CROWDING OUT THROUGH PUBLIC INVESTMENT AND EXTERNAL DEBT IN PAKISTAN: A CASE STUDY

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ABSTRACT: *This research paper has been detected the effect of public investment and external debt on real GDP growth rate by taking time series data over the period of 1984 to 2012 in case of Pakistan. An Auto Regressive Distributive Lag (**ARDL**) econometric technique was applied to find out the short run as well as long run results of statistical model. Further structural breaks of the model are tested through CUSUM and COSUM sum of squares. The Error correction model with negative sign of the adjustment coefficient represents the highly significant of the econometric model in both short run and long run. The empirical and statistical research results that the effect of public investment and external debt along with other variables on economic growth is negative through crowding out in case of Pakistan. I have gone through all literature reviewed, but not found the single study which revealed the negative effect of public investment and external debt on real GDP growth rate through crowding out while the overhang situation varies country to country and economy to economy. Further paid data from ICRG of governance was used in the study.*

Keywords: Public Investment, External debt, Governance, Trade openness, Economic Growth, ARDL Econometric Technique.

1. INTRODUCTION

The topic of public investment has been debated in Macro economics and Development economics for the last many decades. Many empirical studies have emphasized the positive role of public investment for raising the level of employment, on economic growth, technological progress, expanding the market, increase the productivity and encourage the development growth of the economy**[1,2].**

The other depressing aspect of public investment on economic growth has been detected by many researchers for developing and OECD countries' research. They argued that public investment in health sector, education sector, military sector and infrastructure or maintain the law and order and governance adversely affect the economic growth. The depressing role of public investment is because of two major reasons **[3]**.

1.1 Discourage Investment by Imposing taxes

The study highlighted the burning issue of the high rate of taxes which the govt. has levied 6 %withholding on banking transaction more than Rs 50000and 19.5 % service tax on 3 G and 4G broadband and EVO in 2015. So all businessmen and internet users have to face the high rate of taxing, which resulted the country's investment flow to the low tax rate, which pushed the economy to the stone age by throwing down the growth of the economy(**Chamber of Commerce and Industry**)

1.2 Investment Decreased by Crowding out

The financial position of Pakistan is poor because of low tax rate and limited tax base hence the public investment is made by borrowing from commercial banks. In 2004 the public borrowing was Rs 71 bilion and rose up to Rs 81 bn, Rs 102 bn and Rs 464 bn in 2005, 2007-8 respectively.(FBS 2008) and (Economic Survey of Pakistan) **[4]**

Further State Bank of Pakistan has published a report of borrowing in 2015 which has declared that borrowing has climbed up to Rs 959bn from scheduled banks. This heavy amount of borrowing pushed out the private sector from banking borrowing orbit while, the private sector borrowing was just Rs 140bn during the last 8 months of 2015. The public borrowing has eroded the economy and growth rate.

Pakistan has included into highly indebted poor countries where the debt has threatened the growth of economy. In the past 2010 the debt was $54.5 billion dollar, but it has reached up to dangerous threshold point of $65.147 billion dollar **[5].**

The empirical researchers investigated positive effect of debt on economic growth in the initial stage but when the external debt approaches to thresh hold level then the burden of debt becomes larger and country's ability to pay principal amount and rate of interest on debt rises above 60% of GDP then the economy enters in to the stage of overhang from where the major part of part of debt is allocated to the burden of debt service and less amount of resources are channelized to public investment hence debt has negative effect on economicgrowth.

The debate on effect of public investment has been controversial. Mostly, the studies emphasized on the crucial role of public investment and external debt for economic growth while the other researchers present a depressing and discouraging role of public investment and external debt on economic growth in highly debt poor country like Pakistan. So background conveys the message that previous studies pays attentions only encouraging the role of public investment and external debt, while this research detected the depressing role of public investment on economic growth. The real picture of diagram has been drawn from the data **[6, 7].**

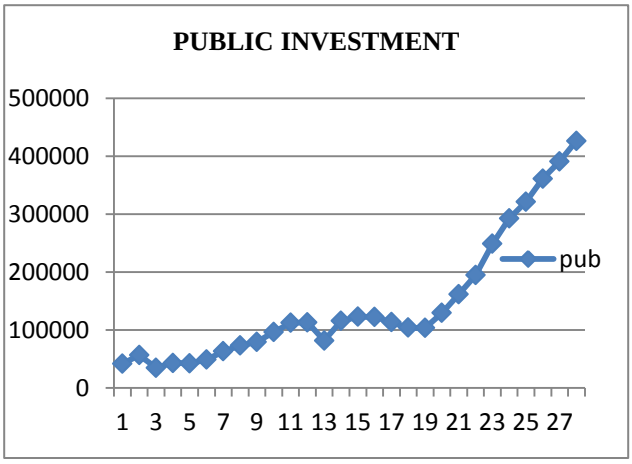

Figure (a): Graph of the Public Investment

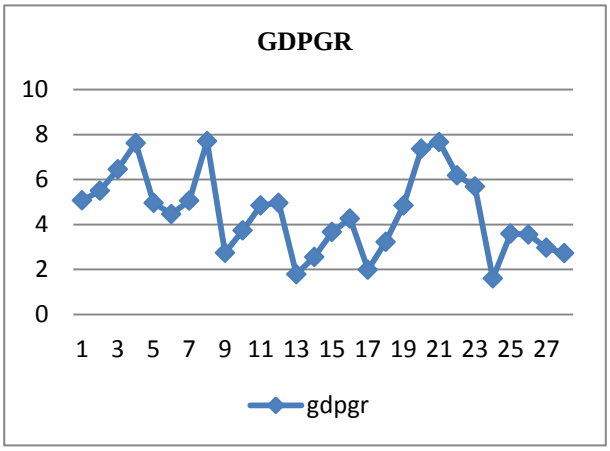

Figure (b): Graph of the GDPGR

As the public investment trend approaches upward the Real GDP growth graph molded into overall negative shape shown by the below diagram. So against such controversial debate on public investment and external debt the empirical research is launched and determines the following objectives.

Research objectives

(1) To measure the effect of public investment along with other economic variables on the real GDP economic growth in short run and long run.

(2) To investigate the impact of external debt as percent of GNI on economic growth in both short run and long run**.**

(3) To recommend the policy measures and suggest the remedy for depressed growth in case of Pakistan.

2. Literature Review

A numbers of researchers referenced the growth model of Solow, Swan, Mankiw, Romer and investigated the two predictions of public investment, the one was that it contributed to economic growth if OLS econometric technique was applied and the other it determined statistically insignificant result if Instrumental variable technique was applied **[8].**

The conducted research on private and public investment by applying the Vector Autoregressive econometric technique investigated the negative impact of public investment on Real output and further revealed no impact of burden on private investment **[9].**

The other economist explored the depressed impact of external debt on GNP growth rate and found encouraging of capital flight from tax rise. He revealed that debt burden depressed the economic growth due to low productivity of labor and capital **[10].**

The many scholars investigated empirically negative effect of external debt on GDP growth rate and also discovered the impact of high levels of debt had a negative effect on physical capital formation. Patillio [12] and Fosu [13] showed the negative effect of external debt on economic growth by a diminishing rate of marginal productivity of capital .

Recent research focused on the course of public and private investment in determining the economic growth by taking ni ne Latin American countries for the period of 1983 to 1993. The empirical research the aggregate consumption expenditure had a negative effect on private investment and economic growth **[14].**

Multidimensional aspect examined the role of public and private investment in aggregate production function. Public investment proved a major determinate of economic growth. The study revealed negative effect of public investment on economic growth while the impact of private investment was positive on economic growth **[15].**

The comprehensive results were found that the effective role Public Investment in encouraging private investment and investigated the uncertain effect of public investment on economic growth by taking data from 11964 to 2000 **[16].**

Khan took the data of 95 developing countries from 1970 to 1990 and showed their impact on economic growth. He further concluded that if public Investments is made on unproductive projects that depressed the economic growth **[17]**.

The author expressed public and private investment in determining the course of economic growth by applying Vector Auto Regressive econometric technique. The research study focused the positive effect of private investment on economic growth when the public investment, depressed the growth of economy**[18].**

3. Model Specification and Data Source.

$RGDPGR = \beta 0 + \beta 1\ PI + \beta 2\ ED + \beta 3\ GOV + \beta 4\ TOP + \beta 5\ INF + ui$

GDPGR = Real GDP Growth Rate, PI = Public Investment, ED = Total External Debt as a Percentage of GNI to Measure the Burden of Debt, GOV = Governance Composite Index based on 12 social, political and Economic Factors to Measure Good Governance. This index value lies from o to 1 low value of the index shows good governance and high value of index represents poor governance, INF = Inflation to Measure and TOP = Sum of import and export in US $ as percent of GDP is used to measure trade Openness.

Data of six variables has been taken from World Development Indicators, International Country Risk Guide and State Bank of Pakistan for the period of 1984 to 212.

3.1 Unit Root Test

Unit Root test is applied only for checking the stationary of the variables that none of variables should be at second difference I (2). All variables should be at level **I (0)** or at first difference I (1) or mixture of I(0) and I(1) for ARDL technique.

3.2 Co Integration

To examine the short-run and long-run relationship among foreign direct investment, governance, market size, openness and infrastructure the present research uses the error-correction version of ARDL model of equation (A) by following Pesaran and Pesaran (1997) as,

$$\Delta GDPGR_t = \propto_0 + \sum_{i=1}^{N} \propto_1 \Delta GDPGR_{t-i} + \sum_{i=0}^{N} \propto_2 \Delta PI_{t-i} + \sum_{i=0}^{N} \propto_3 \Delta ED_{t-i} + \sum_{i=0}^{N} \propto_4 \Delta GOV_{t-i} + \sum_{i=0}^{N} \propto_5 \Delta TOP_{t-i} + \sum_{i=0}^{N} \propto_6 \Delta INF_{t-i} + +\beta_1 GDPGR_{t-1} + \beta_2 PI_{t-1} + \beta_3 ED_{t-1} + \beta_4 GOV_{t-1} + \beta_5 TOP_{t-1} + \beta_6 INF_{t-1} + \mu_t$$

…… …….. **(A)**

The first step in ARDL approach to co-integration is to examine long-run relationship among the variables by carrying out familiar F-statistic on the differenced variables components of Unrestricted Error Correction Mechanism (UECM) model for the joint significance of the coefficients of lagged level of the variables.

$$\Delta GDPGR_t = \propto_0 + \sum_{i=1}^{N} \propto_1 \Delta GDPGR_{t-i} + \sum_{i=0}^{N} \propto_2 \Delta PI_{t-i} + \sum_{i=0}^{N} \propto_3 \Delta ED_{t-i} + \sum_{i=0}^{N} \propto_4 \Delta GOV_{t-i} +$$

…….(B)

To create error correction mechanism in this equation, first lag of the level of each variable is added to the equation (B) and a variable Addition Test is conducted by calculating F-test on the joint significance of all the added lagged level variables.

3.3 Table Explanation Bound Test

F-Calculated	95% confidence interval		90% confidence interval	
5.203	Lower Limit	Upper Limit	Lower Limit	Upper Limit
	3.206	4.658	2.619	3.891

The author's own Source

The calculated value of F-statistics exceeds from lower limit value 3.206 and upper limit value 4.658 at 95% confidence interval and lower limit value 2.619 and upper 3.891 at 90% confidence interval explains the rejection of null hypothesis means the long run relationship is not exist among variables and the alternative hypothesis is accepted depicts long run relationship among variables .The bound test confirms that variables are co integrated and GDP growth rate is taken as dependent variable.

3.4 Table Dynamic ARDL Model Based on Schwarz Lag Estimates Criterion

Variables	Coefficients	S.E	T-Ratios	P-Values
RGDPGR (1)	-.401	.239	-1.679	(.109)
PI	-10.915	.596	-3.360	(.003)
ED	-.217	.070	-3.072	(.006)
GOV	-16.535	6.337	-2.609	(.017)
TOP	-49.889	21.626	-2.306	(.032)
TOP (-1)	39.822	17.574	2.265	(.035)
INF	-.013	.056	-.235	(.816)

The author's own Source

In the table the public investment, external debt, governance and trade openness are statistically significant at 1% and 5%.the public investment, external debt, governance and trade openness have discouraged the economic growth effect on while the lag value of trade openness has positive effect on growth at 5 %

3.5 Table Good fit of The Model

R^2	.638
Adjusted R^2	.511
D.W-Statistics	2.091
F (7,20)	5.035

The author's own Source

In table 63.8 % variation in GDP growth rate is the result of explanatory variables correspond the value of R^2 is .638 and the other variation in the model is due to residual term. Over all good fit of themodel also depend upon high value of R^2 while the adjusted R^2 reflects over all good fit of the model adjusted with degree of freedom. Durban Watson statistics is close to the value of 2 shows no auto correlation.

3.6 Table Diagnostic Test

PROBLEM	LM-VERSION (P.V)	F-VERSION (P.V)
SerialCorrelation	(.699)	(.753)
Functional Form	(.179)	(.267)
Normality	(.665)	Not applicable
Hetroscedasticity	(.940)	(.943)

The author's own Source

In table the assumptions of OLS are confirmed by ARDL statistical technique. There is no serial correlation checked by Lagrange Multiplier test and correct functional form is confirmed by Ramsey Reset test. Further the value of LM-version and F-version are more than 10 % satisfied no serial correlation and correct functional form no chance of hetroscdacticity.

3.7 Stability Test

Brown, Durbin and Evan devised a Stability Test for confirming the stability of the model in short run variables as well as long run coefficients. Pesaran and Pesran applied this test practically, if the graph of Cumulative Sum of Recursive Residual CUSUM lies in between 5% critical bound limit and the graph of CUSUM sum of the square lies in between 5% critical bound limit which confirm structural stability of the model in short run and long run. Stability of the model is checked through CUSUM and CUSUM Square tests and the graph of the CUSUM sum of the square also lies in between 5% critical bound limit which confirm structural stability of the model in short run and long run. Stability of the model is checked through CUSUM and CUSUM Square tests**[19, 20].** The CUSUM and CUSUM Square tests confirm that the results are stable as the calculated lines lie inside the critical bounds at the 5 percent level of significance which proposed models stable. The following results show that the lines are within the critical bounds, so model has no structural breaks. It can also conclude that there is no structural break in model. The model can be used for prediction purpose.

3.8 Table Long Run Estimation of the Model

Variables	Coefficients	S.E	T-Ratios	P-Values
PI	-.143E-4	.303E-5	-4.713	(.000)
ED	-.155	.037	-4.204	(.000)
GOV	-11.799	4.548	-2.594	(.017)
TOP	-7.183	8.979.	-.800	(.433)
INF	-.0nt09	-.040	.235	(.816)

The author's own Source

In the table long run results of public investment, ED as a percent of GNI and GOV are statistically significant at 1 % and 5 % which is most important finding of the study. The study investigate negative effects of Public Investment, External Debt, governance and TOP have negative effect on Real GDP growth while Inflation has positive impact on Real GDP growth .

3.9 Table Error Correction Model Explanation

Variables	Coefficients	S.E	T-Ratios	P-Values
dPI	-10.915	.596E-5	-3.360	(.003)
dED	-.217	.070	-3.072	(.006)
dGOV	-16.535	6.337	-2.609	(.016)
dTOP	-49.889	21.626	-3.206	(.031)
dinf	-.013	.056	-.235	(.816)
ecm (-1)	-1.401	.239	-5.863	(.000)

The author's own Source

Error correction model defines the different aspect of short run results. Here the coefficients are all statistically significant except inflation. As one unit increase in public investment the real GDP growth rate falls by .200E-4 unit and 1 unit increase in external debt the real GDP growth rate decreased by 0.217 units. Further, one unit rise in GOV, TOP bring negative change in Real GDP growth rate by 16.35 and 49.889 units respectively and inflation is statistically insignificant.

The negative sign with adjustment coefficient represent the model significant highly at 1 % level and guarantees of existence of the long run relationship among variables. The ecm (-1) explains 144 % disequilibrium in the last year will converge to equilibrium in the present year.

4. CONCLUSION

The research makes the serious the serious effort to measure the effect of public investment and external debt on Real GDP growth in both short run as well as long by using time series data. ARDL econometric technique was employed to find out statistical and economical results. In short run Real GDP growth rate is adversely affected by Public Investment and External debt. As one unit rises in public investment, the real GDP growth decreases by -10.913. The other variables like external debt, trade openness, Governance, are statistically significant at 1% and 5% while the inflation is statistically insignificant. The study confirms no structural breaks because the value of CUSUM and CUSUM sum of square lies in between 5% critical bounds.

5. REFERENCES

[1] Naqvi, "Is public capital more productive than private capital? Macroeconomic Evidence from Pakistan, 1965-2000", *Working paper in Economics and Finance***No 03/03, School of finance and Business University of Durhan (2003).**

[2] Ghani, E and Musleh-Ud Din, "The Impact of Public Investment on Economic Growth in Pakistan", *The Pakistan Development Review***45: 1 pp. 87–98(2006).**

[3, 8] Milbourne, R., G. Otto, and G. Voss Public Investment and Economic Growth Applied Economics **35, 527–540 (2006).**

[4] FBS (various years) Pakistan Economic Survey (2007-08). Federal Bureau of Statistics (BBS), Finance Division, Islamabad (2008).

[5] State Bank Report September **(2015).**

[6] Sachs, J. D., "External debt, structural adjustment and Economic growth" I*nternational Monetary and Financial Issues for the 1990s***(1990).**

[7] Krugman, P., "Financing vs. Forgiving a Debt Overhang", Journal of Development Economics, **No. 29, pp 253-268 (1988)**.

[9] Musleh-Ud Din, "The Impact of Public Investment on Economic Growth in Pakistan", *The Pakistan Development Review***45: 1 pp. 87–98(2006).**

[10] Chowdhury, A. R., "External Debt and Growth in Developing Countries; A Sensitivity and Causal Analysis," *WIDER Discussion Paper***No. 2001/95(2001)**

[11] Siddiqui, R. & Malik, A., "Debt and economic growth in South Asia", **The Pakistan Development Review**, **pp 677-688 (2001).**

[12] Pattillo, C., "What Are the Channels through Which External Debt Affects Growth", *IMF Working Paper*, **No. 04/15 (2004).**

[13] A. K. Fosu, "The External Debt Burden and Economic Growth in the 1980s: Evidence from Sub Saharan Africa"*Canadian Journal of Development Studies*, **pp 307-318, (1996).**

[14] D.Ramirez, M. and Nazmi, N., "Public Investment and Economic growth in Latin America: an Empirical Test", *Review of Development economics***, 7 (1), 115-126, 2003.**

[15] Aschauer, D., "Does Public Capital Crowd-Out Private Capital?" *Journal of Monetary Economics***, Vol.24, 171 88 (1989).**

[16] Naqvi, N. H., "Crowding-in or Crowding-out? Modeling the Relationship between Public and Private Fixed Capital Formation Using Co-integration Analysis: The Case of Pakistan 1964-2000" *The Pakistan Development Review***, Vol.41, No.3, 255-276** (2002).

[17] Khan, A. H., "MacroeconomicPolicy and Private Investment in Pakistan" *The Pakistan Development Review*, **Vol.27, No.3, 277–292 (1996).**

[18] Hussain, F., "Pakistan's economic growth may pick up to 6.5 percent next year: *ADB" Business Recorder*. (**April 03 2008).**

[19] Brown, R. L., J. Durbin, and J. Evans 'Techniques for Testing the Constancy of Regression Relations over Time'. *Journal of the RoyalStatistical Society*, **37:149-63(1975).**

[20] Pesaran, M. H., and Pesaran, B., "Working with Microfit 4.0: Interactive Econometric Analysis", *Oxford: Oxford UniversityPress* **(1997).**