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The Nexus of Tourism and Economic Growth in Botswana During the Period Of 1995 – 2019

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Abstract

This study examined the casual linkages between tourism and economic growth in the Republic of Botswana from 1995 to 2019. This was inspired by the highly claimed potential of tourism on GDP, against a background where literature cautions that causal linkage relationships are not always direct and obvious, but rather country specific and most likely to change over time. Co-integration and Granger causality were used to assess the causal nexus between the variables. The findings supported a unidirectional causal relationship between GDP and tourism (GDP → TOR) as well as a long-run co-integration between tourism and economic growth. The study findings imply that the country's rich natural resources may be insufficient to propel tourism growth and drive GDP in the absence of a supportive economic environment. Therefore, the study suggests that efforts to support policy and investments should concentrate more on overall economic development than at tourism per se. This would create an environment conducive for attracting and retaining visitors to the country, and thus boost tourism.

Keywords: Growth-led tourism, Granger-causality, ARDL-bounds F-test, Botswana.

1. Introduction

Tourism is among the top three economic industries in the world in terms of foreign revenue production, accounting for 7% of total global exports (Van der Schyff, Meyer & Ferreira, 2019). Tourism development has become a vital aspect of most policymakers', governments', and private individuals'/institutions' macroeconomic aims (Roudi, Arasli & Akadiri, 2018). The literature demonstrates that tourism drives economic development and advancement for a country, particularly in developing nations (Kyara *et al*., 2021).

In the Republic of Botswana, tourism is identified as a growth engine, encompassing economic diversity, natural resource conservation, and local livelihood enhancement (Stone, Stone & Mbaiwa, 2017). Its tourism industry is currently centred on the country's natural resources (Molefe, 2021). The Chobe River Plains and the Okavango Delta are only two examples of the nation's many natural wonders and natural resource variety (Madigele, 2016). More than 70% of this flat country is made up of the Kalahari Desert (World Population Review, 2022). Due to the Okavango Delta's abundance of natural resources, which make it home to many tourism facilities, tourism is concentrated around it (Mogomotsi, 2019). Much of the tourism is nature based and takes place in game reserves, national parks and other protected areas, all of which are sites of biological variety, world-renowned wildlife and natural features, along with cultural attractions and beautiful scenery (Hottola, 2009). However, there appears to be a

disconnect between the tourism industry's significant presence in these areas and the people's profit from tourism (Mogomotsi, 2019). Poverty and unemployment persist in the country, particularly among the youth (Molokwane & Motsu, 2021; Diraditsile, 2021).

The association of economic growth and tourism is not always direct but multiple outcomes are possible. The question of unidirectional causation comes into play here, i.e., the issue of whether tourism leads to economic growth or the other way round. Bidirectional causation is also possible, in which there is a feedback loop in the causal relationship; and also of no causal relationship at all (Wu & Wu, 2019). Thus, a national evaluation of the dominant causal relationships is required. This is against a background where the link between tourism and economic growth may evolve over time. A thorough understanding of the prevailing causal relationship is needed so that governments and other role players may strategically target development efforts and thus promote the full realisation of the relationship's advantages (Rasool *et al*., 2021). The Republic of Botswana's empirical causal linkage between tourism and economic growth was therefore analysed in this study.

1.1 Problem Statement

There have been substantial global investigations regarding the tourism and economic growth causality aspect (Lopez & Arreola, 2019). The results from the investigations by Chatziantoniou *et al*. (2013) show that tourism-led growth hypothesis (TLGH), although popular, does not continually hold true throughout time and in different countries. Numerous studies have been drawn to these findings on the relationship of these variables in various nations which strive to comprehend the current causal relationships at the national level in order to improve the strategic targeting of development initiatives. According to Fayissa *et al*. (2008), despite high numbers in studies conducted globally, few are from Southern Africa, unfortunately. Yet speculation and optimism prevails about tourism's positive effects on the economic growth of Southern Africa. A need exists to uncover whether this optimism is justified and whether or not development efforts might be better targeted elsewhere. Given Botswana's diverse natural resources, tourists numbers and the popular tourism-led growth narrative it is possible to associate economic growth with tourism. The study therefore queried this popular narrative using data from 1995 to 2019 given that literature has shown that the relationship between tourism and economic growth is dynamic.

1.2 Objectives

To estimate the co-integration of tourism and economic growth the Republic of Botswana.

To examine the causal relationship between tourism and economic growth for the Republic of Botswana.

1.3 Hypothesis

H_1 : There is a co-integration of tourism and economic growth in the Republic of Botswana.

H_2 : Tourism Granger-causes GDP growth in the Republic of Botswana.

2. Literature review

This section presents tourism and economic growth literature for the Republic of Botswana. It also discussed, as suggested by literature, the nexus associated with tourism and economic growth.

2.1 Tourism and economic growth in Botswana

Figure 1 shows the tourism trends in the Republic of Botswana based on economic growth (GDP) and international tourism receipts. The international tourism receipts shows a general upward trend from 1995 to 2019. This rise can be attributed to national parks and game reserves' high value, low volume nature-based tourism, which occurs primarily in the northern area of the country (Molefe, 2021). This upward trend was interrupted in several years (1996; 2000; 2008; 2010; 2013 and 2016). According to Leechor (2002), the Republic of Botswana has seen a decrease in the number of tourists from the years 1999 to 2001, particularly from lucrative international tourism markets and this has significant implications for foreign exchange earnings, economic growth, and job creation, particularly given the fact that the trend is pronounced mostly in the holiday travel market segment which has high-revenue. Literature also states that the US dollar's weakening; Germany's slow recovery of its economic; Zimbabwe's political unrest; and the emphasis on "low volume-high cost" tourism, which has influenced the public's impression of Botswana as a pricey travel destination are just the few examples of the poor economic conditions in key markets that could be cited as causes for this declining trend from 1999 to 2001 (Leechor, 2002). The solely commodity-based economy of the Republic of Botswana was vulnerable during the 2007–2008 global economic recession (Mogomotsi, 2019) and this might have caused a decline in economic growth and tourism receipts. The reduction in diamond export demand, which resulted in job losses and decreased tax revenue, revealed the fragility of an economy dependent on a single product (Throup, 2011). Throughout the examined period, (1995 – 2019), the country's economic growth front has largely shown an upward trend, with sharp declines in the years 1998, 2001, 2009 and 2015. This trend might be because the economy is primarily dependent on the diamond industry, making it extremely vulnerable to external shocks caused by price changes (Phiri *et al*., 2022). Although not very pronounced, as tourism rises, GDP drops and vice versa (1998; 2001; 2008; 2009; 2015) a scenario that suggests no co-integration between tourism and GDP worth empirically testing, given the general positive upward trend of both tourism and GDP growth.

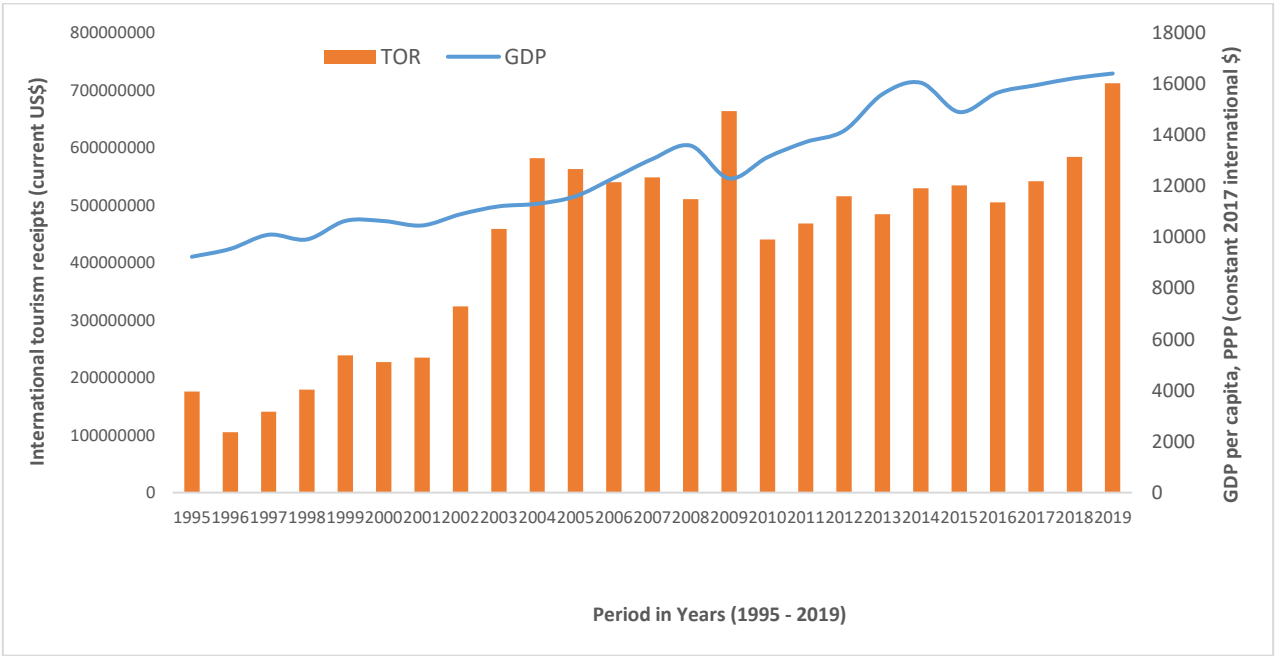

Figure 1: The economic growth (GDP) and international tourism receipts trends for Botswana (1995-2019)

Source: World Bank (2022)

2.2 The nexus between tourism and economic growth

Based on literature, this section discusses the nexus between tourism and economic growth. Four hypotheses are suggested by literature as follows; tourism-led growth, growth-led tourism hypothesis, feedback hypothesis and the neutral hypothesis.

The tourism-led growth hypothesis (TLGH) theory is by far the most comprehensive, prevalent, and vigorously defended in the literature (Badulescu *et al*., 2021). As its name suggests, it asserts that tourism spurs economic growth (Fuinhas *et al*., 2020; Kyara *et al*., 2021). It confirms a tourism to economic growth causal relationship that is unidirectional. The tourism sector can directly contribute to foreign exchange with the influx of foreign visitors and the development process is made easier by the expanding foreign exchange reserves (Holik, 2016). The theory also states that tourism supports economic growth through promoting investment and pushing local firms toward greater efficiency due to increased competition and it encourages investment in infrastructure and human capital because tourism generates positive economies of scale and a significant amount of human capital, it lowers production costs for local businesses (Fuinhas *et al*., 2020). Due to the possibility that the tourism sector could both directly and indirectly support economic growth, the TLGH theory has received attention from many economists (Holik, 2016). As far as the researcher can tell, most studies confirming the TLGH were done outside Africa with a small number from Northern Africa [Tang & Abosedra, 2016 (Morocco and Tunisia), Midoun & Nardjess, 2019 (North African Countries)] and one from Southern Africa [Kyara *et al*., 2021 (Tanzania)]. Given that most Southern African countries, the Republic of Botswana inclusive, employ tourism as a catalyst for economic expansion (Ploch & Cook, 2012; Mogomotsi, 2019; Molefe, 2021); more studies are required from this region to understand the causal linkage direction of tourism and economic growth. This will assist these countries to appropriately develop and implement enhancing support structures and investments based on the confirmed direction of the prevailing linkages.

The reverse hypothesis or the growth-led tourism hypothesis (GLTH) declares that the expansion of tourism is a result of economic growth (Kyara *et al*., 2021). Which implies that economic growth, infrastructural development, and political stability promote tourism development (Odhiambo & Nyasha, 2020). In other words, a decline in a country's economic performance can drastically lower tourism growth (Fuinhas *et al*., 2020). Several studies confirm this hypothesis but a few studies conducted in Africa support this association [Ahiawodzi, 2013 (Ghana); Nene & Taivan, 2017 (Sub Saharan Africa); Muzekenyi, Nheta & Tshipala, 2018 (South Africa); Bouzahzah & Menyari, 2013 (Morocco and Tunisia): Masvingise, Taruvinga & Gwala, 2023 (Madagascar)].

The feedback hypothesis proposes a reciprocal causal relationship between economic growth and tourism (Kyara *et al*., 2021). It is also known bi-directional (two-way) hypothesis, where it is anticipated that both economic growth and tourism will propel one another (Sokhanvar *et al*., 2018). It views tourism development and economic growth as strongly correlated and complimentary, giving each other mutual benefits. This relationship has been verified in Africa, specifically in South Africa by Odhiambo & Nyasha (2020) during the period of 1995 to 2016.

There is no causal relationship between economic growth and tourism, according to the neutral hypothesis (Oh, 2005). This implies that by promoting tourism, economic growth cannot be achieved, and also, changes in economic growth do not affect tourism (Sokhanvar *et al*., 2018). They are completely independent. This suggests that, for instance, efforts to grow the tourism industry (such as

investing) have no direct impact on the economy's expansion. In Africa, Pisa (2018) attested to this relationship in South Africa during the period of 1995 to 2015.

The literature that has been published thus far offers a variety of options (unidirectional, bidirectional, and neutral) regarding the relationship between tourism and economic growth. Therefore, in order to improve strategic targeting through investments and supporting policies, a clear understanding of the prevailing nexus is essential at the national level. The literature also shows that few studies have been done on the relationship between tourism and economic development in most African nations, particularly in Southern Africa. Despite this, tourism is still portrayed as a vital sector that can spur economic growth. In addition, literature is clear in that, over time the economic growth and tourism causal direction may change in a country. Thus far, to avoid errors of omission and commission in developing tourism and economic growth support mechanism at country level, background knowledge of the prevailing nexus is necessary. This is more relevant to Southern African countries (Botswana) with many natural resources they are currently using to promote economic growth under the banner of tourism.

3. Methodology

This chapter presents the study methods that were employed. It presents the analytical processes that were employed that include the unit root, co-integration and causality tests.

3.1 Co-integration method

Once stationarity is confirmed and the optimal lags have been established, an estimation of the long-run relationship should be done making use of the test for co-integration. An ARDL-bounds F-test was employed to estimate the tourism–economic growth co-integration. Because of the omission-of-variable bias commonly caused by the bivariate Granger-causality model (Odhiambo & Nyasha, 2020), exports of goods and services, or EXP and trade, or TRD were used as control variables. Equation 1 below shows the resultant multivariate Granger-causality model, as illustrated by Odhiambo & Nyasha (2020).

$$GDP = f(TOR, TRD, EXP) \quad (1)$$

Where:

- GDP = Gross Domestic Product;
- TOR = Tourism;
- TRD = Trade;
- EXP = Export of goods and services;

In accordance with Odhiambo & Nyasha (2020), the general co-integration model was thus expressed as a set of four co-integration equations 2–5.

$$\Delta GDP_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i}\, \Delta GDP_{t-i} + \sum_{i=0}^{n} \alpha_{2i}\, \Delta TOR_{t-i} + \sum_{i=0}^{n} \alpha_{3i}\, \Delta TRD_{t-i} + \sum_{i=0}^{n} \alpha_{4i}\, \Delta EXP_{t-i} + \alpha_5 GDP_{t-1} + \alpha_6 TOR_{t-1} + \alpha_7 TRD_{t-1} + \alpha_8 EXP_{t-1} + u_{1t} \quad (2)$$

$$\Delta TOR_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i}\, \Delta TOR_{t-i} + \sum_{i=0}^{n} \beta_{2i}\, \Delta GDP_{t-i} + \sum_{i=0}^{n} \beta_{3i}\, \Delta TRD_{t-i} + \sum_{i=0}^{n} \beta_{4i}\, \Delta EXP_{t-i} + \beta_5 TOR_{t-1} + \beta_6 GDP_{t-1} + \beta_7 TRD_{t-1} + \beta_8 EXP_{t-1} + u_{2t} \quad (3)$$

$$\Delta TRD_t = \pi_0 + \sum_{i=1}^{n} \pi_{1i}\, \Delta TRD_{t-i} + \sum_{i=0}^{n} \pi_{2i}\, \Delta GDP_{t-i} + \sum_{i=0}^{n} \pi_{3i}\, \Delta TOR_{t-i} + \sum_{i=0}^{n} \pi_{4i}\, \Delta EXP_{t-i} + \pi_5 TRD_{t-1} + \pi_6 GDP_{t-1} + \pi_7 TOR_{t-1} + \pi_8 EXP_{t-1} + u_{3t} \quad (4)$$

$$\Delta EXP_t = \rho_0 + \sum_{i=1}^{n} \rho_{1i}\, \Delta EXP_{t-i} + \sum_{i=0}^{n} \rho_{2i}\, \Delta GDP_{t-i} + \sum_{i=0}^{n} \rho_{3i}\, \Delta TOR_{t-i} + \sum_{i=0}^{n} \rho_{4i}\, \Delta TRD_{t-i} + \rho_5 EXP_{t-1} + \rho_6 GDP_{t-1} + \rho_7 TOR_{t-1} + \rho_8 TRD_{t-1} + u_{4t} \quad (5)$$

Where:

- GDP = Gross Domestic Product;
- TOR = Tourism;
- TRD = Trade;
- EXP = Export of goods and services;
- $\alpha_0, \beta_0, \pi_0, \rho_0$ = respective constants;
- $\alpha_1 - \alpha_4, \beta_1 - \beta_4, \pi_1 - \pi_4, \rho_1 - \rho_4$ = respective short-run coefficients;
- $\alpha_5 - \alpha_8, \beta_5 - \beta_8, \pi_5 - \pi_8, \rho_5 - \rho_8$ = respective long-run coefficients;
- Δ = difference operator;
- n = lag length;
- t = time period and
- μ_{it} = white-noise error terms.

3.2 Causality test

The ECM-based multivariate Granger-causality test was estimated in order to determine the causal relationship between economic growth and tourism growth, as well as its direction for functions that confirmed co-integration, along with an error-correction term. This test seeks to determine whether a variable's past values may be used to explain another variable's current values (Pinzon, 2018). Equations 6 to 9 illustrate the corresponding ECM-based multivariate Granger-causality models that were specified in accordance with Odhiambo & Nyasha (2020).

$$\Delta GDP_t = \alpha_0 + \sum_{i=0}^{n} \alpha_{1i}\, \Delta GDP_{t-i} + \sum_{i=0}^{n} \alpha_{2i}\, \Delta TOR_{t-i} + \sum_{i=0}^{n} \alpha_{3i}\, \Delta TRD_{t-i} + \sum_{i=0}^{n} \alpha_{4i}\, EXP_{t-i} + \delta_1 ECM_{t-1} + u_{1t} \quad (6)$$

$$\Delta TOR_t = \beta_0 + \sum_{i=0}^{n} \beta_{1i}\, \Delta TOR_{t-i} + \sum_{i=0}^{n} \beta_{2i}\, \Delta GDP_{t-i} + \sum_{i=0}^{n} \beta_{3i}\, \Delta TRD_{t-i} + \sum_{i=0}^{n} \beta_{4i}\, \Delta EXP_{t-i} + \delta_2 ECM_{t-1} + u_{2t} \quad (7)$$

$$\Delta TRD_t = \pi_0 + \sum_{i=0}^{n} \pi_{1i}\, \Delta TRD_{t-i} + \sum_{i=0}^{n} \pi_{2i}\, \Delta GDP_{t-i} + \sum_{i=0}^{n} \pi_{3i}\, \Delta TOR_{t-i} + \sum_{i=0}^{n} \pi_{4i}\, \Delta EXP_{t-i} + \delta_3 ECM_{t-1} + u_{3t} \quad (8)$$

$$\Delta EXP_t = \rho_0 + \sum_{i=0}^{n} \rho_{1i}\, \Delta EXP_{t-i} + \sum_{i=0}^{n} \rho_{2i}\, \Delta GDP_{t-i} + \sum_{i=0}^{n} \rho_{3i}\, \Delta TOR_{t-i} + \sum_{i=0}^{n} \rho_{4i}\, \Delta TRD_{t-i} + \delta_4 ECM_{t-1} + u_{4t} \quad (9)$$

Where:

ECM = error-correction term;

$\delta_1 - \delta_4$ = respective coefficients for the error-correction terms;

μ_{it} = mutually uncorrelated white-noise residuals.

Other variables and characters are as described in equations 2 – 5.

3.3 Diagnostics tests

To find out if the model fits the data reasonably, diagnostic tests are run (Gujarati & Porter, 2009). Serial correlation, heteroskedasticity (residual diagnostics) and stability (stability diagnostics) were tested on the models. Serial correlation tests whether the error term's successive values are temporarily independent (Abdulhafedh, 2017). The Breusch-Godfrey Serial Correlation LM Test was therefore used. According to Alaali (2020), if serial correlation exists on the error terms' values, there might be a problem of omitted variables in the regression model. For checking whether the regression model consistently predicts the variable that is dependent across all values of the explanatory variables, the heteroskedasticity test: Bresch-Pagan-Godfrey test was used (Khaled *et al.*, 2019). The CUSUMSQ

(Cumulative Sum of Square) test together with the CUSUM (Cumulative Sum) test were employed to determine structural breaks and the stability of parameters in the models for making long-run decisions (Kunwar, 2019). The model is assumed to be stable if the CUSUMSQ and CUSUM remain inside the 5% critical bounds.

3.4 Data sources

This study used annual time series data from 1995 to 2019. Economic growth was assessed using the variables GDP per capita, PPP (Constant 2017 International $), annual percentage growth in export of goods and services, and trade as a percentage of GDP. Tourism comprised the variable 'international tourism receipts' (in current US$). The World Banks's world development indicators database was used to obtain the data for all variables for the period 1995 to 2019. Statistical tests in the EView 11 statistical package were used for data analysis.

4. Results and Discussion

The study results are presented in this section. The results of the stationarity test are first shown, then the multivariate Granger-causality results and then the co-integration results. Lastly, the chapter presents the residual and stability diagnostics tests results.

4.1 Unit Root Test Results

Table 1 shows the stationarity test results for variables used.

Table 1: Stationarity tests for GDP, TOR, TRD and EXP

Variable	Test for unit root in level		Test for unit root in first difference	
	Intercept	Trend and intercept	Intercept	Trend and intercept
Augmented Dickey-Fuller (ADF)				
GDP	-0.514474	-3.379562	-5.670142***	-5.537556***
TOR	-1.025978	-1.939788	-5.517190***	-5.419943***
TRD	-1.743020	-1.719881	-3.107746**	-2.946090
EXP	-4.424804***	-4.429449**	-4.373719***	-4.211649**
Phillips-Perron (PP)				
GDP	-0.011838	-3.285577	-9.696514***	-10.09002***
TOR	-0.921301	-1.912665	-5.517190***	-5.427868***
TRD	-1.975131	-1.841905	-4.476694***	-4.500659***
EXP	-4.990322***	-4.930060***	-14.11023***	-13.75196***

Note: *** and ** denote stationarity at 1% and 5% significance levels. GDP – Gross Domestic Product, TOR – Tourism, TRD – Trade and EXP – Exports.

The results indicate that in first difference, GDP, TOR and TRD are stationary, but not in level, while both PP and ADF tests reveal EXP to be stationary in level. These findings mean that the integration of the variables is at different levels: I(1) and I(0).

4.2 Optimal Lag Determination Results

Table 2 shows the optimal lag determination results. The AIC has the lowest significant figure of 69.75632 at lag 1. This suggests that the best lag to choose is lag 1.

Table 2: The optimal lag determination

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-883.3503	NA	1.53e+27	73.94586	74.14220	73.99795
1	-817.0758	104.9346*	2.37e+25*	69.75632*	70.73803*	70.01677*

Where:

- *: indicates lag order selected by the criterion
- LR: sequential modified LR test statistic (each test at 5% level)
- FPE: Final prediction error
- AIC: Akaike information criterion
- SC: Schwarz information criterion
- HQ: Hannan-Quinn information criterion

4.3 Co-integration test results

Table 3 presents the ARDL-bounds F-test results.

Table 3: Autoregressive Distributed Lag (ARDL) bounds F-test for co-integration

Dependent variable	Function	F-statistic	Decision
1) GDP	F(GDP|TOR, TRD, EXP)	5.559724**	Co-integrated
2) TOR	F(TOR|GDP, TRD, EXP)	1.870977	Not co-integrated
3) TRD	F(TRD|GDP, TOR, EXP)	3.034622	Inconclusive
4) EXP	F(EXP|GDP, TOR, TRD)	11.94114***	Co-integrated

	1%		5%		10%	
F-statistic	I(0)	I(1)	1(0)	I(1)	I(0)	I(1)
	4.614	5.966	3.272	4.306	2.676	3.586

Note: *, ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively

Two co-integration vectors were verified, indicating that the variables in Models 1 and 4 have a long-run stable relationship. Findings indicate the convergence of the models in the long-run if shocks are introduced to the system. Therefore, the study accepts the null hypothesis that there is a co-integration of economic growth (GDP) and tourism (TOR) during the investigation period based on Models 1 and 4. The study therefore finds that economic growth (GDP) has a long-run relationship with tourism (TOR).

4.4 Causality Test Results

In this section, the study queried the relationships' stability and the direction in which the variables are causally related. Co-integration was confirmed for Models 1 and 4, as shown in Table 4, implying a stable relationship in the long-run. The results of the Error Correction Term (ECT) show evidence of long-run movement towards equilibrium among Model 1 variables (Coefficient =0.001281: *t-statistics* = -5.800945) and Model 4 (-1.189225: *t-statistics* = -8.588022) should shocks be implemented in the short-run. In the event of a short-run shock, Model 1 is predicted to adjust towards equilibrium in the long run at a rate of 0.13%, whereas Model 4 is predicted to adjust at a rate of 119%. Thus, these findings validate the existence of stable relationships, in the long-run, for the variables of Models 1 and 4, indicating possible causal relationships.

The results of the causality test are shown in Table 4 for the estimation of the causal relationship between tourism and economic growth.

Table 4: ECM-based Granger-causality test

Dependent variable	F – statistics [probability]				ECT_{t-1}
	ΔGDP_t	ΔTOR_t	ΔTRD_t	ΔEXP_t	[t-statistics]
Model 1:					
ΔGDP_t	-	3.16719* [0.0896]	0.20781 [0.6533]	0.80365 [0.3802]	-0.001281*** [-5.800945]
Model 2:					
ΔTOR_t	1.28149 [0.2704]	-	0.02125 [0.8855]	0.03117 [0.8616]	-
Model 3:					
ΔTRD_t	0.19945 [0.6597]	0.04994 [0.8253]	-	0.17140 [0.6831]	-
Model 4:					
ΔEXP_t	0.16969 [0.6846]	0.19959 [0.3388]	0.51495 [0.4809]	-	-1.189225*** [-8.588022]
Long run decisions	Model 1: Unidirectional Causation GDP → TOR (GDP Granger-cause TOR)				Significance level 10%

Note: *, ** and *** denote statistical significance at 10%, 5% and 1% levels, respectively

GDP → TOR (GDP Granger-cause TOR)

Results of causal links indicate the Granger-causality of tourism and GDP (3.16719: *p-value* = 0.0896) for Model 1 at 10% significance level. There is a verified causal relationship between GDP and tourism (GDP → TOR), supporting the GLTH. This suggests that more resources should be channelled into economic development (especially the country's leading development sectors like industry and the services sector) instead of the tourism industry. These findings demonstrate that economic growth (GDP) drives tourism growth (TOR) in the Republic of Botswana, and not the other way round, as normally suggested on various platforms. These findings align with the inferences made by Ahiawodzi

(2013) for Ghana, Bouzahzah & Menyari (2013) for Morocco and Tunisia, Muzekenyi, Nheta & Tshipala (2018) for South Africa and Masvingise *et al*., (2023) for Madagascar.

4.5 Residual Diagnostics

This section presents the results of the residual diagnostic tests, focusing on Model 1, which showed co-integration, statistically significant ECTs and Granger-causality for GDP and tourism.

Table 5: Serial correlation and heteroskedasticity tests results

Test	F-statistic	P-value
Serial correlation	2.592644	0.1248
Heteroskedasticity	2.570405	0.0712

Note: *, denote statistical significance at 5% level.

Using the Breusch-Godfrey Serial Correlation LM test, no serial correlations were found with respect to Model 1 (F-statistic: 2.592644: *p-value*: 0.1248) at a 5% significance level. These findings verify that Model 1 did not have any issues with omitted variables, since no serial correlations were detected (Alaali, 2020). Moreover, using the heteroskedasticity test, Breusch-Pagan-Godfrey test, at a 5% significance level, no heteroscedasticity was found in Model 1 (F-statistic: 2.570405: p-value: 0.0712). According to Khaled *et al*. (2019), the outcomes validate Model 1's capacity to consistently forecast the dependent variable's value across all explanatory variable values.

4.6 Stability diagnostics

The stability diagnostic test results are presented in this section. In the models, structural breaks and the stability of parameters were estimated employing the CUSUMSQ and CUSUM tests, as summarised in Figures 2 and 3, for Model 1. At 5% significance level, neither CUSUMSQ nor CUSUM plots (see the blue lines in Figures 2 and 3) crossed the critical bounds (the red lines), indicating no significant structural instability. Therefore, there is substantial evidence to support the estimated first model's validity and stability for long-term decision-making (Kunwar, 2019). As a result, the outcomes may have an impact on policy.

Figures 2 and 3 present the CUSUM and CUSUMSQ plots.

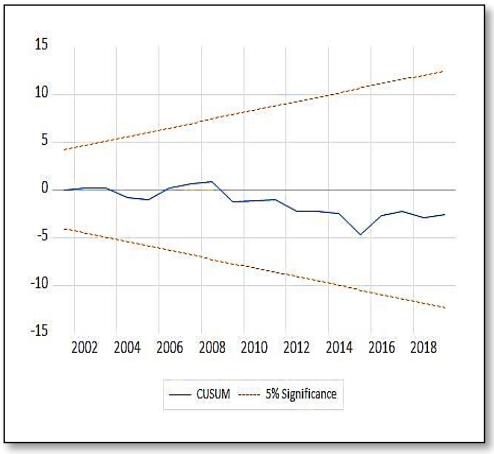

Figure 2: Plot of CUSUM, Model 1

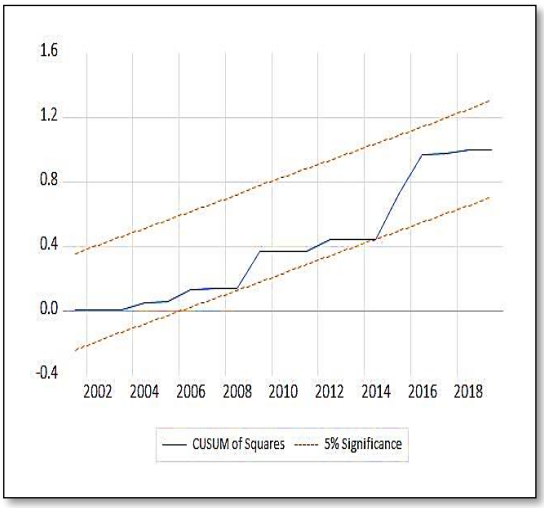

Figure 3: Plot of CUSUMSQ, Model 1

Thus, the results of the residual and stability diagnostics show that Model 1 is reliable and appropriate for using in long-term decision-making.

5. Conclusion and policy insights

Co-integration and Granger-causality tests were used in the study to investigate the causal relationships between tourism and economic growth in the Republic of Botswana. The ARDL-bounds F-test confirmed a strong and consistent long-run correlation between tourism and economic growth during the studied period (1995–2019). This relationship was further confirmed by the ECM results, revealing that even if short-run shocks are introduced, the stable long-run relationship of the variables would return, over time, to long-run equilibrium. The ECM-based multivariate Granger-causality test confirmed a unidirectional causation that runs from economic growth to tourism. This study therefore concludes that tourism growth for the country does not Granger-cause economic growth during the studied period; rather, economic growth Granger-cause tourism growth. Results confirm the growth-led tourism hypothesis, in contrast to the widely accepted narrative of tourism-led growth that stakeholders frequently promote.

These findings imply that, the nation's development-leading industries should receive more funding, investments, and assistance in order to promote economic growth. The country should also focus efforts on developing and maintaining its physical infrastructure in order to sustain all sectors of the economy, tourism included. Moreover, the country need to promote socio-economic and political stability to create the kind of environment that attracts tourists and propels tourism growth. The study therefore argues that, although the tourism industry in Botswana is diverse, unique and promising, it is unlikely to make an appreciable difference to economic growth at the scale needed until and unless a supportive economic environment is created to sustain it. Attractive natural features alone are insufficient to support tourism on their own. What is needed is a good, regularly maintained physical infrastructure, sound governance practices, good economic policies and political stability. These will assist to connect tourists to the diverse and unique natural resources of this country.

Disclosure statement

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