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THE RELATIONSHIP BETWEEN EXTERNAL PUBLIC DEBT AND ECONOMIC GROWTH: AS A CASE OF UZBEKISTAN

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ABSTRACT

This study investigates the relationship between external debt and economic growth in the Uzbekistan during the period 2010–2020. Two-step Engle and Granger Cointegration method is employed to determine the cointegration relationship between external debt and GDP growth. Our findings show that there is a negative significant relationship between external debt and economic growth. We can also observe that a 1% increase in external debt will lead to a 24% decrease in GDP growth. Also the results of ECM model suggests that if economic shocks and periodic downturn occur in GDP as a result of external debt, then 86.0% will return to its equilibrium in each subsequent short period. This suggests that GDP growth may return to its equilibrium after a period of 1.17 (1/86) from debt crisis and shocks.

KEYWORDS: economic growth, cointegration, debt overhang, external public debt, error correction model.

INTRODUCTION

Almost all economies have public debt, and external public debt plays an important role in determining economic growth. Public debt is a universal phenomenon that occurs in all countries and has a significant impact on the economy in the short and long term. (Lakshmanasamy, 2021). The sources of public debt are internal and external public debt. The sources of internal public debts from which the government borrows include individuals, banks, business firms and others and the sources of external debt are the foreign commercial banks, international financial institutions like IMF, World Bank, and other national governments, as debt owed to non-residents repayable in terms of foreign currency, food or service. The effect of external debt on investment and economic growth of the country has remained questionable and there has not been consensus on the impact of external debt on economic growth. External debt may be used to stimulate the economy but whenever a nation accumulates substantial debt, a reasonable proportion of public expenditure and foreign exchange earnings will be absorbed by debt servicing and repayment with heavy opportunity cost (Wijeweera et al. 2007). The conventional view is that public debt reflects deficit financing and hence stimulate aggregate demand and output in the short run, but crowds out capital and reduces output in the long run (Elmendorf and Mankiw, 1999) An excessive external debt constitutes an obstacle to sustainable economic growth and poverty reduction (Ajayi and Oke, 2012). Moreover, public debt, foreign debt, has an independent existence outside the budget and public finance.

Public debt influences the economy through several channels. High levels of public debt can adversely affect capital accumulation and growth via higher long-term interest rates, higher future distortionary taxation, inflation, and greater uncertainty about prospects and policies. In more extreme cases of a debt crisis, by triggering a banking or currency crisis, these effects can be magnified. High external debt is also likely to constrain the scope for countercyclical fiscal policies, which may result in higher volatility and further lower growth. In the standard neoclassical growth theory, an increase in government debt leads to slower growth due to a fiscal deficit, a temporary decline in growth along the transition path to a new steady-state while in the endogenous growth, high government debt leads to a permanent decline in economic growth.

In developing country contexts, few available studies on the impact of external debt on economic growth are motivated by the debt overhang hypothesis, a situation where a country's debt service burden is so heavy that a large portion of output accrues to foreign lenders and consequently creates disincentives to invest. Even few available evidence on the public-debt-economic growth relationship in developing countries are mixed. While studies like Imbs and Ranciere

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(2005) and Pattillo et al. (2011) find a nonlinear effect of external debt on growth i.e. a negative and significant impact on growth at high debt levels, typically over 60 percent of GDP and an insignificant impact at low debt levels, Cordella et al. (2010) find evidence of debt overhang for intermediate debt levels but an insignificant debt-growth relationship at very low and very high levels of debt. Despite the theoretical predictions and empirical evidence in advanced economies, there is little systematic analysis and evidence of the impact on GDP growth of high public debt. Specifically, little is known on the public debt effects on growth along with the other determinants of growth as well as issues such as reverse causality i.e. low growth can lead to large public debt (Lakshmanasamy, 2021).

Therefore, this study attempts to examine the statistical relationship between external public debt and economic growth in Uzbekistan along with other macroeconomic variables. This study uses annual time series data for 10 years from 2010 to 2020. The data are derived from the World Development Indicators of the World Bank. The macro variables considered are the GDP growth, gross capital formation, percentage share of external public debt to GDP. Empirically, this study applies the two-step Engle and Granger cointegration approach to study the behaviour of the variables in Uzbekistan.

LITERATURE REVIEW

Sulaiman and Azeez (2012) carried out a study on the effect of external debt on economic growth in Nigeria. An annual time series data covering the period 1970-2010 was used. The empirical analysis carried out using the Ordinary Least Squares (OLS) revealed that a long-run relationship exist between external debt and economic growth. The findings from the error correction model revealed that external debt contributes positively to economic growth of the Nigerian economy. The findings supported the Keynesian proposition which states that the absolute size of the debt does not matter, but what matters most are the interest payments on the debt. Foreign funding can supplement domestic savings so as to boost economic growth. In addition, the study also recommended that the Nigerian economy should ensure political and economic stability so as to ensure effective debt management.

A similar study by Faraji and Makame (2013) found mixed results whilst investigating the impact of external debt on the economic growth in Tanzania. Time series data on external debt and economic growth covering the period 1990-2010 was used. The Johansen test of cointegration showed that there is no long-run relationship between external debt and economic growth in Tanzania. Nevertheless, the findings showed that external debt stock and debt service both have significant impact on real GDP growth. Total external debt stock had a significant positive effect and debt service payment had a significant negative effect on economic growth. The findings favor the crowding-out hypothesis which states that debt service payments have more detrimental effects to economic growth rather than the debt stock.

Contrary to the above findings, Clements et.al (2003) found a non-linear relationship between external debt and economic growth using a panel dataset of 55 low-income countries over the time period 1970 to 1999. The researchers estimated that the critical threshold turning point in the net present value of external debt is in the range of 20 percent to 30 percent of GDP. Their conclusion is closely related to the debt-overhang hypothesis as defined by Krugman (1988). Beyond a certain threshold, the value of the debt will have opposing effects on growth due to growing uncertainty over a country's repayment ability. The end result will be reduced investment incentives and potential growth.

Shah and Pervin (2012) analyse the effect of external debt on economic growth in Bangladesh. during the period 1974 to 2010 applying the error correction model. To specify the debt overhang and crowding out effect of external public debt, the debt burden has been segmented into two parts - external debt stock and external debt service. The study shows a significant negative effect of external public debt service and a positive effect of external public debt stock on GDP in the long run. In the short run, the external public debt has a negative effect while the debt stock does not have any significant effect on the GDP. The study finds no evidence of debt overhang on GDP as there is no significant adverse effect of debt stock on GDP, but finds evidence of an adverse effect of debt service payment resulting in the crowding-out effect on economic growth. There is a dichotomy between debt stock and service payment, and hence the reconciliation of debt should be prudent to optimise growth.

Woo and Kumar (2015) explore the long-run effects of high public debt on economic growth for a panel of advanced and emerging economies over the period 1970-2007. The study finds an inverse relationship between initial debt and subsequent growth. With a ten percent increase in the debt-GDP ratio, the annual growth of real GDP per capita decreases by 0.2 percentage points per year. The effect is much muted in developed countries. Only high levels of debt above 90 percent of GDP have a significant negative effect on growth. Patillo et al. (2011) show that the marginal impact of the net present value of external debt on economic growth becomes negative for debt ratios ranging from 5 to 50 percent of GDP.

Hadhek and Fatma (2014) examine the effects of debt on economic growth and the contribution of investment to the economic growth of 19 developing countries covering the period 1990 to 2011 and applying dynamic panel data methods. The study hypothesizes a negative effect of two measures viz. total external debt to GDP and external debt as a percentage of GNI ratio, on economic growth and negative interaction between these two debt measures and investment. The study finds external debt negatively affects economic growth and negative interaction between external debt and investment in these countries.

METHODOLOGY AND DATA

Following neo classical growth model GDP growth rate is dependent variable and the independent variables are labour, capital, and external debt. The GDP growth (GDP_growth), Population of working age group

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(15-64) as percentage of total population (WAG) used as proxy of labour force, Gross capital formation (GCP) used as capital variable and External debt to GDP (ExD) data are derived from world development indicator (WDI) of World Bank. Gross capital formation data is converted to natural logarithm data (lnGCF).

The General Empirical Model

Empirical model is formulated from the analysis of neoclassical production function. Following Cunningham (1993) the production function is used to explain the relationship of GDP growth and External debt. The production function is similar as export considering production function. The external debt affects the productivity of labour and accumulation of capital. So it is rational to include external debt in the production function.

$$Y = f(K, L, ED)$$

Where, Y= GDP growth, K= capital, L=labour, ED=external debt

Only external public debt burden is included in this model though Cunningham model includes nation`s total debt burden. So general model is specified as

$$GDP\_growth = \alpha + \alpha 1 * lnGCF + \alpha 2 * WAG + \alpha 3 * ED + \mu$$

GDP = gross domestic product growth

lnGCF = natural logarithm of gross capital formation

WAG = percentage share of working age population to total population

ExD = percentage share of external public debt to GDP

α = constant term

αi = responsiveness coefficient of independent variable to dependent variable.

μ= error term

STATA16 has been used for the necessary calculations.

ANALYSIS AND RESULTS

The econometric technique used in the empirical analysis is the Engle and Granger cointegration methodology. To avoid any inconsistency in the coefficient estimation, the series is required to be stationary. Therefore, it is critical to check the presence of unit root and to identify the integration order of the series.

Unit Root Test

The unit root test of stationary of time series data was determined before the cointegration and Error correction model. The unit root test was performed using the Argumented Dickey-Fuller (ADF) test, developed by Dickey and Fuller (1981), to examine variables from a stationary point of view.

Table 1
Results of the ADF Unit Root Test Variable

	Level I(0)		1st difference I(1)
GDP_growth	-1.954	**Δ GDP_growth**	-8.108 ***
LnGCF	-2.018	**Δ LnGCF**	-3.298**
WAG	-1.805	**Δ WAG**	-7.099 ***
ExD	-1.448	**ΔExD**	-4.380**

***1% significance level, **5% significance level.

Decision criteria**:** If the Argumented Dickey-Fuller (ADF) test statistic is greater than the MacKinnon critical value, the variable is stationary, and if the ADF test statistic is less than the MacKinnon critical value, the variable is not considered stationary. The maximum lag lengths were set to 1 and Akaike (AIC) Criterion was used to determine the optimal lag length.

The results of the unit root test of the variables are given in Table 1. If the given variables are not stationary at level I (0), but are stationary in the first differences, at I (1), then the cointegration test can be performed. Cointegration is one of the most important tools in modeling long-term relationships, mainly in time series data. Cointegration is a statistical method used to verify the relationship between two or more non-stationary time series over a long period of time or over a specified period of time. This method helps to determine the equilibrium of two or more sets of variables with long-term parameters. In our cases, the results of the unit root tests show that all variables are non-stationary in level I(0) but stationary in first differences I(1), so the two-step Engle and Granger cointegration test between the variables can be performed for Uzbekistan.

ENGLE AND GRANGER COINTEGRATION MODEL

The cointegration test is used to determine if there is a correlation between two or more variables in the long-term. This theory was first introduced in 1987 by Nobel laureates Engle and Granger. Among a number of alternative methods, the Engle-Granger Cointegration model has received considerable attention in recent years. One of its main advantages is that the long-run equilibrium relationship between these variables (cointegration regression) can be modeled and determined by straightforward regression, including the levels of the variables.

In the first step of the Engle-Granger Cointegration model, all dynamics are not taken into account and cointegration regression is evaluated using the standard OLS (Ordinary least squares) evaluation method and whether there is a long-term correlation between variables. (Regression Equation 1).

$$Y_t = \beta_0 + \beta_1 X_t + \varepsilon_t \quad \text{(Equation 1)}$$

$$GDP\_growth_t = \beta_0 + \beta_1 * LnGCF_t + \beta_{2*} WAG + \beta_{3*} ExD + \varepsilon_t \quad \text{(Equation 1.1)}$$

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Using cointegration equations in the analysis, GDP_growth is evaluated as a dependent variable (Regression equation 1.1). The residuals of these regression equation are determined and checked for stationary. If the OLS residuals (ε_t-residuals) are stationary at level I (0), it can be concluded that there is a long-term relationship between variables. The results of stationary OLS residuals (ε_t-residuals) are given in Table 2.

Table 2
Argumented Dickey-Fuller (ADF) stationary statistical test results of residuals

Variables	Augmented Dickey-Fuller test statistic	p-value	MacKinnon critical value			Results
			1%	5%	10%	
$GDP_{dependent}$	-9.171	0.0000	-2.660	-1.950	-1.610	stationary

According to Table 2, all residuals of regression equations are stationary at level I(0), indicating that there is a long-term relationship between GDP_growth and external debt in the country.

The second step Engle-Granger Cointegration model involves assessing the relationship between external debt and GDP_growth using the Error Correction Model (ECM) (Regression Equation 2). In this model, the error correction term (ECT) or, in other words, the speed of return to the previous stable cycle must be negative and statistically significant.

Error Correction Model

$$\Delta y_t = c + \beta_0 \Delta x_t + \gamma ect_{t-1} + u_t \quad \text{(Equation 2)}$$

Where: Error correction term (ECT) - this shows the speed of return to the previous stable cycle for each subsequent short period when an unbalance occurs in a time series in a dependent variable under the influence of certain economic shocks.

Table 3
Regression Result of ECM, ΔGDP_growth as Dependent Variable

ΔGDP_growth	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Δ lnGCF	-1.22	1.521	3.43	.019	1.312	9.129	**
Δ WAG	.438	.365	1.20	.285	-.502	1.377	
Δ ExD	-.241	.047	-5.13	.004	-.361	-.12	***
ect_{t-1}	-.859	.319	-5.82	.002	-2.679	-1.038	***
Constant	.053	.221	0.24	.82	-.514	.621	

Mean dependent var	-0.588	SD dependent var	1.417
R-squared	0.941	Number of obs	10
F-test	19.929	Prob > F	0.003
Akaike crit. (AIC)	16.003	Bayesian crit. (BIC)	17.516

*** $p<.01$, ** $p<.05$, * $p<.1$

The estimated ECM results are quite satisfactory especially as the speed of correction in short term disturbance towards the long-run stable relationship (-0.859) is negative and statistically significant. The ECM indicates that any divergence from the long-run relation in the current period should be adjusted by around 86 percent in the following period. This shows that the short-run disequilibrium is corrected by about 86 percent every year and eventually the long-run relationship would be restored in a short span of time. While an increase in share of working age population to total population positively affects economic growth and statistically insignificant, external debt reduces economic growth by -24 percent. Further, the effect of the changes in the gross capital formation on growth is significantly negative. This implies the crowding-out effect of external debt, that external debt crowds out capital and reduce output growth in the long run. Thus, external debt impacts economic growth negatively in Uzbekistan.

CONCLUSION

This study examines the effect of external public debt on economic growth in Uzbekistan over a period of 10 years from 2010 to 2020. The study applies the Engle-Granger Cointegration method to estimate the long-run and short run relationship of external debt on GDP growth using the aggregate data derived from the World Bank statistics.

Firstly, to achieve the goal of this study, the stationary of the variables and their order of integration (I) were tested using the Augmented-Dickey Fuller (ADF) test.

The ADF test results show that all variables are not stationary at I(0), but were found to be stationary at I(1) in their first differences. Therefore, the Engle-Granger Cointegration test was used in all versions of the regression models.

The first step of the Engle-Granger Cointegration test examined whether there was a long-term correlation between external debt and GDP growth. And the results the first step has shown that there is a long-term relationship between external debt and GDP growth.

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In the second step of the Engle-Granger Cointegration test, short-term correlations between external debt and GDP were assessed using the Error correction model (ECM).

The analysis of model of ECM shows that the Error correction term is -0.86, if economic shocks and periodic downturn occur in GDP as a result of external debt, then 86.0% will return to its equilibrium in each subsequent short period. This suggests that GDP growth may return to its equilibrium after a period of 1.17 (1/86) from debt crisis and shocks. We can also observe that a 1% increase in external debt will lead to a 24% decrease in GDP growth.

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