Economic Growth, External Debt and Export Relationship: The Case of Bhutan

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Abstract

Bhutan depends mostly on external debt for economic development. Most of its external debt is related to hydropower construction, which in total overshot its GDP by more than 100 percent. This has worried some sections of the society. However, Johansen's cointegration test suggests that there is no long-term relationship between economic growth, external debt, external debt service and export in Bhutan. Further, findings from the unrestricted VAR indicate that even in the short-term, external debt and external debt service have insignificant relationship with economic growth, while it is the export that substantially helps the economy to grow. The Impulse Response Analysis (IRS) suggests that over a medium-term period, a shock from external debt, external debt service can positively influence economic growth at least up to four and half years after initial negative effect. Whereas, export is found to positively impact growth all the way up to fourth year. Therefore, Bhutanese government should focus more into producing export-oriented goods and services in order to spur economic growth.

Keywords: Bhutan; GDP; VAR; External Debt; External Debt Servicing; Export.

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1. Introduction

External debt is a debt owed to non-residents repayable in currency, goods or services (World Bank, 1988). External borrowings take place when domestic financial resources are inadequate to fund development activities. Economic theory postulates that reasonable amount of external debt can spur economic growth because countries at their initial development phase has limited capital stock, which increases investment opportunities (Pattillo, Poirson, & Ricci, 2011). However, when external debt gets accumulated beyond a certain limit, it hinders the economic growth by impeding productive investments (Pattillo et al., 2011). As the external debt accumulates, most of the foreign reserves are used in meeting the debt service, which leads to loss of creditworthiness and external funds. It is believed that increase in external debt leads to equal increase in external debt service payments, which has negative repercussion on countries economic growth (Hameed, Ashraf, & Chaudhary, 2008).

There are several empirical studies that investigate the relationship between external debt and economic growth. For instance, Ezeabasili, Isu and Mojekwu (2011), and Hameed et al. (2008) studied the impact of external debt on economic growth in Nigeria and Pakistan respectively. They found that external debt has a detrimental effect on economic growth. However, Butts, Mitchell, and Berkoh (2012) found that short-term external debt positively and significantly contributed to economic growth in Thailand. Saad (2012) also investigated the relationship between external debt service and economic growth along with other variables such as export and exchange rate in Lebanon. Findings indicate that export and exchange rate contributes in improving countries economy while debt servicing is found to have negative association though the relationship is found statistically insignificant. In some cross-country analyses, Sen, Kasibhatla and Stewart (2007) and Amoateng and Amoko-Adu (1996) observes that debt has negative impact on economic growth in Latin American

countries, and African countries respectively. Contrarily, Jayaraman and Lau (2009) found that external debt and export has positive and statistically significant relationship with growth in Pacific Island countries.

Pattillo et al. (2011) speculates that the average impact of debt on per capita growth becomes negative for debt level above 160-170 percent of exports and 35-40 percent of Gross Domestic Product (GDP). In 2016, Bhutan's debt situation reached 353.86 percent of export and 113.80 percent of its Gross National Income (https://data.worldbank.org/indicator/DT.DOD.DECT.CD.CG?locations=BT). Though International Monetary Fund (IMF) debt sustainability analysis classified Bhutan under a moderate risk of debt distress but some local economist feared the worst when the external debt reached 110 percent of GDP in 2016 (https://countryeconomy.com/national-debt/bhutan). Over the last decade, Bhutan saw an average economic growth rate of 7.65 percent (NSB, 2017a), which is commendable going by growth patterns in other developing nations. Therefore, the first objective of the study is to investigate the nature of relationship that exists between external debt, external debt servicing and economic growth in Bhutan. Findings from the analyses suggest that there is no long-term relationship between external debt, external debt servicing and economic growth. Even in the short term, the relationship is found statistically insignificant. However, Impulse Response Analysis suggests that shock from external debt and external debt servicing can spur economic growth over the medium-term.

As an outcome of economic growth, the domestic production increases which has to be sold to the outside world owing to small domestic market. On the other hand, the export-led-growth hypothesis posits that export is one of the major factors that promote economic growth (Shirazi & Manap, 2005). This

is mainly due to the export earning capability, which can facilitate in debt servicing. Export is also found to increase opportunities for investment as a result of higher level of income and savings in the economy (Lee & Huang, 2002). Bhutan is mostly dependent on hydropower export to India and high-end tourism service to the outside world. These exports have tremendously paved the way for economic growth. In 2016, Bhutan's net export of hydro electricity earned around Nu 13,364.51 million (M) and tourism industry contributed around Nu 4,954.59 M to its economy (NSB, 2017b). Overall, the total export as percentage of GDP stands at 55 percent over the last decade (NSB, 2017b). Therefore, the second objective of the study is to test the export-led-growth hypothesis in Bhutan. The results indicate that export-led growth hypothesis is applicable in Bhutan. It is observed that export has positive influence on growth in the immediate term as well as over medium-term scenario.

This article is arranged as follows. In the next section, data and methodology is discussed. In section three, various results are discussed and the final section concludes with policy recommendations.

2. Data and Methodology

This study uses annual time series data of real GDP, external debt, external debt servicing and export from 1982-2016. The data on real GDP is obtained from annual national accounts statistics report of the NSB. Data on external debt and external services are taken from the World Development Indicators of the World Bank and finally the data on export is extracted from annual statistical yearbook of Bhutan published by the NSB. Data on GDP and export are expressed in their natural log while data on external debt and external debt servicing are presented as percentage of Gross National Income (GNI).

For the analysis, the following functional relationship has been formulated:

$$\text{GDP} = f(\text{ED, EDS, EX}) \tag{1}$$

Where GDP is the real GDP, ED is the external debt, EDS is the external debt service and EX is the export.

A long run relationship is tested using Johansen (1988) cointegration test. Though the result from Augmented Dickey Fuller (ADF) and Philips Perron (PP) test suggests that variables are integrated of order (1), a meaningful association could not be established in the long run. Detailed results are provided while discussing the empirical results. Therefore, the adoption of Vector Error Correction model (VECM) is deemed unfit and unrestricted Vector Auto Regressive (VAR) model is constructed as follows:

$$y_t = a + A_1 y_{t-1} + A_p y_{t-p} + B_0 x_t + B_0 x_{t-1} + \cdots B_i x_{t-i} + e_t \tag{2}$$

where, $t \in \{-\infty, \infty\}$

$\quad\quad y_t = (y_{1t}, \ldots y_{kt})'$ is a $K \times 1$ random vector,

$\quad\quad A_1$ through A_p are $K \times K$ matrices of parameters,

$\quad\quad x_t$ is an $M \times 1$ vector of exogenous variables,

$\quad\quad B_0$ through B_i are $K \times M$ matrices of coefficients,

$\quad\quad a$ is a $K \times 1$ vector of parameters, and

$\quad\quad e_t$ is assumed to be white noise.

There are $K^2 \times p + K \times (M(s+1) + 1)$ parameters in the equation for y_t, and there are $\{K \times (K+1)/2$ parameters in the covariance matrix Σ.

3. Empirical Results

3.1. Preliminary estimates

The preliminary examination of the data provided by the descriptive statistics presented in Table 1 indicates that the average real GDP over 35 years of observation is around Nu 25,083 M, which is lower than external debt that averaged around Nu 26,943 M. External debt servicing and export is comparatively lower standing at Nu 1,459 and Nu 11,315 M as compared to other two variables.

Table 1*: Summary Statistics*

Variables	Obs	Mean	Std. Dev.	Min	Max
GDP	35	25,083.14	17,362.92	5,575.12	64,037.43
ED	35	26,942.65	39,498.87	10.82	157,166.00
EDS	35	1,459.33	2,240.91	0.03	8,270.78
EX	35	11,315.63	12,830.35	159.4	35,584.99

Table 2 presents the pair wise correlation analysis to show the nature of relationship between the variables under the study. It shows that there is negative relationship between external debt, external debt servicing and GDP, while export has positive association with GDP. This indicates that external debt and external debt servicing could hurt economic growth.

Table 2: *Pair Wise Correlation*

	GDP	ED	EDS	EX
GDP	1			
ED	-0.1545	1		
EDS	-0.011	-0.0269	1	
EX	0.3927	-0.1405	-0.131	1

Since the analysis require data to be stationary, the time series properties of the variables are tested using standard unit root test such as Augmented Dickey Fuller (ADF) test (Dickey & Fuller, 1979) and Phillips Perron (PP) test (Phillips & Perron, 1988). Table 3 presents the unit root test of the four variables

used in the study. The ADF and PP test examines the null hypothesis that the series has a unit root. The null is rejected if the ADF and PP test statistics is less than the critical value at one percent level of significance. According to the test, all the four variables are stationary at first difference indicating that they integrated of order one or I(1).

Table 3: *Unit root test*

Variables	ADF Test		PP Test	
	Levels	First Difference	Levels	First Difference
GDP	-0.759	-5.295***	-0.760	-5.290***
ED	-0.299	-4.595***	-0.461	-4.597***
EDS	-2.081	-7.201***	-1.973	-7.280***
EX	-2.406	-3.880***	-2.263	-3.889***

Note: **** is the significance level at 1 percent.*

In the next step, optimal lag length is determined. Table 4 shows that optimal lag length as suggested by final prediction error (FPE), Akaike's Information criterion (AIC), Hannan and Quinn information criterion (HQIC) and Schwarz's Bayesian information criterion (SBIC) for the study is one.

Table 4: *Lag selection*

lag	LL	LR	Df	P	FPE	AIC	HQIC	SBIC
0	-199.583				5.94742	13.1344	13.1947	13.3194
1	-66.5905	265.98	16	0	.003171*	5.58649*	5.88806*	6.51164*
2	-58.0144	17.152	16	0.376	0.005422	6.06544	6.60828	7.73072
3	-43.1037	29.821	16	0.019	0.006769	6.13572	6.91982	8.54112
4	-28.1072	29.993*	16	0.018	0.009956	6.20046	7.22583	9.34599

The next step consists of testing whether these variables are cointegrated by applying the Johansen cointegration procedure. The result presented in Table 5 suggests that there is no cointegrating relationship at 5 percent significance level. This result implies that there is no long run association between variables under the study. Therefore, this prompts the

study to prohibit the use of VECM and use unrestricted VAR model to study the short-term relationship.

Table 5: *Johansen tests for cointegration*

Maximum Rank	Parms	LL	Eigenvalue	Trace Statistic	5% Critical Value
0	4	-100.8254	.	46.0893*	47.21
1	11	-87.196705	0.55143	18.8319	29.68
2	16	-81.915855	0.26702	8.2702	15.41
3	19	-77.781281	0.21589	0.001	3.76
4	20	-77.780757	0.00003		

3.2. VAR results

The short run coefficients estimated using unrestricted VAR are presented in Table 6. As the current data series are yearly, a maximum of 2 lag lengths are used for the estimation. Column (1) shows the coefficient of independent variables when GDP serves as the dependent variable and it is the major focus of discussion in the study. Column (2), (3) and (4) presents the results when external debt, external debt service and export are used as dependent variable respectively.

It is clear from the result that external debt and external debt service has no significant association with GDP in Bhutan in the short-run. Though external debt has positive association with GDP at one lag and negative association at two lags, the relationship is found statistically insignificant. Similarly, external debt service is found to have negative relationship with GDP though the coefficients are insignificant. It is only export at one lag, which has significant relationship. A unit increase in export is found to increases GDP by 10.47 percent and the relationship is statistically significant at 5 percent level of significance. Albeit export's positive association at two lags, the relationship is found statistically insignificant.

In column (2), the coefficients show that as GDP increases, external debt also increases and the relationship is found

significant at 10 percent level of significance. This indicates that it is the economic growth that has precedence over external debt. External debt servicing has negative and statistically significant relationship with external debt at two lags, while export also has negative impact on external debt but the relationship is found significant only at one lag.

Table 6: *Unrestricted VAR*

Independent Variables	Dependent Variables			
	GDP (1)	ED (2)	EDS (3)	EX (4)
GDP				
L1.	-0.088	50.847*	1.789	-0.4118
L2.	-0.220	57.084**	4.284	-0.7700
ED				
L1.	0.00082	0.08372	-0.056**	0.0054
L2.	-0.0013	-0.1629	-0.026	-0.0032
EDS				
L1.	-0.00053	-1.6616	-0.576**	-0.0139
L2.	-0.00049	-2.2410**	0.1632	0.0293
EX				
L1.	0.1047**	-20.972**	0.9654	0.4426**
L2.	0.0251	-12.787	2.3178	0.1541
Constant	0.0730	2.3421	-0.4559	0.1351**

Note: *, **, *** *denotes significance level at 10 percent, 5 percent and 1 percent respectively. L1 and L2 stands for lag one and lag two respectively.*

In column (3), GDP and export is found to have positive but statistically insignificant relationship. Surprisingly, external debt and debt servicing is found to have negative association and statistically significant relationship at one lag. This could be possible in the short-run because it takes time for debt repayments to actually start immediately. Debt servicing at its own one lag has negative impact indicating that better debt servicing leads to its reduction.

In the last column (4), higher the GDP, export is found to reduce export at both the lags. However, the impact is found to be statistically insignificant. Similarly, external debt has positive relationship at one lag and negative relationship at two lags but the relationship is found to be statistically insignificant. Even debt servicing is found to have statistically insignificant relationship with export. It is only export at its own one lag that positively impacts export. The relationship is found to be statistically significant at 5 percent level of significance.

3.3. Impulse Response Analysis

Impulse response analysis is also undertaken to show how an unexpected change in one variable can affect other variables over a medium-term period. It should be emphasized that impulse response analysis in the study is looking at shocks coming from the error term related to external debt, external debt servicing and export, and how such shock can change GDP. The dynamic response of GDP on each independent variable is predicted up to 10 years ahead using the bootstrap percentile 95 percent confidence intervals.

In Figure 1, the response of GDP to a shock on external debt is presented. Likewise, figure 2 and figure 3 also show the impulse response analysis, while the impulse is external debt servicing and export, and the response variable is GDP. It is evident from figure 1 that when there is a shock on external debt, GDP initially reduces but starting the 2nd year, it increases all the way up to 5th year before the impact becomes insignificant. This shows that external debt in fact has the potential to increase GDP over medium term period.
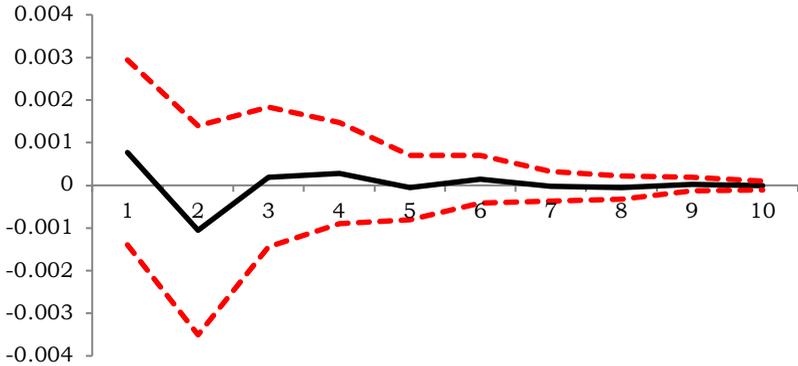
Figure 1: *Impulse ED, response GDP*

Figure 2 shows a very similar pattern to that of figure 1 meaning that as shock from external debt servicing has negative impact only during the initial year and after which it increases GDP until mid 4th year.
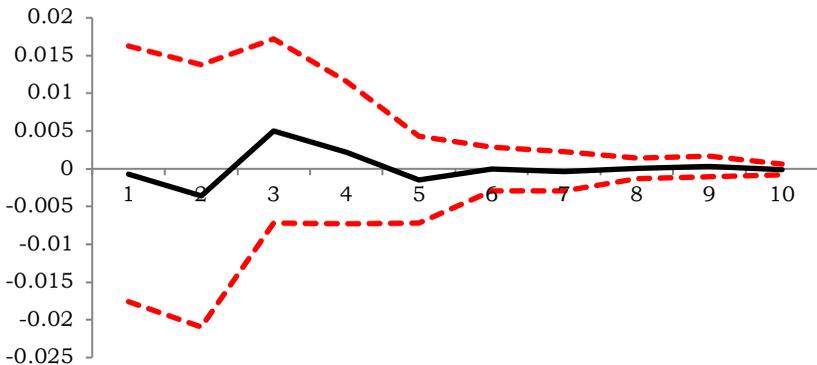

Figure 2: *Impulse EDS, response GDP*

It is only shock from export, which has immediate positive impact on GDP and the affect continues all the way up to 4th year. The impact diminishes for a while but re-bounces back in the 6th year. This shows that export is very important for economic growth in Bhutan.
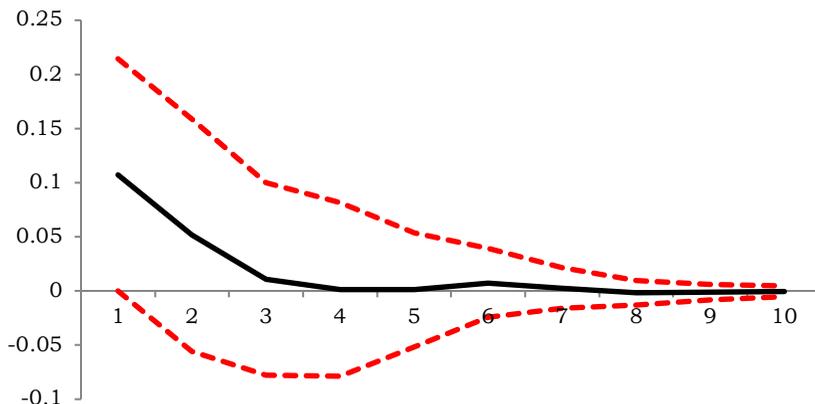

Figure 3: *Impulse EX, response GDP*

VAR diagnostic test reveals that variables are normally distributed except for GDP. There is no serial correlation at one and two lags respectively. The VAR model is found to satisfy the stability condition. The diagnostic test results are presented in the Appendix. Table A1 shows the Jarque-Bera normality test, while Table A2 depicts the Lagrange multiplier test for serial correlation and the final Table A3 shows the Eigenvalue stability test for the VAR model.

4. Conclusion

Economic theory suggests that reasonable amount of external debt can assist economic growth, while external debt beyond certain limit have negative repercussions. Besides, export led growth hypothesis postulates that export is one of the major

determinants in spurring economic growth. In order to test such theories, this article used time series data from 1982-2016 and employed an unrestricted VAR model to test its applicability in Bhutan.

The initial results indicated that there was no cointegrating relationship between external debt, external debt servicing, export and GDP in the long run. In the short-run, the unrestricted VAR results indicated that external debt and external debt servicing had no significant influence over economic growth. It was only export that significantly spurred economic growth in Bhutan. Over the medium-term scenario, despite initial insignificant association, a shock on external debt and external debt servicing showed positive impact on the economic growth at least up to four and half year. Even in the medium term, a shock on export showed positive influence over economic growth, which consents the export-led growth hypothesis in Bhutan. Other significant findings from the study are, economic growth is found to have immediate impact in increasing external debt, while external debt servicing and export has negative impact on external debt. External debt is also found to have negative association with external debt servicing and export has positive association with debt servicing. Finally, it is only export at its own lag that increases export.

In terms of policy recommendation, despite no immediate effect, external debt is an important factor that can spur economic growth over the medium term. Even debt servicing is found to have the same influence. This could be true because most of Bhutanese external debts are hydropower related debt, which is quite secure and repayable. Therefore, Bhutan should look into avenues for investment into more hydropower construction. However, a word of caution is needed here. Due to unavailability of longer time series segregated data on

hydropower debt and non-hydropower debt, it is unclear how non-hydropower debt would behave in the economy.

As the findings support export-led growth hypothesis even in the short term, Bhutanese government need to focus more on producing export-oriented goods and services. Hydro electricity is the major export commodity that Bhutan can capitalize on due to abundance of fast flowing rivers. Bhutan has been exporting hydro electricity to India and should do the same in near future as well. In addition, Bhutan needs to look for export possibilities beyond India to diversify its market in order to reduce sole market vulnerability. Besides, the export of services such as high-end tourism is also highly recommended. Bhutan should look into diversifying tourism products to attract more tourists.

Finally, it is important to mention some limitations of the study. The study is severely constrained by availability of longer time series data. Most probably, due to such inadequacy, long-term relationship could not be established in the study and the use of Error Correction Model (ECM) could not be implemented. Upon availability of longer time series data on hydropower debt and non-hydropower debt, another round of research is suggested to actually see the behaviour of external debt on economic growth in Bhutan.

Reference

Amoateng, K., & Amoako-Adu, B. (1996). Economic growth, export and external debt causality: the case of African countries. *Applied Economics, 28*(1), 21-27. DOI: 10.1080/00036849600000003

Butts, H.C., Mitchell, D.I., & Berkoh, A. (2012). Economic Growth Dynamics and Short-Term External Debt in Thailand. *The Journal of Developing Areas*, *46*(1), 91-112

Dickey, D.A., & Fuller, W.A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of American Statistical Association, 74*, 427-431.

Ezeabasili, V. N., Isu, H. O., & Mojekwu, J. N. (2011). Negeria's External Debt and Economic Growth: An Error Correction Approach. *International Journal of Business and Management. 6*(5), 156-170.

Hameed, A., Ashraf, H., & Chaudhary, M. A. (2008). External Debt and Its Impact and Economic and Business Growth in Pakistan. *International Research Journal of Finance and Economics. 20*, 132-140.

Jayaraman, T.K., & Lau, E. (2009). Does External Debt Lead to Economic Growth in Pacific Island Countries. *Journal of Policy Modeling, 31*, 271-288. DOI: 10.1016/j.jpolmod.2008.05.001

Johansen, S. (1988). Statistical analysis of cointegration vectors. *Journal of Economic Dynamics and Control, 12*(2-3), 231-254.

Lee, C., & Huang, B. (2002). The Relationship between Exports and Economic Growth in East Asian Countries: A Multivariate Threshold Autoregressive Approach. *Journal of Economic Development*, 27(2), 45-68.

National Statistics Bureau (2017a). *National Accounts Statistics Report, 2017*, Thimphu: Bhutan, Author.

National Statistics Bureau (2017b). *Statistical Yearbook of Bhutan, 2017*, Thimphu: Bhutan, Author.

Pattillo, C., Poirson, H., & Ricci, L. (2011). External Debt and Growth. *Review of Economics and Institutions, 2*(3), 1-30. DOI: 10.5202/rei.v2i3.45

Phillips, P. C. B., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika, 75,* 335-46. http://dx.doi.org/10.2307/2336182

Saad, W. (2012). Causality between Economic Growth, Export, and External Debt Servicing: The Case of Lebanon. *International Journal of Economics and Finance. 4*(11), 134-143.

Sen, S., Kasibhatla, K. M., & Stewart, D. B. (2007). Debt overhang and Economic-Growth-The Asian and the Latin American Experiences. Economic Systems, *31,* 3-11. Doi: 10.1016/j.ecosys.2006.12.002.

Shirazi, N. S., & Manap A. T. A. (2005). Export-Let Growth Hypothesis: Further Econometric Evidence from South Asia. *The Developing Economies*, *XLIII*(4), 472-488.

World Bank. (1988, January 1). External debt: definition, statistical coverage and methodology. Retrieved from http://documents.worldbank.org/curated/en/193061468782370806/pdf/multi-page.pdf

Appendix

Table A1: *Jarque-Bera normality test for normality.*

Equation	χ^2	df	Prob > χ^2
GDP	21.735	2	0.0002
ED	0.812	2	0.6666
EDS	0.499	2	0.7791
EX	0.990	2	0.60967

Table A2: *Lagrange-multiplier test for Serial correlation.*

Lag	χ^2	df	Prob > χ^2
1	7.1510	16	0.97024
2	7.7656	16	0.95552

Ho: no autocorrelation at lag order

Table A3: *Eigenvalue stability condition.*

Eigenvalue			Modulus
- 0.3646448	+	.5408589i	0.652299
- 0.3646448	-	.5408589i	0.652299
0.6064164			0.606416
- 0.5999198			0.59992
0.2171133	+	.4558036i	0.504871
0.2171133	-	.4558036i	0.504871
0.0749921	+	.4308944i	0.437371
0.0749921	-	.4308944i	0.437371

All the eigenvalues lie inside the unit circle. VAR satisfies stability condition.