimal level of aggregate real public spending as percentage of GDP is 14.41%. Average rate of inflation from 1974-2018 is around 8%. Hence adding the rate of inflation our calculated optimal level of public spending is 22.41%; against the average 19.9% of GDP, from 2006 to 2018. The results emphasized that the aggregate public expenditures are lower than the optimal level and there is a need to increase aggregate public spending to

improve economic growth as well as social welfare. Results also show that, capital labor ratio is affecting positively towards economic growth. One of the main features of neoclassical growth theory sheds light on the fact that capital-labor ratio is low in poor nations but these nations have high marginal product of capital as compared to rich nations. This shows that Pakistan can experience quick increase in growth by absorbing more capital and technology.To obtain the optimum level of public current spending, following equation is regressed.

$$LOLR = \alpha_0 + \alpha_1 LCG + \alpha_2 LCG^2 + \alpha_3 LCSLR + \alpha_4 LRFDI + \alpha_5 LRTRADE + \varepsilon$$

The results are reported below in table 5:

Table 5:   Estimated results for Public Current Expenditures

Dependent Variable Economic Growth	OLS Technique	
Regressors	**Co-efficient**	**S.E**
Cons.	0.0111*	0.0034
DLCG (log of public current expenditures)	0.0699**	0.0294
DLCG^2	-0.2484**	0.1169
DLCSLR (log of capital stock to labor ratio)	0.7552*	0.1101
DLRTRADE (log of real trade)	0.1002*	0.0311
DLRFDI (log of real foreign direct investment)	0.0117**	0.0047
Adjusted R^2	0.69	
DW-stat	2.07	
Note: *, **and *** shows variable significant at 1%, 5% & 10%, respectively. Author's own calculations. Model - Equation 2: LOLR= f (LCG, LCG^2, LCSLR , LRFDI, LRTRADE)		

The above results (in the table 5) indicate that public current spending has positive and significant influence on economic growth while quadratic expression shows that the influence of public current spending on growth is negative and significant and this implies the application Armey Curve in Pakistan's Economy. The growth maximizing public current expenditures can be determined by differentiating quadratic function (CG^2) with respect to public current expenditures.

$$CG = \alpha 1/2 \; \alpha 2$$

CG = - 0.0699/2(-0.2484)
CG = 0.14*100
 CG = 14

The calculated optimal level of public current expenditures is 14% of GDP, against the average current expenditures 15.82% of GDP; from 2006 to 2018. The result shows that estimated level of public current expenditure is lower than the actual level and therefore, in order to maximize economic growth, it is required to decrease public current spending.The above analysis of government spending has important bearing for policy formulation. It appears that government needs to reduce current expenditures and to increase overall aggregate spending, with focus on improving development expenditures. To find the optimal level of public development expenditures, following equation is regressed.

$LOLR = \alpha_0 + \alpha_1 LDG + \alpha_2 LDG^2 + \alpha_3 LCSLR + \alpha_4 LRFDI + \alpha_5 LRTRADE + \varepsilon$

Table 6: Estimated results for Government Development Expenditures		
Dependent Variable Economic Growth	**OLS Technique**	
Regressors	**Co-efficient**	**S.E**
Const.	0.0222*	0.0040
DLDG (log of public development expenditures)	0.0613*	0.0226
DLDG^2	-0.3557**	0.1452
DLCSLR (log of capital stock to labor ratio)	0.5615*	0.1049
DLRTRADE (log of real trade)	0.0681***	0.0346
DLRFDI (log of real foreign direct investment)	0.0059	0.0050
Adjusted R^2	0.66	
DW-stat	2.17	
Note: *, **and *** shows variable significant at 1%, 5% &10%, respectively. Author's own calculations. Model - Equation 3: LOLR= f (LDG, LDG^2, LCSLR, LRFDI, LRTRADE).		

The results are reported in the table 6. Here dependent variable is economic growth, while regressors are development expenditures, real FDI, real trade and capital stock to labor ratio. The results indicate that linear public development expenditures has a significant and positive effect on economic growth while the squared expression shows that the influence of public development expenditures on economic growth is significant and negative and this implies the robustness of Armey Curve in Pakistan's Economy.The growth maximizing level of public development expenditures can be determined by differentiating the quadratic function with respect to public development expenditures.

$DG = -\alpha 1/2 \ \alpha 2$

$DG = - 0.06/2(-0.36)$

$DG = 0.08*100$

$DG = 8.3$

This empirical finding shows the optimum level of public development expenditures. Estimated optimal public development expenditures are 8.3% of GDP, against the average 4.17% of GDP; during 2006 to 2018. The outcome indicates that public development expenditures are much lower than the optimal level which needs to be increased to the extent of doubling it. It could be a reason that due to low development expenditure, the welfare services provided by the government are not only poor but also have very poor growth. Thus, there is dire need that government should increase the level of development expenditures to improve economic output.

CONCLUSION

In this study optimum level of public expenditures were estimated by taking annual time series data from the period 1974 to 2018. Given an inverted U shape relation between government expenditures and share of public sector, the current study aimed to point out whether public spending boosts or hinders the growth in Pakistan and also estimated optimum level of aggregate public expenditures, current expenditures, and development expenditures. For this purpose, three models were estimated. The results showed that various categories of government expenditures influenced economic growth in a positive manner, as government expenditures increased within a certain level, economic growth showed an upward trend. The projected results indicated that optimum level of overall public expenditures, current expenditures and development expenditures are 22.41%, 14% and 8.3 % of GDP, respectively. Presently, hardly government is following this level of expenditures. It could be one of the reasons that public sector is not very successful in improving the economy, and standard of living of people, particularly, social services are in poor condition. The fiscal policy in Pakistan may focus to follow above cited guide lines to improve economic and welfare services of country, i.e. doubling development expenditures. Further research in this direction may open up more avenues of economic improvement. The above results are different then the ground realities i.e. average aggregate public spending from 2006 to 2018 was 19.9% of GDP, while, average current expenditures were 15.82% of GDP

and average development expenditures were 4.17% of GDP during 2006 to 2018. It may be noted that estimated optimum level of aggregate public expenditures, current expenditures and development expenditures are 22.41%, 14% and 8.3% of GDP, respectively. Thus there is a need of collection of revenue to increase public expenditures. The current expenditures need to be decreased, while development expenditures need to be enhanced to improve economic conditions.

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Appendix

Figure 1: GDP Growth, Current and Development Expenditures as % of GDP