Full Length Research Paper

Services sector and economic growth in Botswana

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This paper examines factors affecting services sector growth and development in Botswana. Using annual time series data from 1980 to 2015, the study employs the autoregressive distributed lag (ARDL) estimation technique to identify the factors that contribute to the services 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 services sector in Botswana. However, trade openness is found to negatively impact the growth of service sector. These results imply that in formulating service oriented policies, public policy should focus on factors that augment the growth and development of the services sector. It is also important for the banking sector to avail credit to the private sector as this is essential for the growth and development of the services sector.

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

INTRODUCTION

The services 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 (Government of Botswana, 2017).

The importance of the sector 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 overall increase in services sector output growth. This trend shows that the economy has considerably diversified overtime.

Excluding mining, the services 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 services 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.

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, 2017b).

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
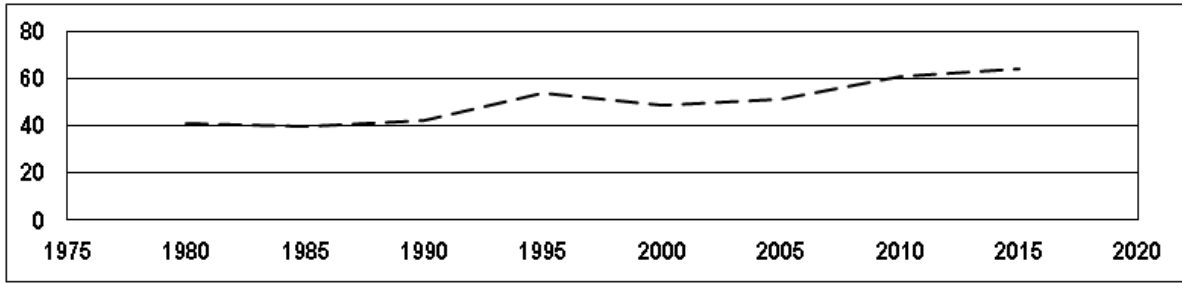
Figure 1. Percentage contribution of services sector to GDP (1980 – 2015). Source: Author computed from Statistics Botswana (2016a)
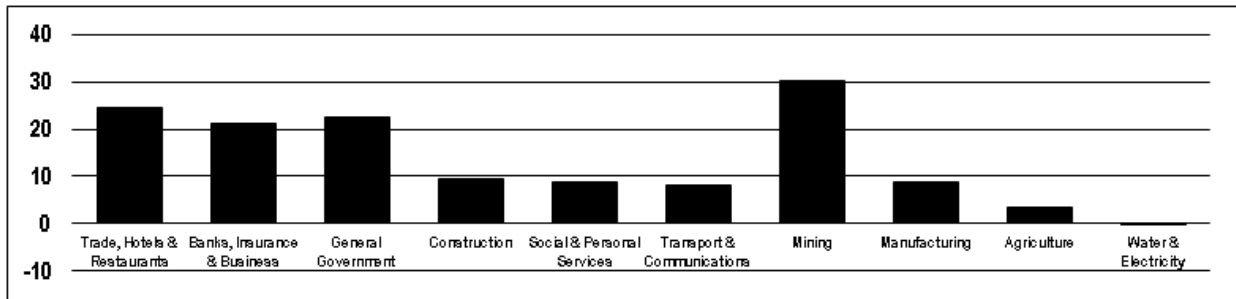

Figure 2. Sector's average contribution to GDP growth during NDP 10. Source: Author computed from Government of Botswana (2017)
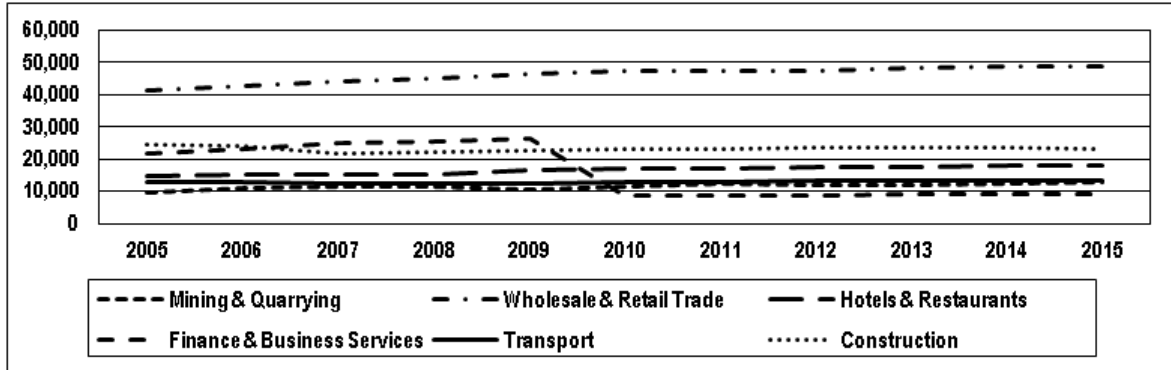

Figure 3. Estimated number of paid employees by sector, yearly averages (2005 – 2015). Source: Author computed from Statistics Botswana (2016b)

reduction in unemployment. Unemployment hit a record high of 26.2 percent in 2008 (Statistics Botswana, 2016a). 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 indicate that unemployment stands at 17.7 percent (Statistics Botswana, 2017a). 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.

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 services 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: Review of literature on determinants of services sector growth; Econometric methodology used; Results and Discussion; and then Conclusion which highlights the policy implications of the results.

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 services 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 liberalization 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 the main determinants of the 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 and 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 to

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 in the case of TVP approach while the relationship was insignificant in the case of ARDL estimation.

METHODOLOGY

Data: 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. 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.

The model: The paper employs the ARDL 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 Phillips 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 and Chai, 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).

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

$$\Delta \log(SER_t) = \partial_0 + \sum_{i=0}^{n} \alpha_{1i} \Delta \log(SER_{t-i}) + \sum_{i=0}^{n} \alpha_{2i} \Delta INF_{t-i}$$
$$+ \sum_{i=0}^{n} \alpha_{3i} \Delta \log(DCP_{t-i}) + \sum_{i=0}^{n} \alpha_{4i} \Delta FDI_{t-i}$$
$$+ \sum_{i=0}^{n} \alpha_{5i} \Delta \log(GNE_{t-i}) + \sum_{i=0}^{n} \alpha_{6i} \Delta \log(K_{t-i})$$
$$+ \sum_{i=0}^{n} \alpha_{7i} \Delta \log(TO_{t-i}) + \beta_1 \log(SER_t)$$
$$+ \beta_2 INF_t + \beta_3 \log(DCP_t)$$
$$+ \beta_4 FDI_t + \beta_5 \log(GNE_t) + \beta_6 \log(K_t) +$$
$$\beta_7 \log(TO_t) + \varepsilon_t \qquad (1)$$

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, $\alpha_i's$ depict the short run dynamics of the model, $\beta_i's$ show the long run association while t, ε, and 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 services 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 optimum lag length selected is 1 lag.

After determining the optimal lag length, the ARDL bounds test is conducted to establish whether the model 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.

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:

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

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.

Results and Discussions

Unit root test: We assess the stationary behaviour 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 1 and Table 2 respectively. Both the ADF and PP unit root results show that FDI and DCP are stationary at levels. SER, INF, GNE, K and TO are stationary after first difference.

The F-bounds test: Table 3 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 (9.432), 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 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.

Long run estimation: The long run estimates are provided in Table 4. The long run results are based on the ARDL estimation. The results show that in the long run, gross national expenditure and domestic credit to the private sector have a positive and significant impact on services sector output growth while trade openness has a negative and significant impact on services sector output growth. Ceteris paribus, a one percent increase in gross national expenditure will lead to 1.238 percent increase in services sector output growth while a one

Table 1. Augmented Dickey Fuller 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 2. Phillips-Perron 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	-5.887	I(1)
DCP	-0.491	-3.721	I(0)			
5% critical value	-2.948	-3.544		- 2.951	-3.548	

Table 3. 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		

Table 4. Long run model

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

percent increase in domestic credit to the private sector increases the services sector output growth by 0.319 percent. A one percentage increase in trade openness will lead to a decline in services sector output growth by

Table 5. 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

approximately 0.88 percent. Inflation, gross fixed capital formation and foreign direct investment were found to have no significant impact on service sector output growth in the long run.

Short Run Estimation: Table 5 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, domestic credit to the private sector and gross fixed capital formation have a positive and significant impact on services sector output growth. The results further show that trade openness has a negative and significant impact on services 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.

Trade openness was found to have 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 and foreign direct investment were found to have no significant impact on services sector output growth.
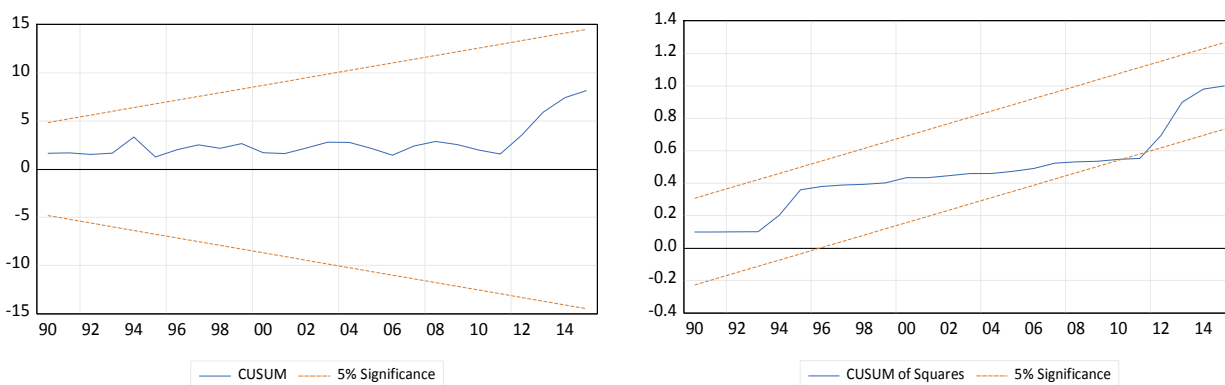
The results show that the error correction term (ECT(-1)) is negative and statistically significant at 1 percent level. This ensures that long run equilibrium can be attained. The coefficient of the ECT (-0.289) implies that about 29 percent of any deviation is corrected within the period. The adjusted R squared value of 0.766 implies that the ECM fits the data reasonably well.

Model Diagnostics: Diagnostic tests were performed on the estimated ECM to check its appropriateness and robustness. These test are carried out in order to avoid spurious estimation results. The results are provided in Table 6. The diagnostic test results show that there is no autocorrelation, 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 cumulative sum (CUSUM) and cumulative sum of squares (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 that 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 Figure 4. The results show that both the CUSUM and CUSUMSQ plots lie between the critical bounds. This implies that the model is stable.

Table 6. Diagnostics tests for the short run model

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

Figure 4. Plots of CUSUM and CUSUMSQ of residuals

CONCLUSIONS AND POLICY IMPLICATIONS

This paper identified 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.

Public policy should focus on factors that augment the growth of the 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. 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.

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