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Determinants of Service Sector Growth in Botswana

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BOTSWANA INSTITUTE FOR DEVELOPMENT POLICY ANALYSIS

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BIDPA

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ABSTRACT

This study examines the factors affecting service sector growth and development in Botswana. Using annual time series data from 1980 to 2015, the study employs the auto regressive distributed lag (ARDL) estimation technique to identify the factors that contribute to service sector growth. The results show that gross national expenditure, domestic credit to the private sector and gross fixed capital formation contribute positively to the growth of the service sector in Botswana. However, trade openness is found to negatively impact the growth of service sector in the country. The policy implication of the results is that in formulating service oriented policies, government should focus on factors that augment the growth of services sector. Specifically, government should increase spending on the service sector and its sub-sectors. Also, the banking sector should avail credit to the private sector as this is essential for the growth and development of the service sector.

Keywords: Service Sector, Co-integration, Error Correction Model, ARDL

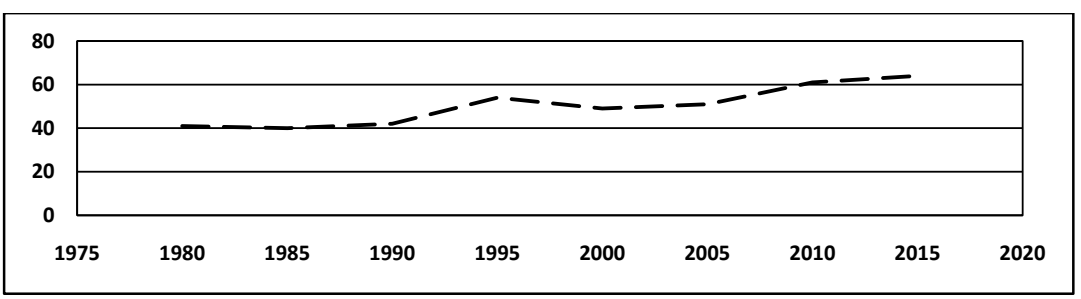
1. INTRODUCTION

The service sector has become an important sector for Botswana's growth performance. It is one of the best performing non-mining sectors for the country. The trade, hotels and restaurants as well as the banks, insurance and business services are among the four major sectors in terms of their contribution to the economy's gross domestic product (GDP). The share of trade, hotels and restaurants to GDP increased from 11.8 percent in the national development plan (NDP) 9 to 24.6 percent in NDP 10, while the banks, insurance and business services share increased from 12 percent in NDP 9 to 24.6 percent in NDP 10 (GoB, 2017).

The importance of services to the economy also lies in the fact that many services provide inputs to the production process particularly mining and to other sectors. Thus, their growth has wider productivity and efficiency outcomes for activities outside of the services sector. One of Botswana's key challenges has been that its rapid economic growth has not been broad based as growth in the non-mining sectors has been slow (Mupimpila and Moalosi, 2016).

Figure 1 shows the services sector contribution to overall economic growth in Botswana. The figure shows that the services sector contribution to overall GDP has increased over time. This increase could be due to drop in mining sector contribution or overall increase in services output growth. This trend shows that the economy has considerably diversified overtime.

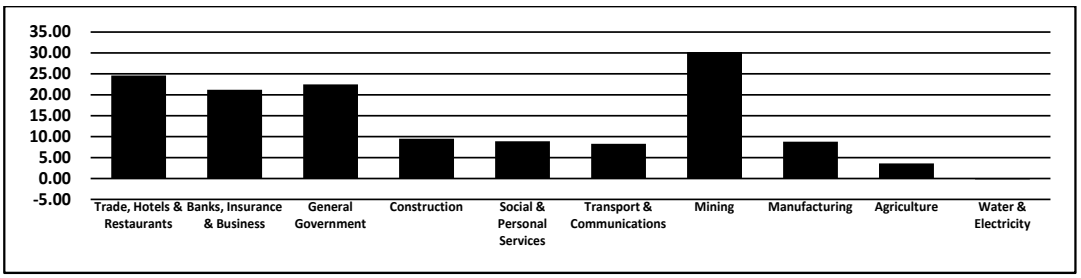
Figure 1: Contribution of Services Sector to GDP (percentage): 1980 - 2015



Source: Statistics Botswana (2016a)

Excluding mining, the service sector outperformed other sectors in terms of average contribution to GDP growth during the NDP 10 period. The trade, hotels and restaurants contributed 24.6 percent while general government, banks, insurance and business services recorded 22.5 percent and 21.2 percent of the total value added growth respectively (Figure 2). Clearly, the three service sub-sectors; trade, hotels and restaurants, general government and banks, insurance and business services were the most important sectors after mining in terms of contribution to GDP.

Figure 2: Sector's Average Contribution to GDP Growth: NDP 10



Source: GoB (2017)

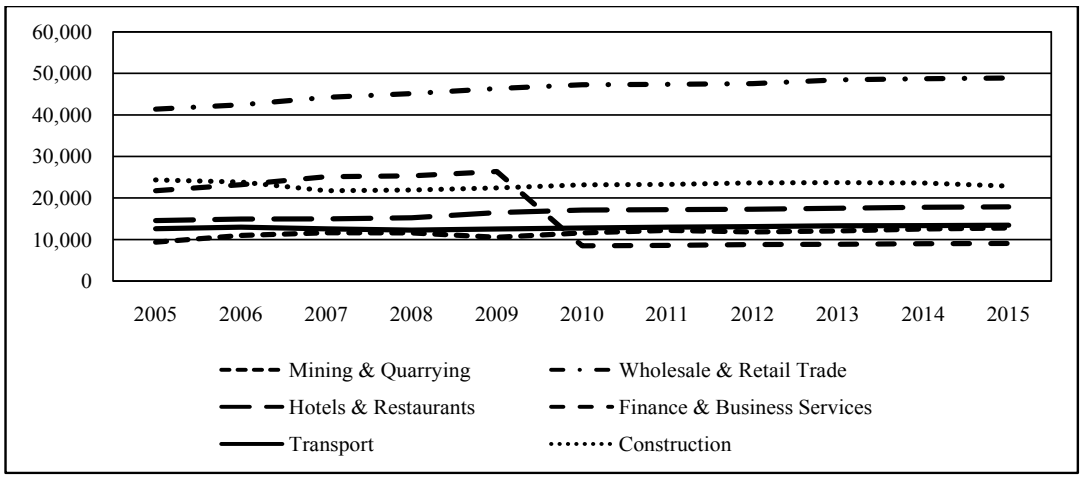
The growth of the services sector comes at a time when real value added from mining has been declining due to weak global demand for luxury goods, particularly diamonds. However, the downside of the services sector is that even though its overall contribution to GDP is at 64 percent, its contribution to exports is only 7 percent while diamonds make up 70 percent of exports (Statistics Botswana, 2017).

The service sector also contributes significantly to employment. One of Botswana's key challenges over the years has been high levels of unemployment. The high growth rates over the years have not translated to reduction in unemployment. Unemployment hit a record high of 26.2 percent in 2008 (Statistics Botswana, 2016). The Botswana AIDS Impact Survey (BAIS) IV of 2013 recorded unemployment at 20 percent while the recent results of the 2015/2016 Botswana Multi – Topic Household Survey (BMTHS) indicate that unemployment stands at 17.7 percent. Though the results show a decline in unemployment, this is still relatively high.

The mining sector which has been the main driver of Botswana's economic growth contributes very little to employment despite its high contribution to GDP. This is mainly because mining is capital intensive in nature and employs too few people per unit of output. The other reason is that Botswana operates at the base of the mining value chain. The country exports its mining output without much value addition, and therefore loses on job creation opportunities from downstream processing of its output.

Figure 3 shows the estimated number of paid employees by sector. The largest private and parastatal employers include construction and commerce (wholesale & retail trade), which are also among the most labour intensive services in the economy as shown in Figure 3. The contribution of commerce in total employment has shown steady growth in the last few years. This underscores the importance of the services sector in terms of employment creation.

Figure 3: Estimated Number of Paid Employees by Sector, Yearly Averages; 2005 - 2015



Source: Statistics Botswana (2015)

In view of the growing importance of the services sector in the economy of Botswana, it is important to find out the factors that affect services sector output growth. The objective of this paper is therefore to identify the determinants of service sector output growth in Botswana. This study is important for policy as the country continues to seek ways to diversify the economy away from the mining sector.

The rest of the paper is organized as follows. Section 2 provides a review of literature on determinants of service sector growth. Section 3 describes the data and conducts preliminary analysis. Section 4 sets out the econometric methodology used. Section 5 presents the findings and discussion of results. Section 6 concludes the paper and highlights the policy implications of the results.

2. RELATED LITERATURE REVIEW

There are a few empirical studies conducted on the possible determinants of service sector growth. Determinants in this paper refer to the factors that affect the service sector output level. Gordon and Gupta (2004) in the study to understand India's services sector revolution used simple ordinary least square method on annual data from 1952 to 2000. The study aim was to ascertain the impact of high income elasticity of demand, input usage of services in other sectors, exports of services and economic reforms on services sector growth. The empirical findings led to the conclusion that growth rate of commodity producing sector, growth rate of foreign trade, growth of exports in services and trade liberalizations affected the services sector growth positively and significantly.

Agostino et al. (2006) used panel data from 1970 to 2003 to check the role of services in employment in European countries. The authors applied generalized least square method proposed by Baltagi and Wu (1999) to find out the main determinants of share of services sector in employment. They established that macroeconomic variables

(per capita income, private consumption and productivity) are main determinants of gap between the US and European share of employment in services sector. In Europe, institutional framework played an important role in share of employment in services sector.

Singh & Kaur (2014) in the study on the determinants of Indian services sector concluded that gross national product per capita, domestic investment and foreign trade have positive impact on share of services sector in gross domestic product while foreign direct investment affected the share of services sector in GDP negatively and significantly. They applied vector regression analysis on annual data for period 2000-2013. Wu (2007) in the study on the determinants of services sector in India and China found that per capita income, foreign demand for services and urbanization have positive and significant impact on growth of services sector in India and China. The author applied panel estimation techniques including fixed effect and random effect models to establish the determinants of services sector growth in India and China.

Jain et al. (2015) used ordinary least square method for annual data from 2000 to 2012 to identify the factors affecting services sector in India. The authors concluded that foreign direct investment, net foreign institutional investment equity and imports have positive impact on services sector growth while foreign institutional investment, debt and exports affected services sector negatively.

Ajmair et al. (2017) used the autoregressive distributed lag (ARDL) bound testing and time varying parametric (TVP) estimation with general to specific approach to determine the growth of service sector in Pakistan for the period from 1976 to 2014. The empirical findings show that inflation has negative effect on services sector output growth for both the TVP and ARDL estimation techniques while net foreign direct investment has positive and significant effect on services sector output growth in both techniques of estimation. Gross national expenditure had positive effect on services sector output growth at five percent significance level in case of TVP approach while relationship was insignificant in case of ARDL estimation.

The government of Botswana has persistently come up with strategies to diversify the economy away from mining. The performance of the services sector underscores the importance of the sector as a potential source of growth, yet there has not been any study so far on what drives the services sector output growth. This study is aimed at filling this gap.

3. DATA AND PRELIMINARY ANALYSIS

The study uses annual time series data from 1980 to 2015. The data is obtained from the World Development Indicators (WDI, 2016) of the World Bank. The choice of the sample period is largely influenced by availability of data. All variables except inflation and foreign direct investment are used in logarithm form in the long run estimation while the first differences are used in the short run estimation.

Unit Root Test

We assess the stationary behavior of the variables using the Augmented Dickey Fuller (ADF) and Phillips Perron (PP) unit root tests. The importance of the unit root test is to determine the order of integration before identifying any possible long run relationship. The results of the ADF and PP unit root tests are provided in Table 1a and Table 1b respectively.

Both the ADF and PP unit root results show that the net foreign direct investment (FDI) and domestic credit to the private sector (DCP) are stationary at levels. The share of services (SER), annual inflation rate (INF), gross national expenditure (GNE), gross fixed capital formation (K) and trade openness (TO) are stationary after first difference.

Table 1a: ADF Unit Root Test Results

Variable	Levels			First Difference		
	Intercept	Trend & Intercept	Order	Intercept	Trend & Intercept	Order
SER	-0.527	-2.027		-4.429	-4.417	I(1)
INF	-2.629	-3.267		-7.858	-7.755	I(1)
FDI	-3.776	-3.492	I(0)			
GNE	-2.496	-2.575		-4.797	-4.979	I(1)
K	-2.246	-2.548		-4.958	-4.519	I(1)
TO	-1.858	-1.608		-5.789	-5.877	I(1)
DCP	-0.911	-3.700	I(0)			
5% critical value	-2.948	-3.544		-2.951	-3.548	

Table 1b: Phillips-Perron Unit Root Test Results

Variable	Levels			First Difference		
	Intercept	Trend & Intercept	Order	Intercept	Trend & Intercept	Order
SER	-0.633	-2.232		-4.429	-4.417	I(1)
INF	-2.495	-3.222		-8.149	-8.045	I(1)
FDI	-3.745	-3.621	I(0)			
GNE	-2.495	-2.529		-5.127	-5.221	I(1)
K	-2.390	-2.548		-4.974	-5.126	I(1)
TO	-1.870	-1.629		-5.789	-5.877	I(1)
DCP	-0.491	-3.721	I(0)			
5% critical value	-2.948	-3.544		-2.951	-3.548	

Based on the unit root test results for the data, the ADRL model is the appropriate estimation technique. The choice of this approach is informed by the data properties and its advantages over other co-integration techniques such as the Engle Granger and Johansen co-integration. The ARDL technique is superior to other techniques because;

(i) It can be applied regardless of whether the underlying regressors are I(1) or I(0) or a combination of both (Pesaran and Shin, 1999),
(ii) ARDL bounds testing approach performs better than Engle and Granger (1987), Johansen and Juselius (1990) and Philips and Hansen (1990) co-integration test in small samples;
(iii) ARDL model takes sufficient number of lags to capture the data generating process in a general-to-specific modelling framework (Laurenceson et al., 2003), and
(iv) The technique generally provides unbiased estimates of the long run model and valid t-statistics even when some of the regressors are endogenous (Harris and Sollis, 2003); moreover, the endogeneity bias tends to be irrelevant and very small (Ang 2008; Inder 1993).

4. ARDL METHODOLOGY

Model Specification

The estimated model is specified in Equation 1. The equation provides the short-run and long-run representation of the estimated model.

$$\begin{aligned}\Delta\log(\mathrm{SER}_t) = \partial_0 &+ \sum_{i=0}^{n}\alpha_{1i}\Delta\log(\mathrm{SER}_{t-i}) + \sum_{i=0}^{n}\alpha_{2i}\Delta\mathrm{INF}_{t-i} + \sum_{i=0}^{n}\alpha_{3i}\Delta\log(\mathrm{DCP}_{t-i}) + \sum_{i=0}^{n}\alpha_{4i}\Delta\mathrm{FDI}_{t-i} \\ &+ \sum_{i=0}^{n}\alpha_{5i}\Delta\log(\mathrm{GNE}_{t-i}) + \sum_{i=0}^{n}\alpha_{6i}\Delta\log(\mathrm{K}_{t-i}) + \sum_{i=0}^{n}\alpha_{7i}\Delta\log(\mathrm{TO}_{t-i}) + \beta_1\log(\mathrm{SER}_t) + \beta_2\mathrm{INF}_t \\ &+ \beta_3\log(\mathrm{DCP}_t) + \beta_4\mathrm{FDI}_t + \beta_5\log(\mathrm{GNE}_t) + \beta_6\log(\mathrm{K}_t) + \beta_7\log(\mathrm{TO}_t) \\ &+ \varepsilon_t) \qquad (1)\end{aligned}$$

where SER is the share of services (as a percentage of GDP), INF is the annual inflation rate, DCP is the domestic credit to the private sector, FDI is net foreign direct investment, GNE is gross national expenditure, K is the gross fixed capital formation and TO is trade openness. ∂_0 is a constant, Δ represent the first difference, α_i's depict the short run dynamics of the model, β_i's show the long run association while t, ε, n represent the time period, the error term and the optimal lag length respectively. All the variables except inflation are expected to have a positive impact on service sector growth.

Selection of optimal lag length is important in ARDL estimation because it helps explain over parameterization issue and saves the degrees of freedom (Taban, 2010). The Akaike Information Criterion (AIC) is used to select the optimal lag length. The AIC is preferred due to its performance in small sample size. The optimal lag length that is selected for the analysis is 1.

After determining the optimal lag length, the ARDL bounds test is conducted to establish whether it passes the F-test criteria for the long run relationship among the variables. If the variables in the estimated model are co-integrated, the next step is to estimate the error correction model in order to investigate the short run dynamics.

Testing

The ARDL bound test is based on the Wald Test (F-statistic). The F-test, tests the hypothesis:

$H_0 : \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = 0$

against the alternative hypothesis:

At least one of

$H_a : \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7 \neq 0$

Rejection of H_0 implies that the variables have a long-run relationship. Pesaran et al., (2001) provide bounds on the critical values for the asymptotic distribution of the F-statistic. If the computed F-statistic falls below the lower bound, we conclude that there is no co-integration. If the F-statistic exceeds the upper bound, we conclude that there is co-integration. Finally, if the F-statistic falls between the bounds, the test is inconclusive.

Diagnostic tests are carried out on the estimated ARDL equation before making any statistical inference. This is done to ascertain the goodness of fit of the estimated equation. The diagnostic tests check for serial correlation, normality, model specification and heteroscedasticity in the estimated model. The stability of the estimated model is checked by employing the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ).

5. RESULTS AND DISCUSSION

The F-Bounds Test

Table 2 shows the results of the F-Bounds Test. The Table shows the critical values for the upper and lower bounds and compares them with the calculated F-statistic. The computed F- value (9.423), is greater than both the lower and upper bound critical values at 5 percent level of significance. Therefore, the null hypothesis of no co-integration is rejected. This implies that there is a long run relationship between services sector output growth and other variables in the specified model. Based on these results, the ARDL model can be estimated to determine the long run and short run dynamics using an error correction representation.

Table 2: F-Bounds Test Results

Critical Value Pesaran et al., (2001)	Lower Bound Value	Upper Bound Value
1%	2.88	4.43
5%	2.45	3.61
10%	2.12	3.23
Calculated F-statistics = 9.423 k=6		

Long Run Estimation

The long run estimates are provided in Table 3. The long run results are based on the ARDL estimation. The results show that in the long run, gross national expenditure (GNE) and domestic credit to the private sector (DCP) have a positive and significant impact on service sector output growth while trade openness (TO) has a negative and significant impact on service sector output growth. A one percent increase in gross national expenditure (GNE) will lead to 1.238 percent increase in service sector output growth while a one percent increase in the domestic credit to the private sector (DCP) increases service sector output growth by 0.319 percent. A one percentage increase in trade openness (TO) will lead to a decline in service sector output growth by approximately 0.88 percent. Inflation (INF), gross fixed capital formation (K) and foreign direct investment (FDI) were found to have no significant impact on service sector output growth in the long run.

Table 3: Long Run Model Results

Variable	Coefficient	Std. Error	t-Statistic	P-Value
LOGINF	-0.065	0.099	-0.661	0.514
LOGGNE	1.238	0.386	3.211	0.004***
LOGK	-0.366	0.319	-1.147	0.262
LOGTO	-0.876	0.304	-2.884	0.008***
LOGDCP	0.319	0.097	3.292	0.003***
FDI	-0.016	0.010	-1.492	0.148
C	2.831	1.299	2.179	0.039
Adjusted R-squared	0.975			

***: statistically significant at 1 percent

Short Run Estimation

Table 4 reports the short run coefficient estimates obtained from the error correction model (ECM) version of the ARDL model. The estimated coefficients of the short run model show that gross national expenditure (GNE), domestic credit to the private

sector (DCP), gross fixed capital formation (K) have a positive and significant impact on service sector output growth. The results further show that trade openness (TO) has a negative and significant impact on service sector output growth.

The results imply that gross national expenditure, domestic credit to the private sector and gross fixed capital formation are important factors for the growth and development of the service sector in Botswana. These findings are consistent with (Ajmair et al., 2017). Domestic credit to the private sector is important for the growth of the service sector because access to credit enhances the productive capacity of firms and enhances their potential to grow. Increases in government expenditure on socio-economic and physical infrastructures impact on long run growth rate. Thus, increased spending on services such as health and education can significantly improve the growth of the services sector. Further, increases in physical stock in the form of private domestic and public investment is expected to improve the share of services.

The results further show that trade openness (TO) has a negative and significant impact on service sector output growth. This finding is consistent with Ajmair et al., (2017). Their results led to a conclusion that trade openness has a negative and significant impact on service sector output growth. Inflation (INF) and foreign direct investment (FDI) were found to have no significant impact on service sector output growth.

The results show that the error correction term (ECT) is negative and statistically significant at 1 percent level. This ensures that long run equilibrium can be attained. The coefficient of the ECT (-0.289) implies that about 29 percent of any deviation is corrected within the period. The adjusted R^2 value of 0.766 implies that the ECM fits the data reasonably well.

Table 4: Results of the Error Correction Model (Short run dynamics)

Variable	Coefficient	Std. Error	t-Statistic	P- value
Δ(LOGSER(-1))	-0.289	0.069	-4.181	0.000***
Δ(INF)	-0.019	0.030	-0.624	0.538
Δ(LOGGNE)	0.358	0.089	4.037	0.000***
Δ(LOGK(-1))	0.229	0.089	2.552	0.017**
Δ(LOGTO)	-0.253	0.079	-3.193	0.004***
Δ(LOGDCP)	0.092	0.038	2.451	0.021**
Δ(FDI)	-0.004	0.003	-1.620	0.117
ECT(-1)	-0.289	0.032	-9.109	0.000
Adjusted R-squared	0.766			

*** and **: statistically significant at 1 percent and 5 percent respectively
Δ indicates first difference

Diagnostic Tests

Several diagnostic tests were performed on the estimated ECM to check its appropriateness and robustness. These tests are carried out in order to avoid spurious estimation results. The results are provided in Appendix 1. The diagnostic test results show that there is no auto correlation, heteroscedasticity and serial correlation detected in the estimated short run model. The results further show that the residuals are normally distributed.

Stability Tests

In order to assess the stability of the long run and short run relationship between service sector output growth and its determinants, the CUSUM and CUSUMSQ tests are applied at 5 percent level of significance. Both the CUSUM and CUSUMSQ tests are applied to the residuals of the model. If the CUSUM line lies in-between the lines of the level of significance, it shows the model is stable. However, if the CUSUM line is out of these two lines, the variables are unstable. A graphical presentation of the CUSUM and CUSUMSQ plots is provided in Appendix 2. The results show that both the CUSUM and CUSUMSQ plots lie between the critical bounds. This implies that the model is stable.

6. CONCLUSIONS AND POLICY IMPLICATIONS

The objective of this paper was to identify the factors that drive service sector growth in Botswana. The results indicate that gross national expenditure, domestic credit to the private sector and gross fixed capital formation are important for the growth of the services sector. The results further reveal that trade openness negatively impacts the growth of the services sector. The findings are consistent with both economic theory and studies on the determinants of service sector output growth.

The implication for these findings is that government should focus on factors that augment the growth of services sector in the formulation of service oriented policies. Such factors include gross national expenditure, domestic credit to the private sector and gross fixed capital formation. Government should increase spending on the service sector and its sub-sectors. It is also important for the banking sector to avail credit to the private sector as this is essential for the growth of the service sector. This can be achieved through a well-functioning and developed financial system.

REFERENCES

Agostino, A. D., Serafini, R. and Warmedinger, M. W. (2006). *Sectoral Explanations of Employment in Europe - The Role of Services.* European Central Bank, Working Paper Series, No. 625.

Ajmair, M., Hussain, K., Akram, S. and Zeb, A. (2017). What Determines the Growth of Services in Pakistan? A Comparison of ARDL Bound Testing and Time Varying Parametric Estimation with General to Specific Approach. *Turkish Economic Review,* 4(3): 308-319.

Ang, J. B. (2008). *Financial Development and Economic Growth in Malaysia.* Routledge, New York.

Baltagi, B. H., and Wu, P. X. (1999). Unequally Spaced Panel Data Regressions With AR(1) Disturbances. *Econometric Theory,* 15: 814–823.

Central Statistics Office. (2009). *2008 Botswana AIDS Impact Survey III (BAIS III).* Central Statistics Office, Gaborone.

Engle, R. F. and Granger, C. W. J. (1987). Cointegration and Error Correction Representation: Estimation and Testing. *Econometrica,* 55: 251–76.

Gordon, J. and Gupta, P. (2004). *Understanding India's Services Revolution.* IMF Working Paper WP/ 04/171.

Government of Botswana. (2017). *National Development Plan 11. Volume 1, April 2017 – March 2023.* Government of Botswana, Gaborone.

Harris, R. and Sollis, R. (2003). *Applied Time Series Modelling and Forecasting*. Wiley, West Sussex.

Inder, B. (1993). Estimating Long-Run Relationships in Economics: A Comparison of Different Approaches. *Journal of Econometrics,* 57: 53–68.

Jain, D., Nair, K. S. and Jain, V. (2015). Factors Affecting GDP (Manufacturing, Services, Industry): An Indian perspective. *Annual Research Journal of Symbiosis Centre for Management Studies,* 3: 38-56.

Johansen, S. and Juselius, K. (1990). Maximum Likelihood Estimation and Inference on Cointegration- with Applications to the Demand for Money. *Oxford Bulletin of Economics and Statistics,* 52 (2):169-210.

Laurenceson, J., Joseph, C. and Chai, H. (2003). *Financial Reform and Economic Development in China.* Cheltenham, UK, Edward Elgar.

Mupimpila, C. and Moalosi, M. (2016). Determinants of Non-Mining Output Growth in Botswana: Does Trade Openness Matter? *International Journal of Economic Issues*, 9 (2): 107-117.

Pesaran, M. H. and Shin, Y. (1999). An Autoregressive Distributed Lag Modelling Approach to Cointegration Analysis. In: Strom, S. (Ed.), *Econometrics and Economic Theory in 20th Century: The Ragnar Frisch Centennial Symposium,* Chapter 11. Cambridge University Press, Cambridge.

Pesaran, M. H., Shin, Y. and Smith, R. (2001). Bounds Testing Approaches to the Analysis of Level Relationships. *Journal of Applied Econometrics,* 16, 289-326.

Phillips, P. C .B. and Hansen, B. E. (1990). Statistical Inference in Instrumental Variable Regression with I (1) Processes". *Review of Economic Studies* 57:99.125.

Singh, M. and Kaur K. (2014). Indian's Service Sector and Its Determinants: An empirical Investigation. *Journal of Economics and Development Studies*, 2(2), 385-406.

Statistics Botswana. (2013). *Preliminary Results. Botswana Aids Impact Survey IV (BAISIV).* Statistics Botswana, Gaborone.

Statistics Botswana. (2016a). *Selected Statistical Indicators, 1966-2016.* Statistics Botswana, Gaborone.

Statistics Botswana. (2016b). *Formal Sector Employment Survey Stats Brief.* Q1 March 2016. Statistics Botswana, Gaborone.

Statistics Botswana. (2017). *Botswana Multi-Topic Household Survey 2015/2016.* Statistics Botswana, Gaborone.

Taban, S. (2010). An Examinations of Governmental Spending Economic Growth Nexus for Turkey Using the Bound Test Approach. *International Research Journal of Finance and Economics,* 48, 184-193.

Taye, H. K. (2013). *Inflation Dynamics in Botswana and Bank of Botswana's Medium-Term Objective Range.* BIDPA Working paper 36. Botswana Institute for Development Policy Analysis (BIDPA), Gaborone.

World Bank. (2017). *World Development Indicators 2016.* World Bank, Washington, USA.

Wu, Y. (2007). Service Sector Growth in China and India: A Comparison. *China: An International Journal*, 5(1), 137-154.

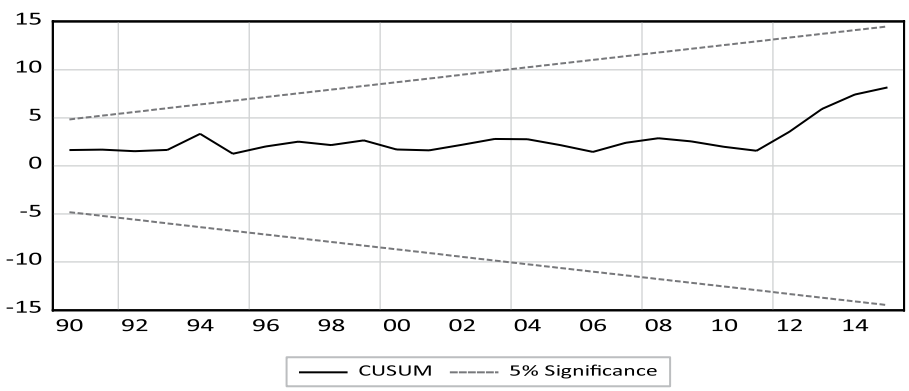
APPENDICES

Appendix 1: Diagnostics Tests for the short run Model

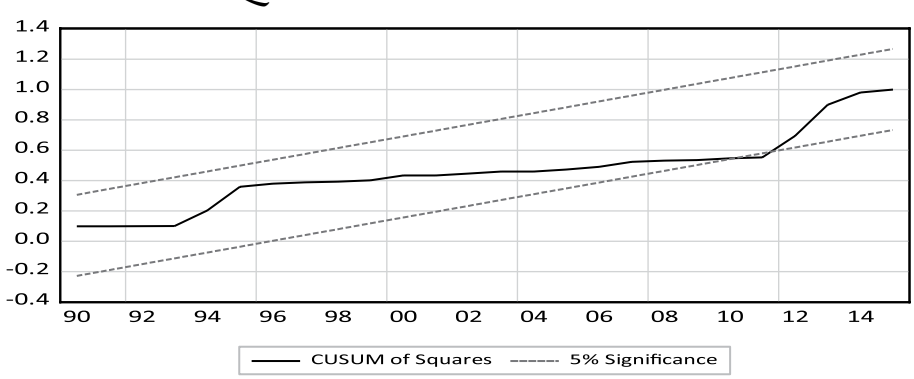
Diagnostic Test	P Value	Significance	Decision Rule	Conclusion
LM Serial Correlation H0: No Serial Correlation	0.345	@5%=0.05	Reject H0 if P > S	Cannot reject H0
Ramsey Reset Test H0: Model correctly specified	0.294	@5%=0.05	Reject H0 if P > S	Cannot reject H0
ARCH Heteroskedasticity H0:Homoskedasticity	0.232	@5%=0.05	Reject H0 if P > S	Cannot reject H0
White Heteroskedasticity H0: Homoskedasticity	0.899	@5%=0.05	Reject H0 if P > S	Cannot reject H0
Normal Distribution H0: Residuals normally distributed	0.579	@5%=0.05	Reject H0 if P > S	Cannot reject H0

Appendix 2: Stability Test

Plot of CUSUM Residuals



Plot of CUSUMSQ Residuals



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