Effects of External Debt on National Savings in Botswana

Moreputla Oageng[11] and Moffat Boitumelo[12]

Abstract

The main objective of the study was to investigate the effects of external debt on national savings in Botswana using time series economic tools for the period 1980-2014. Annual data for Savings as percentage of GDP, GDP per capita, Exports as percentage of GDP, Exchange rates, Gross Fixed Capital Formation as percentage of GDP, Real interest rates and External Debt as percentage of GDP were examined. Vector Error Correction Model showed that external debt had a negative and statistically significant effect on national savings in Botswana. Furthermore, the results indicated that other variables such as GDP per capita, real interest rates, exports as percentage of GDP and Gross Fixed Capital Formation as a percentage of GDP had a significant influence on savings in Botswana. Due to the negative impact of external debt on national savings the government should put in place additional measures to the existing ones to ensure that these negative effects are turned into positive ones.

Keywords: External debt, national savings, Botswana, VECM

[11] Former MA student, Department of Economics, University of Botswana.

[12] Senior Lecturer, Department of Economics, University of Botswana. Email:Boitumelo.moffat@mopipi.ub.bw

1.0 Introduction

Botswana's economy has grown at a remarkable rate over the years. This is attributable to the revenue from minerals. Before the discovery of minerals, foreign aid and grants from the British government played a major role in enhancing economic development. Other creditors to Botswana were Scandinavian countries, Germany, Holland, North America and multilateral agencies which were providing funds in the form of grants, low-interest loans, technical assistance, personnel, and volunteers (Molutsi, 1993).

Due to Botswana's impressive economic growth, the country was classified as a middle-income country which resulted in a decrease in the aid it was receiving from donors. Due to these declining funds from donors, the country resorted to external debt mainly to finance government budget and stimulate the economy. The external debt is a portion of the total debt that a country owes creditors outside the country. The borrowers could be governments, corporations or private households. World Bank defines external debt as a debt that the country owes non-residents repayable in foreign currency, goods or services. Total external debt[13] is the sum of private non-guaranteed debt and public and publicly guaranteed debt.

Botswana like other Sub-Saharan African countries continued to be constrained with low profile savings to boost capital formation. The private savings in particular continue to be low for Botswana as it only contributes around 25 percent of national savings which ultimately results in low savings. As a result of low savings and underwhelming performance of the mining sector which is the driving force of the Botswana economy the need for finding other sources of funds arises. Hence, borrowing externally becomes one of the alternatives. However, Botswana has managed to maintain low levels of external debt stock despite the recent increase in external debt which may become a serious problem when diamonds get depleted. International Monetary Fund (2012) highlights the recent rise in external debt stock by showing that the gross external debt increased from US$2.6 billion in 2009 to US$3.1 billion in 2011. Ministry of Finance and Development Planning report (2015) also argues that because of decline in diamond revenues it forced the government to increase its borrowing sharply, especially from external sources. Furthermore, the public debt increased by 45 percent between 2009/10 and 2010/2011 financial year, with GDP ratio increasing from 22.1 to 25.5 percent. This growth in external debt accumulations fills the vacuum created by fiscal gaps and complement low savings in order to stimulate economic growth by encouraging investment.

This study therefore, seeks to analyze the effects that external debt has on national savings in Botswana. Also, due to scarcity of literature on the relationship between external debt and savings in Botswana, this study seeks to fill this gap in the empirical literature.

2.0 Theoretical Literature

When dealing with savings and external debt the theories of Keynesian, Classical, IS gap and Debt overhang can be of paramount importance. The two opposing schools of thought being Keynesian and Classical theories are usually useful when dealing with economic theory of external debt and economic growth. Keynesian postulates that indebtedness stimulates demand, which lead to a proportional rise in investment through the accelerator effect, thus,

[13] The terms external debt and external borrowing have the same meaning and will be used synonymous in this paper.

leading to an increase in production. Contrary to Keynesian theory, the classical theory regards indebtedness as future tax and it is attributed to the state. According to this theory indebtedness have adverse effects as it hinders capital accumulation and consumption by present and future generations.

The above mentioned theories are also imperative in explaining the savings behaviours. Keynesian states that when income increases the other portion is consumed while the other one is saved. This implies a positive relationship between savings and income, that is, income is expected to be positively correlated to savings. However, classical theory of savings postulates a positive relationship between interest and savings. This is to say, when real interest rate increases savings is also expected to increase. This relationship can be shown in the form of life cycle or inter-temporal theories of consumption and savings. Chaudhry et al, (2009) stressed that from these theories increase in interest rate has two effects being income and substitution effect. Since for a country like Pakistan, which has relatively small net assets, substitution effect is expected to outweigh income effect thus, savings will be positively correlated with interest rate. The implication of this in the economy is that there will be increase in the cost of borrowing; therefore, the level of investment spending is adversely affected.

McCallum (1993) suggested that the effect of one dollar increase in government consumption financed by borrowing funds is to reduce national savings by one dollar. However, for few reasons, the theory seem to be converging on the verdict that an increase in government expenditure has to be associated with an increase in gross private saving or taxes and thus, the net effect of a change in government spending on national saving should be less than one for a one. One of the reason is that standard IS/LM style Keynesian economics states that an increase in government expenditure results in a higher output. Private saving and tax revenue rise by the product of the increase in income and respectively the marginal propensities to save and to tax. For these reasons, the decrease in national saving is less than the rise in government expenditure. The other reason of what may be referred to as the neoclassical approach, private consumer goods and government provided goods and services may be close substitutes. A rise in government expenditure is associated with a decrease in consumption. McCallum (1993) also argued that it provides evidence that a rise in government expenditure will result in a rise in private savings and lastly, an increase in government expenditure leads to an increase in interest rate which will further reduce consumption and raise savings.

Hall (1978) developed a theoretical framework based on life-cycle/permanent-income hypothesis. The choice of this theory can be justified by the fact that it takes in to account the lifecycle/ permanent income variables. Starting with the life cycle hypothesis, the assumption made by the theory is that an individual wants to maximize the present value of lifetime utility subject to income. The other assumption made by the theory is that life time income expectations determine consumption in each period. Fluctuations in income throughout the life of an individual imply that stages in the life cycle are important in determining savings behaviour. The life cycle theory of consumption assumes that there is no relationship between current savings and current income. The nonexistence of a relationship between these variables implies that individuals make forecasts, and base their decisions to save on life time income instead of current income. Based on the consideration above, growth rate and income level are the independent variables in the saving function. Hence, life cycle model assumes a positive relationship between the rate of growth of income and saving rate.

Life Cycle theory states that it is rational for the individual to borrow when starting to work in order to finance his or her consumption needs; and pay back the borrowed money or funds in the middle of his life time when the income he earns would have gone up; and save the other income for the future within this phase of his working life and use the savings to finance consumption on retirement. Borrowing always goes hand in hand with interest rate. The life-cycle model predicts that a higher interest rate leads to an increase in the current price of consumption in comparison to the future price, thus, resulting in an increase in saving.

The model shown below follows the framework developed by Hall (1978) which ensures that all the variables that affect the savings decisions are included;

$$S_t = Y_t - C_1 f(Z_t) + \frac{1}{T-1}\left(\sum_{t=2}^{T} \mathrm{E}_2[\mathrm{Y}_t] - \sum_{t=2}^{T} \mathrm{E}_1[\mathrm{Y}_t]\right)$$

The above equation shows that changes in saving between each period equal the change in income, consumption and other variables. In general the basic idea of the life-cycle/permanent-income hypothesis is a simple insight about saving and that saving is a future consumption as people will dissave in the future in order to finance consumption. Therefore, anything that has impact on consumption will equally have effects on saving. Similar to the consumption function, the savings function is an expression of the functional relationship between savings and its determinants. Specifically, the saving function shows the mirror image relationship between income and consumption.

2.1 Empirical review

Most studies found out the existence of a negative relationship between external borrowing and national savings. These studies also state that the host countries were heavily reliant in external borrowing. For instance, Aliyu and Usman (2013) conducted a study on the impact of external debt, public debt and debt servicing on national savings in Nigeria. They postulated that external borrowing have a negative and statistically impact on national savings. In their empirical model they came up with savings function below.

$$NSAV = \beta_0 + \beta_1 EXDEBT + \beta_2 PUBDEBT + \beta_3 DEBSERV + U_t \quad (1)$$

$$LOGNSAV = \beta_0 + \beta_1 LOGEXDET + \beta_2 LOGPUBDEBT + \beta_3 LOGDEBSERV + LOGU_t \quad (2)$$

Where
NSAV is national savings
EXDEBT is external debt
PUBDEBT is public debt and
DEBSERV is debt service.

Chaudhry et al, (2009) carried out a study on the impact of foreign debt on savings and investment in Pakistan using time series econometric tools for the period 1973 to 2006. They found that there is partial evidence that foreign debt had significant impact on investment expenditures and savings in Pakistan. The savings and investment functions were specified in linear log forms as follows:

$$S/CPI = \propto_1 + \propto_2 (RD - INF) + \propto_3 Y + \propto_4 (FD/GDPD) + \mu \quad (1)$$
$$S/CPI = \beta_1 + \beta_2 (RD - INF) + \beta_3 Y + \propto_4 (FDS/GDPD) + \mu \quad (2)$$
$$Log(S/CPI) = \gamma_1 + \gamma_2 (RD - INF) + \gamma_3 LogY + \gamma_4 Log(FD/GDPD) + \mu \quad (3)$$
$$Log(S/CPI) = \delta_1 + \delta_2 (RD - INF) + \delta_3 LogY + \delta_4 Log(FD/GDPD) + \mu \quad (4)$$

Where:
S/CPI= real savings
RD-INF is real interest rate on bank deposits
Y= real gross domestic product
FD/GDPD= real debt servicing on foreign debt.

$$I = \beta_1 + \beta_2 (RA - INF) + \beta_3 GROWTH + \beta_4 (FD/GDPD) + \beta_5 I(-1) + \mu \quad (5)$$
$$I = \propto_1 + \propto_2 (RA - INF) + \propto_3 GROWTH + \propto_4 (FDS/GDPD) + \propto_5 I(-1) + \mu \quad (6)$$
$$Log(I) = \gamma_1 + \gamma_2 (RA - INF) + \gamma_3 GROWTH + \gamma_4 Log(FD/GDPD) + \gamma_5 Log[I(-1)] + \mu \quad (7)$$
$$Log(I) = \delta_1 + \delta_2 (RA - INF) + \delta_3 GROWTH + \delta_4 Log(FDS/GDPD) + \delta_5 Log[I(-1)] + \mu \quad (8)$$

Where
I= real investment
RA-INF= real interest rate on bank advances
Growth= growth rate of real GDP
FDS/GDPD= real debt servicing on foreign debt
I(-1)= one year lagged real investment and
FD/GDPD= real foreign debt.

They concluded from their findings that foreign debt on its own does not have any significant influence on national savings. However, debt servicing affects adversely national savings. In the case of investment they found that foreign debt have favourable effects on the level of investment expenditure.

3.0 Model specification

This paper determines whether the external debt has a significant impact on national savings in the case of Botswana. The study uses Vector Auto Regressive (VAR) in order to determine whether a long run relationship between savings and external debt do exist in Botswana. This will also enable a Granger causality test to be carried out to identify direction of causality.
The model adopted in this study follows Aliyu and Usman (2013) and Chaudhry et al. (2009). However, modifications are made depending on the availability of data and the economic realities of Botswana. The model also encompasses the standard life-cycle/permanent-income hypothesis. Implicitly we have,

$$\mathbf{Z_t} = \alpha + \beta X_\tau + \upsilon_\tau \quad (1)$$

From equation above, $\mathbf{Z_t}$ is the savings; α is the intercept. β is the vector of the unknown parameters to be estimated. X_t is the vector of saving determinants and U_t being the error term in the equation. The model used in this study takes the form:

$$\boldsymbol{GS = f(EX, XR, ED, GFCF, GDPPC, RINT)} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \textbf{(2)}$$

The equation to be estimated is specified as follows:

$$GS_t = \beta_0 + \beta_1 EX + \beta_2 XR + \beta_3 GFCF + \beta_4 GDPPC + \beta_5 RINT + \beta_6 ED + \mu_t \ldots\ldots \textbf{(3)}$$

Where
GS= National Savings as percentage of GDP
EX= Real Exchange rates
XR= Exports as percentage of GDP
GFCF= Gross Fixed Capital Formation as percentage of GDDP
GDPPC= GDP Per Capita
RINT= Real interest rate
ED= external debt as percentage of GDP
μ_t = error term

Justification of variables and apriori expectations

National Savings (GS)

The main objective of this study is to determine how external debt influences savings. Therefore, saving is the dependent variable. It composes of private and public savings. National savings are calculated as gross national savings less total consumption, plus net transfers. It is taken as a percentage of GDP. As literature has shown the level of investment in the economy depends on savings available. When the country has high level of savings it is expected to demand less of external borrowing. Savings is measured as a ratio of GDP.

Real Interest Rates (RINT)

RINT is captured as the lending interest rate adjusted for inflation as measured by the GDP deflator. The relationship between RINT and savings is unclear theoretically as interest rate changes are subject to potentially offsetting positive substitution and negative income effects (Ozcan *et al*., 2003). The substitution effect postulates that higher interest rates results in higher current consumption and increase in savings. On the other hand the income effect is that if households are net lenders, an increase in interest rates will result in increase in lifetime income thereby increasing present consumption by reducing savings. Despite the ambiguity of the relationship the paper expects a positive relationship between savings and real interest rate.

Exports (XR)

Increase in the volume or value of exports is expected to be a gain to an exporting country. This is because increase in exports means firms will have to produce more to satisfy the outside market hence, employ more workers which will result in increase in national savings as each individual will embark on increasing their personal savings. Exports are taken as a percentage of GDP in this study. The study expects a positive relationship between exports and national savings.

Exchange Rates (EX)

Exchange rate is captured in the model as the domestic currency price of foreign currency. The exchange rate indices are taken with respect to US dollar mainly because almost all of the funds borrowed by Botswana are in US dollars. Exchange rate appreciation is expected to promote exports as price of domestic goods will be lower hence, increase in their demand. Increase in the demand of these goods and services will lead to business expansion and hiring of more people and even better wages which results in the portion allocated to savings

increasing at personal level and ultimately raising national savings. A positive relationship is expected between exchange rate and savings.

GDP per Capita (GDPPC)

GDP Per Capita takes in to account the distribution of benefits of economic growth equitably amongst the population. It shows how the economy has the potential to improve life of every individual in the country though in most cases GDP per capita does not reflect anything significant as the benefits can be highly skewed. An increase in GDP per capita mostly implies that there has been growth in GDP which basically mean economic agents have increase in their incomes or more people in the labour-force have been absorbed. A high GDP per capita is expected to result in increase in savings. As the lives of people improve and their incomes improve economic agents are expected to increase the portion of income allocated to savings. Therefore, a positive relationship is expected between national savings and GDP per capita.

Gross Fixed Capital Formation (GFCF)

Gross Fixed Capital Formation can also be referred to as gross domestic fixed investment. This variable is captured as Gross Fixed Capital Formation as a percentage of GDP. It includes land improvements; plant, machinery, and equipment purchases; and the construction of roads, railways, and the like. An improvement in gross fixed capital formation in a country is expected to improve livelihoods of the nation in general. This is simply because it creates an opportunity for unemployed people in the labour-force to be absorbed either on temporary or permanent basis. This will indirectly improve their lives by increasing their incomes even the improvement in facilities will lead to improvement in the welfare of a nation. It is expected that the improvements or increase in gross fixed capital formation will result in increase in the level of savings. Hence, direct or positive relationship is expected between savings and GFCF.

Total External Debt (ED)

Debt is one of the main problems of savings in less developed countries. Debt depletes national savings, as most of the amount of a country's resources must be deployed to service external debt. Total external Debt is owed to non-resident repayable in foreign currency, goods or services. It is defined as the sum of public, publicly guaranteed, and private non-guaranteed long term debt, use of IMF credit, and short term debt. It is captured as a percentage of GDP. External debt is expected to influence savings negatively as shown by the literature.

Method of data collection

This study uses annual macroeconomic data for the period of 1980 to 2014. The period takes into account both periods where the diamond sector was not dominant and the period where its dominance started to be significant towards the Botswana economy. Data is obtained from Bank of Botswana Annual reports, the global economy and the World Development Indicators. Econometric Views package is used for data analysis.

4.0 Results and Analysis

4.1 Unit Root Results

Most time series data are non-stationary therefore, if used in regression they may result in spurious regression. Before regressing variables to determine if relationship between them exists or not, it is preconditioned that we determine stationarity of the data by conducting unit

root test. The study used Augmented Dickey Fuller to ascertain the stationary or non-stationary of the variables in the time series data. The unit root test results are presented below:

Table 1: Unit Root Test of the Variables with Trend and Intercept

VARIABLE	IN LEVELS			FIRST DIFFERENCE		
	ADF STAT	PROB	I(d)	ADF STAT	PROB	I(d)
GS	-3.012532	0.1437	I(1)	-6.341810	0.0000*	I(0)
GDPPC	-2.760754	0.2206	I(1)	-6.004915	0.0001*	I(0)
RINT	-3.529402	0.0521	I(1)	-4.162096	0.0137**	I(0)
GFCF	-3.038003	0.1372	I(1)	-5.916650	0.0001*	I(0)
XR	-2.741634	0.2275	I(1)	-5.792187	0.0002*	I(0)
EX	-2.850549	0.1907	I(1)	-4.817276	0.0026*	I(0)
ED	-1.952068	0.6056	I(1)	-5.400506	0.0006*	I(0)

NB: *indicates significance at 1% level, ** at 5% level and *** at 10% level

Table 1 reports results of non-stationary test for all variables in the model. Test results indicate that the variables are non-stationary at levels or they have unit root. Since the variables at level were all non-stationary, they are then converted to first difference were they become stationary. At this stage the variables do not have unit root or are stationary and hence the null hypothesis of unit root can be rejected and the variables are integrated of order I(1). Given the unit root properties of each of the series, the next step is to establish whether there is long run relationship among variables in the equation using Johansen cointegration techniques.

4.2 Cointegration Results

Cointegration tests were undertaken based on the Johansen (1990) maximum likelihood framework. The stationary combination may be interpreted as cointegration if results from a regression or model based on unit roots variables are cointegrated. Cointegration refers to the presence of a long run association ship between variables or in the long run they move together. This is done by employing the Johansen (1991), procedure of testing for a cointegrating relationship in a system of equations. Johansen's (1991), cointegration test is adopted to determine whether the linear combination of the series possesses a long-run equilibrium relationship.

Table 2: Cointegration Results

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.929107	234.5295	125.6154	0.0000
At most 1 *	0.875535	149.8387	95.75366	0.0000
At most 2 *	0.763206	83.15926	69.81889	0.0030
At most 3	0.498513	37.06114	47.85613	0.3447
At most 4	0.259171	14.97542	29.79707	0.7817
At most 5	0.125476	5.375909	15.49471	0.7677
At most 6	0.033353	1.085505	3.841466	0.2975

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.929107	84.69082	46.23142	0.0000
At most 1 *	0.875535	66.67943	40.07757	0.0000
At most 2 *	0.763206	46.09812	33.87687	0.0011
At most 3	0.498513	22.08571	27.58434	0.2160
At most 4	0.259171	9.599515	21.13162	0.7813
At most 5	0.125476	4.290404	14.26460	0.8275
At most 6	0.033353	1.085505	3.841466	0.2975

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

From the above cointegration test results, both Trace and Maximum Eigenvalue (Max-Eigen) tests show the existence of a long run association between the series. The Trace and Maximum Eigenvalue test posits similar number of cointegrating equations. Therefore, the conclusion that can be made is that there are no less than three cointegrating vectors among series in this study. However, it is necessary to run the vector error correction model to indicate the nature of long run relationship among series.

4.3 VECM Analysis

In order to analyze the dynamic relationships between variables included in the model the Vector Error Correction Model (VECM) was employed. It is adopted to estimate whether external debt has any effect on national savings in Botswana. The results of the VECM is given in table 3.

Other variables included in the model are: Real Interest Rate (RINT), Gross Fixed Capital Formation (GFCF), Exports ratio (XR), Exchange Rates (EX) and GDP per Capita (GDPPC). Once variables are cointegrated it becomes easy to distinguish between the short run and long run relationships, hence, VECM techniques capture these relationships among variables.

Table 3. Vector Error Correction Estimate Results

Error Correction	D(GS)	D(XR)	D(RINT)	D(GFCF)	D(GDPPC)	D(EX)	D(ED)
CointEq1	-0.874590	-0.849180	0.981192	-0.577604	-31.75647	-0.003439	0.875992
	(0.26761)	(0.74349)	(0.50705)	(0.98251)	(34.6024)	(0.07194)	(0.63409)
	[-3.26819]	[-1.14215]	[1.93509]	[-0.58788]	[-0.91775]	[-0.04781]	[1.38150]
CointEq2	1.511567	-0.612392	-0.988166	0.428452	16.96943	-0.015254	-0.455848
	(0.31108)	(0.44371)	(0.30260)	(0.58635)	(20.6504)	(0.04293)	(0.37842)
	[4.85912]	[-1.38016]	[-3.26554]	[0.73071]	[0.82175]	[-0.35532]	[-1.20462]
CointEq3	-1.177529	-0.149014	-1.574059	-0.059216	-23.51757	-0.001372	0.664739
	(0.39546)	(0.56407)	(0.38469)	(0.74541)	(26.2520)	(0.05458)	(0.48107)
	[-2.97762]	[-0.26418]	[-4.09179]	[-0.07944]	[-0.89584]	[-0.02513]	[1.38181]
D(GS(-1))	0.776738	0.880914	-0.417391	0.213381	32.78302	0.007361	-0.668366
	(0.32079)	(0.47736)	(0.32555)	(0.63082)	(22.2166)	(0.04619)	(0.40712)
	[2.42135]	[1.84538]	[-1.28209]	[0.33826]	[1.47561]	[0.15937]	[-1.64170]
D(GS(-2))	0.659764	0.472411	-0.033328	0.243258	20.94879	-0.023456	-0.420620
	(0.23931)	(0.34134)	(0.23279)	(0.45107)	(15.8860)	(0.03303)	(0.29111)
	[2.75697]	[1.38399]	[-0.14317]	[0.53929]	[1.31869]	[-0.71025]	[-1.44488]
D(XR(-1))	-1.447203	-0.547961	0.904337	-0.155612	-11.02325	0.027066	0.211957
	(0.38799)	(0.55341)	(0.37742)	(0.73132)	(25.7560)	(0.05354)	(0.47198)
	[-3.73002]	[-0.99015]	[2.39611]	[-0.21278]	[-0.42799]	[0.50548]	[0.44908]
D(XR(-2))	-0.757497	-0.148006	0.619961	-0.466593	-3.614800	0.003690	0.386493
	(0.35519)	(0.50663)	(0.34551)	(0.66950)	(23.5786)	(0.04902)	(0.43208)
	[-2.13266]	[-0.29214]	[1.79432]	[-0.69693]	[-0.15331]	[0.07527]	[0.89450]
D(RINT(-1))	0.462563	0.389642	0.529899	-0.140763	19.52449	0.001460	-0.516732
	(0.17683)	(0.33077)	(0.22558)	(0.43711)	(15.3941)	(0.03200)	(0.28210)
	[2.61582]	[1.17798]	[2.34905]	[-0.32203]	[1.26831]	[0.04561]	[-1.83176]
D(RINT(-2))	0.731713	0.235019	0.127790	-0.064050	18.32521	-0.016930	-0.507099
	(0.26018)	(0.37112)	(0.25310)	(0.49042)	(17.2719)	(0.03591)	(0.31651)
	[2.81229]	[0.63328]	[0.50491]	[-0.13060]	[1.06098]	[-0.47151]	[-1.60218]
D(GFCF(-1))	-0.686627	0.007807	0.029230	-0.154538	1.190207	-0.005542	0.060867
	(0.22384)	(0.31928)	(0.21774)	(0.42192)	(14.8593)	(0.03089)	(0.27230)
	[-3.06748]	[0.02445]	[0.13424]	[-0.36627]	[0.08010]	[-0.17941]	[0.22353]

D(GFCF(-2))	-0.915908	0.162874	0.354819	-0.488000	-6.796081	0.010563	0.411097
	(0.27385)	(0.39061)	(0.26639)	(0.51618)	(18.1790)	(0.03779)	(0.33313)
	[-3.34457]	[0.41697]	[1.33196]	[-0.94541]	[-0.37384]	[0.27949]	[1.23404]
D(GDPPC(-1))	-0.014447	-0.000649	0.002455	-0.000354	-0.551725	-0.000124	0.010924
	(0.00706)	(0.01007)	(0.00687)	(0.01330)	(0.46855)	(0.00097)	(0.00859)
	[-2.04680]	[-0.06442]	[0.35751]	[-0.02660]	[-1.17751]	[-0.12767]	[1.27223]
D(GDPPC(-2))	-0.024212	0.000994	0.010941	-0.001973	-0.674397	0.001491	0.012480
	(0.00781)	(0.01114)	(0.00760)	(0.01473)	(0.51868)	(0.00108)	(0.00950)
	[-3.09884]	[0.08917]	[1.43955]	[-0.13399]	[-1.30022]	[1.38277]	[1.31303]
D(EX(-1))	-0.634084	1.460863	-1.584670	-1.435567	-61.06915	0.471592	3.527921
	(1.92937)	(2.75198)	(1.87681)	(3.63669)	(128.078)	(0.26626)	(2.34702)
	[-0.32865]	[0.53084]	[-0.84434]	[-0.39475]	[-0.47681]	[1.77115]	[1.50315]
D(EX(-2))	1.420320	-3.538449	-0.964961	7.922651	41.11924	-0.271017	-3.190518
	(2.07802)	(2.96400)	(2.02141)	(3.91687)	(137.946)	(0.28678)	(2.52785)
	[0.68350]	[-1.19381]	[-0.47737]	[2.02270]	[0.29808]	[-0.94505]	[-1.26215]
D(ED(-1))	0.153279	0.151954	0.661316	-0.397898	17.67221	-0.061264	-0.314592
	(0.33804)	(0.48216)	(0.32883)	(0.63717)	(22.4400)	(0.04665)	(0.41121)
	[0.45344]	[0.31515]	[2.01113]	[-0.62448]	[0.78753]	[-1.31326]	[-0.76504]
D(ED(-2))	-0.739923	0.477960	0.443470	-0.908432	-11.96059	0.018672	0.725436
	(0.28836)	(0.41130)	(0.28050)	(0.54353)	(19.1421)	(0.03979)	(0.35078)
	[-2.56600]	[1.16207]	[1.58099]	[-1.67136]	[-0.62483]	[0.46920]	[2.06808]
C	4.722530	-0.384936	-1.784178	-1.446128	320.0203	0.005465	-3.150832
	(2.05989)	(2.93814)	(2.00377)	(3.88269)	(136.742)	(0.28427)	(2.50579)
	[2.29262]	[-0.13101]	[-0.89041]	[-0.37245]	[2.34032]	[0.01923]	[-1.25742]

R-squared which corresponds to our equation of interest which is equation one in the model is about 0.87 indicating that 87 percent of the variation of National savings in Botswana is explained by the specified explanatory variables; thus the degree of fit is satisfactory. Further, all these variables are important factors which affect savings in Botswana as implied by F-statistic. It can be observed from the results that the error correction term (ECT) coefficient is significant and has a negative sign. This implies that the series cannot drift too far apart and convergence is achieved in the long run. The significance of ECT suggests that long run steady state equilibrium between Savings, external debt and other explanatory variables does exist. More specifically, ECT coefficient from the results is -0.87 which implies that a deviation from the long-run equilibrium in a year is corrected in the next year by 87%. This is a relatively very fast rate of adjustment. From the dynamics of the national savings equation (equation 1), national savings (GS) is explained by its values, lagged values of the national savings, real interest rates (RINT), Gross Fixed Capital Formation (GFCF), Exports (XR), GDP per capita (GDPPC) and total external debt (ED). The coefficients of the above mentioned variables are significant thus, establishing existence of significant short-run relationship with national savings.

The lagged GS carries a positive and significant value in both lags. The lagged values of GS portray the same adjustment pattern with strong effects working during the first lag. The positive sign shows that the lags in savings have an overall positive effect on previous lag. The coefficients for both lags of real interest rate (RINT) are correctly signed, that is, positive and statistically significant. The positive impact of RINT is strongly felt in the second lag. This indicates that all other things held constant, the level of savings will increase by 73 percent when RINT (-2) increases by one percent. Economic theory posits that when the real interest rate is low or (high) savings will be low or (high) as well, that is, a direct relationship between the two variables. These findings are consistent with the life-cycle hypothesis that higher interest rates lead to an increase in the current price of consumption in comparison to the future price, thus, resulting in an increase in saving. This implies that the study fails to reject the null hypothesis that real interest rates are positively related to savings.

It is more interesting to find that in Botswana GDP per capita (GDPPC) has negative influence on savings. The negative sign is inconsistent with expectations of this study. This could be attributed to the fact that income distribution is often skewed or unequal amongst the population. This means GDP per capita sometimes is not a good measure of national economic wellbeing. The other reason that could be attributed to these negative effects could be based on the principle that government savings is the difference between government revenue and government spending. When the government spends more than its revenue, it runs a budget deficit, which results in negative savings. Hence, crowd out investment. These inconsistent results imply that the null hypothesis that savings are directly related to GDP per capita is rejected.

The short run effects of Gross Fixed Capital Formation (GFCF) on savings are statistically significant in the both lags. The lagged values of GFCF have negative signs, which were not expected. This means that the GFCF has a relatively high and unfavourable effect on savings. The negative effect of GFCF is strongly felt in the second lag. That is, holding all other variables constant, increasing GFCF (-2) by one percent will reduce the level of savings by 92 percent. This could be attributed to the fact that most advanced machines and technology requires high skilled labour force which majority of the population does not possess.

Therefore, increasing the Gross Fixed capital in the economy will have unwanted effects in the economy. This is because more qualified foreigners will benefit more than the locals. Most of the foreigners will prefer to save the income they have earned in their native countries than in Botswana, hence, reduction in savings.

The dynamics of equation 1 shows that the coefficients of both lags of exports as a percentage of GDP (XR) are statistically significant. These coefficients are accompanied by unexpected signs, that is, negative sign. This simply means that all other things held constant a one percent increase in XR (-1) and XR (-2) will result in a decrease in level of savings by 145% and 75% respectively. This inconsistency could be attributed to the fact that the exports in Botswana are mostly dominated by diamond or mining exports and the owners of these mining companies are foreigners who often take the profits abroad. This sector is also capital intensive, meaning that few people will be absorbed which will ultimately results in lower savings from the households or economic agents. The other reason which can explain these inconsistencies in signs is the fact Botswana is not well industrialized hence, high imports of goods and services are required to satisfy the increasing demand. Therefore, large volumes of goods and services are imported. This would essentially result in a decline of domestic savings efforts as people spend more of their earned resources buying goods and services from outside. This could as well explain the unexpected negative sign between exports as a percentage of GDP and Savings.

It is more interesting to find that in Botswana exchange rate is negatively related to savings though statistically insignificant. This is inconsistent with what this study expected. The negative inconsistent sign could be attributed to the fact that exports are dominated by the diamond industry in Botswana which is owned by foreigners. The mining sector does not employ a lot of people. Under normal circumstances exchange rate appreciation is expected to benefit exporters than importers. However, for the situation of Botswana the exchange rate appreciation will result in more money being spent on imported goods and less reserved for personal savings hence, decrease in savings. The results from the Vector Error Correction Model depicts a negative and statistically significant relationship between external debt and national savings in Botswana. This result conforms to the studies carried out in Pakistan by Hasan et al., (1992), and the one carried by Aliyu and Usman (2013).

In the short run effects of External Debt (ED) and savings, the coefficient of ED turned out negative and significant at lag 2 implying the effect of external debt on savings in Botswana becomes prominent with a lag of 2 years. In other words, the debt incurred in the last 2 years has a relatively more resounding impact on savings. This means that holding all other things constant one percent increase in ED will result in a decline in savings by 73 percent. This could be explained by the fact that foreign borrowings augment savings at the onset, but overtime with increase in burden of debt service, higher global interest rates, and other macroeconomic failures and negative shocks, the impact of external debt on savings may turn negative. Servicing of the external debt creates a burden on the current resources, thereby adversely affecting national saving efforts. Despite the fact that ED(-1) is not significant it simply shows that initially when funds are borrowed abroad they will have positive effects but as time goes by the principal accumulates interest, which result in increase in the burden of servicing the debt and ultimately affect savings negatively. That is to say ED(-1) is positive though insignificant but ED(-2) is negative and significant. This implies that null hypothesis that external debt does not have effect on national savings in Botswana can be rejected.

Equation 7 shows that ED is not influenced by savings in its own lags. This provides an answer to the controversy between external debt and national savings as to which causes what. The lags of savings are insignificant but carry the expected sign. This is consistent with the I-S gap theory as it states that short fall in domestic savings will result in the need for external debt. However, the conclusion that can be made is that in the case of Botswana savings are influenced by external debt and its own lags not the other way round.

5.0 Conclusion

In conclusion, the study has shown that like in most developing countries external debt has adverse impact on the growth of the economy and savings in Botswana. Savings in Botswana is influenced by real interest rates, Gross Fixed Capital Formation, Exports as ratio of GDP, External debt and GDP per Capita. From the results, it is apparent that external debt has an impact on national savings and a direct causality has been shown by Granger causality test. The Granger causality shows that a uni-directional causality exist between external debt and savings. That is, savings influenced by external debt. External debt is not a major problem as of now in Botswana like it used to be in the early 1970's as the country used to accumulate debt as high as 47% of GDP. However, recent increase in external debt accompanied by declining diamonds revenues is a call for concern.

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