



Business & Social Science
IJRBS

Research in Business & Social Science

IJRBS VOL 13 NO 5 (2024) ISSN: 2147-4478

Available online at www.ssbfnct.com

Journal homepage: <https://www.ssbfnct.com/ojs/index.php/ijrbs>

Cointegrating and causality relationship between exports and economic growth: case for Botswana

Oscar Chiwira ^{(a)*} Lovemore Muchingami ^(b) Lawrence Jambani ^(c)



^(a,b,c) Faculty of Commerce, BA ISAGO University, Gaborone, Botswana

ARTICLE INFO

Article history:

Received 12 May 2024

Received in rev. form 22 June 2024

Accepted 23 July 2024

Keywords:

ARDL; Cointegration; Economic growth; Exports; Botswana

JEL Classification:

B26, G18, G21

ABSTRACT

The study employed the Autoregressive Distributed Lag (ARDL) Bounds model to test for cointegration and the Toda and Yamamoto and Dolado and Lütkepohl (TYDL) model to examine the direction of causality between exports and economic growth for Botswana covering the period 1980 to 2021. Exports statistically positively affect economic growth both in the short-run and long-run and trade openness is detrimental to economic growth both in the short-run and long-run. Economic growth promotes exports both in the short-run and long-run. Economic growth granger causes exports and indirectly influences exports through trade openness and consumer price index. Furthermore, there exists bidirectional causality between economic growth and the consumer price index. The findings underscore the importance of maintaining a healthy and stable macroeconomic environment in Botswana. In addition, a well-rounded approach that considers both export-oriented industrialization and import substitution strategies remains essential for a robust economic growth trajectory.

© 2024 by the authors. Licensee SSBFNET, Istanbul, Turkey. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).

Introduction

The Export-Led Growth (ELG) hypothesis has stood as a prominent theory in international economics, particularly gaining significance in developing nations (Odhiambo, 2022; North, 1955; Emery, 1967; Maizel, Campbell-Boross & Rayment, 1968). This hypothesis posits that a rising Gross Domestic Product (GDP) often correlate with increased export levels and the interplay stimulates economic growth in developing countries by bolstering foreign exchange earnings, fostering industrialization, and elevating productivity through the transfer of knowledge and technology (Ee, 2016; Kalaitzi & Chamberlain, 2021). Given that Botswana is a nation in search of an ideal economic blueprint, the specific objectives of this paper are to examine the relationship between exports and economic growth, exploring its feasibility as one of the anchor strategies to nudge the Botswana economy from the doldrums, taking advantages of opportunists from regional and international trade agreements.

Botswana has emerged as one of Africa's brightest economic prospects, evolving into an upper middle-income economy through sustained positive economic growth (African Development Bank (AfDB), 2023). This growth is anchored on prudent macroeconomic policies and robust economic institutions, particularly in managing diamond revenue (International Monetary Fund (IMF), 2023; World Bank, 2023; AfDB, 2023). Since independence in 1966, Botswana experienced remarkable economic growth, averaging over 9% annually until 1999, leading to the fastest per capita income growth globally (International Monetary Fund (IMF), 2023). Botswana's GDP is primarily composed of services (59.5%), industry (29.3%), and agriculture (2%), showcasing a diversified economy with a significant contribution from the services sector (IMF, 2023).

Botswana's economic landscape has been significantly shaped by its reliance on diamonds which are mainly exported.

* Corresponding author. ORCID ID: 0000-0001-6863-9458

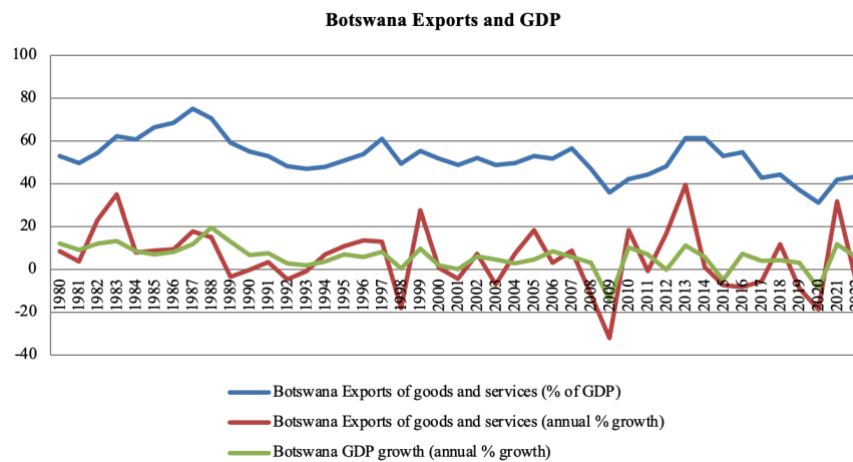


Figure 1: Botswana Exports and GDP; *Source:* World Bank (2023)

The growth rates for both the country's exports and GDP generally mimic each other, possibly suggesting a long-run relationship between these two variables. This is so due to Botswana's exports contribution averaging around 50% of its GDP from 1980 up to before Covid 19 pandemic in line with the dynamic effects as found by Malefane, (2020) and Jordaan & Eita (2009), considering the impact of trade openness on economic growth in Botswana.

With diamonds constituting over 90% of total exports and a major source of fiscal revenues, this poses a sustainability challenge (World Bank, 2023). Botswana has made efforts to diversify its economy, seeking to reduce dependency on diamonds and encouraging growth across various sectors, reflecting a commitment to sustainable development which is a direct response to a period of stagnation in the early 21st century (Fitch Solutions, 2024). Recent trends indicate a slowing economic growth influenced by factors like the 2020 contraction due to the COVID-19 pandemic and ongoing diversification efforts (Band of Botswana (BoB), 2022; World Bank, 2024). Botswana has undergone a transition in trade policies, evolving from import substitution industrialization strategy to the export-led growth strategy (Malefane & Odhiambo, 2016). Key policies supporting this shift include Botswana Exporter Development Programme; a significant initiative aiming at export-led growth, aligning with Vision 2036 and the National Development Plan 11 (NDP11) (United Nations Development Programme (UNDP), 2020). Botswana received an \$80 million credit line from the AfDB to foster industrialization, focusing on economic diversification through sectors like parts manufacturing and agricultural processing (AfDB, 2019).

Further initiatives and structural transformation and diversification efforts include an in-principal sales agreement with De Beers to expand the diamond value chain domestically (IMF, 2024). The belief in industrialization as a catalyst for long-term growth compared to resource-based economies is reflected in Botswana's focus on industrial development strategy crafted and pursued since the turn of the millennium (Sekwati, 2010). The creation of a "Diamonds for Development" Fund, with gradual investments of 10billion Pula (\$750 million) over the next decade, aims to boost economic diversification into non-mining sectors like agriculture, solar, climate change, and tourism (Mmmegi Online, 2023).

The Botswana's trade initiatives, like Botswana Exporter Development Programme is intended to align with the African Continental Free Trade Area (AfCFTA). The AfCFTA is expected to provide Botswana with improved market access to a larger African market, fostering trade opportunities and enhancing economic prospects (United Nations Economic Commission for Africa (UNECA), 2023; World Trade Organisation (WTO), 2023). By reducing trade barriers, the AfCFTA is expected to encourage intra-Africa trade, allowing Botswana to diversify its export destinations and strengthen economic ties with other African nations (Abrego *et al.*, 2020; World Bank, 2022). The AfCFTA is expected to promote deeper economic integration, attracting investment, boosting trade, and potentially leading to better job opportunities and poverty reduction in Botswana (WTO, 2023).

Full implementation of the AfCFTA agreement is estimated to increase Botswana's GDP by more than 5.4% by 2035 and export earnings by 37% through initiatives like the Youth in Trade Challenge propelled by AfCFTA which can contribute to youth-led economic integration, and thus fostering innovation and growth (UNECA, 2023). Through its membership to both the Southern Africa Customs Union (SACU) and the Southern Africa Development Community (SADC), Botswana is implementing regional economic integration programmes that contribute to the attainment of Africa-wide continental agendas and programmes (UNECA, 2023).

The study consists of 5 sections. Section 1 provides the background and motivation of the study; Section 2 covers the review of related literature; Section 3 outlines the methodology; Section 4 presents the empirical findings and the analysis of the results; Section 5 concludes the main findings of the study and provides recommendations as well as policy implications.

Literature Review

The development and growth literature has shown links between export and economic growth and that several countries have sustainable economic growth as one of their top priorities (Tivatyi, Shou & N'Souvi, 2022; Sulaiman & Saad, 2009). The growth of goods and services' accessibility is a central theme in theories of economic development (Solow, 1957). Higher productivity is explained by several factors, including technological improvements, healthy labor markets, and/or suitable access to resources and capital, which reflects some of the theories of economic growth (Sulaiman & Saad, 2009).

Heckscher-Ohlin theory (Heckscher, 1919; Ohlin, 1933), a neo-classical theory, states that when factor endowment gaps widen, trade between countries rises. A country exports the items that make the most use of its vast production resources. Trade will help with the relative abundance of resources. In the trade equilibrium, relative factor prices are the same in all countries (Lam, 2015; Vijayasri, 2013; Jones, 2008; Herzer, 2007). Following the neo-classical theories, modern/contemporary theories of economic growth observe economic growth as the long-term expansion of an economy's capacity for production and the diversification of the products and services it generates because of advances in technology, alterations in human behavior, and the development of social ideologies (Romer, 1990). Economic growth can occasionally rise while exports can fall due to an increase in domestic demand for both exportable and non-tradable items (Helpman & Krugman, 1985).

The Growth-Oriented Exports (GOE) hypothesis held that increased economic growth promotes productivity gains, eases the adoption of new technologies, and eventually boosts exports by giving the nation a competitive edge in global marketplaces (Konya, 2006; Giles and Williams, 2010). Conversely, the ELG hypothesis propounded that increasing exports can, among other things, cause a nation's export items to become more specialized, which could raise the nation's productivity level and ultimately result in production growth. In addition, an export-led growth strategy may also enable access to advanced technology, learning by doing gains and better management techniques, which may lead to further efficiency benefits (Odhiambo, 2022; Ee, 2016; Tang *et al.*, 2015; Rani and Kumar, 2018; Thornton, 1997).

Empirical Literature Review

Thornton (1997), using Granger Causality tests, examined the connection between economic expansion and exports in Germany, Denmark, England, Sweden, Italy, and Norway throughout the second half of the 1800s and the First World War. The study discovered that there was a causal relationship between economic growth and exports. Ee (2015) validated the ELG hypothesis considering some selected sub-Saharan African (SSA) countries from 1985 to 2014. Using the Johansen Cointegration model, Gokmenoglu, Sehnaza, and Taspinara (2015) validated the ELG hypothesis, considering Costa Rica. Yilmaz and Sensoy (2022), considering Turkey, found a long-term relationship between economic growth and exports using the ARDL Bounds test technique. Chiwira, Muchingami and Jambani (2023), using the panel data covering the period 1980 - 2021 and employing the ARDL Bounds test to test for cointegration relationships, concluded that exports positively support economic growth both in the short-run and in the long-run in Southern Africa Customs Union (SACU). The study also established a long-run bidirectional causality between exports and economic growth.

Thornton's (1997), considering Germany, Denmark, England, Sweden, Italy, and Norway found a unidirectional causal relationship from exports and economic growth. This was supported by the study of Hüseyini (2017). In the same vein, Uysal and Sat (2019) discovered that there was a unidirectional causal relationship from GDP to Exports for Russian economy between 2003 and 2018. Yilmaz and Sensoy (2022), using the Toda-Yamamoto causality model, found unidirectional causality from GDP to Export. Studies by Oxley (1993), Cetintas and Barisik (2009), Abbas (2012), Igbal *et al.*, (2012), Shihab *et al.*, (2014), Bonga *et al.*, (2015), Gokmenoglu *et al.*, (2015), Popovici and Calin (2016) support the unidirectional causal relationship from economic growth to exports.

Mehta (2015) examined the relationship between exports, imports, and economic growth in India (1976–2014) using annual data. The findings indicated a long-term co-integrating relationship between India's GDP, exports, and imports using the Vector Error Correction Model (VECM), Granger causality tests, and Engle Granger Cointegration models. The Granger causality tests reveal no causality between Exports and GDP. Darrat (1986) examined the economies of Hong Kong, South Korea, Singapore, and Taiwan, the study revealed no causality between EGD and Exports.

Considering Turkey, over a period of 1999 – 2013, Saglam and Egeci's (2015), the study revealed a bidirectional causality between economic growth and exports. Mensah and Okyere (2020) conducted a study in Ghana which demonstrated the presence of long-term linkages, bi-directional causality between GDP and Exports and a swift return to equilibrium. Bakari (2021) employed the panel Generalized Method of Moments (GMM) model, panel Toda-Yamamoto Causality Tests, and panel Pairwise Granger Causality Tests, and found a bidirectional causality relationship between exports and economic growth. Odhiambo (2022) concluded that while there do not exist a long-term relationship between exports and economic growth. Neither middle-income nor low-income countries have demonstrated an export-led growth response. Rather, the study found evidence of bidirectional causality and neutrality response in low-income and middle-income countries, respectively. Some studies that support the bidirectional/two-way causality are by Panas and Vamvoukas (2002), Elbeydi *et al.*, 2010, Saleem and Sial (2015), Gokmenoglu, Sehnaza, and Taspinara (2015), Sunde (2017), Guntukula (2018), Kalaitzi and Cleve (2018), Dinç and Gökmen (2019).

Even though many empirical studies have been conducted in both developed and developing countries to examine the relationship between exports and economic growth, findings of these studies are frequently inconsistent and inconclusive. This study aims to contribute to the existing academic discourse with the purpose of establishing whether there is a relationship between economic growth and exports in the context of Botswana.

Methodology

The study used the Fisher ($\hat{\alpha}$) panel unit root test by Maddala and Wu (1999) to examine the null hypothesis of non-stationarity against the alternative hypothesis that the series was stationary. The ARDL technique was used to test for both the long-run and short-run relationships and the Toda and Yamamoto (1995) and Dolado and Lütkepohl (1996) (TYDL) to test for causality.

ARDL bounds testing method.

The ARDL bounds technique promulgated by Pesaran and Shin (1999) and extended by Pesaran *et al.*, (2001) was used due to its numerous advantages compared to other cointegration techniques like Johansen and Juselius (1990) and Engle and Granger (1987). Some of the advantages of the ARDL bounds technique are that it is relatively more efficient in either small or large sample sizes and, even in the presence of endogeneity, it yields unbiased results (Harris and Sollis, 2003).

The ARDL bound testing for Exports (EXP) and Economic Growth (Y) along with other variables (Z) was specified as follows:

$$\ln EXP_{it} = \hat{\alpha}_0 + \hat{\alpha}_1 \ln EXP_{i,t-1} + \hat{\alpha}_2 \ln Y_{i,t-1} + \hat{\alpha}_3 \ln Z_{i,t-1} + \sum_{j=1}^p \hat{\alpha}_{1j} \Delta \ln EXP_{i,t-j} + \sum_{j=0}^{q_1} \hat{\alpha}_{2j} \Delta \ln Y_{i,t-j} + \sum_{j=0}^{q_2} \hat{\alpha}_{3j} \Delta \ln Z_{i,t-j} + \delta_{it} \tag{1}$$

$$\Delta \ln Y_{it} = \hat{\alpha}_0 + \hat{\alpha}_1 \ln Y_{i,t-1} + \hat{\alpha}_2 \ln EXP_{i,t-1} + \hat{\alpha}_3 \ln Z_{i,t-1} + \sum_{j=1}^p \hat{\alpha}_{1j} \Delta \ln Y_{i,t-j} + \sum_{j=0}^{q_1} \hat{\alpha}_{2j} \Delta \ln EXP_{i,t-j} + \sum_{j=0}^{q_2} \hat{\alpha}_{3j} \Delta \ln Z_{i,t-j} + \vartheta_{it} \tag{2}$$

Where, $\hat{\alpha}_0$ and $\hat{\alpha}_0$ are intercepts in equations (1 and 2). δ_t , and ϑ_t are the error terms for $\hat{\alpha}_1$, $\hat{\alpha}_2$ and $\hat{\alpha}_3$; $\hat{\alpha}_1$, $\hat{\alpha}_2$ and $\hat{\alpha}_3$ which are related to the long-run coefficients, Δ is the first-difference operator and p 's and q 's are optimal lag length. It means that the models can either take the same or different lag length for the variables. The Z 's variables represent the control variables.

The long-run ARDL coefficients are obtained by estimating equations 3 and 4.

$$\ln EXP_{it} = \hat{\alpha}_0 + \sum_{j=1}^p \hat{\alpha}_{1j} \ln EXP_{i,t-j} + \sum_{j=0}^{q_1} \hat{\alpha}_{2j} \ln Y_{i,t-j} + \sum_{j=0}^{q_2} \hat{\alpha}_{3j} \ln Z_{i,t-j} + \delta_{it} \tag{3}$$

$$\ln Y_{it} = \hat{\alpha}_0 + \sum_{j=1}^p \hat{\alpha}_{1j} \ln Y_{i,t-j} + \sum_{j=0}^{q_1} \hat{\alpha}_{2j} \ln EXP_{i,t-j} + \sum_{j=0}^{q_2} \hat{\alpha}_{3j} \ln Z_{i,t-j} + \vartheta_{it} \tag{4}$$

The short-run dynamic parameters are obtained by estimating the error-correction-models specified as.

$$\Delta \ln EXP_{it} = \delta + \sum_{j=1}^p \hat{\alpha}_{1j} \Delta \ln EXP_{i,t-j} + \sum_{j=0}^{q_1} \hat{\alpha}_{2j} \Delta \ln Y_{i,t-j} + \sum_{j=0}^{q_2} \hat{\alpha}_{3j} \Delta \ln Z_{i,t-j} + \hat{\alpha}ECM_{i,t-1} + \delta_{it} \tag{5}$$

$$\Delta \ln Y_{it} = \delta + \sum_{j=1}^p \hat{\alpha}_{1j} \Delta \ln Y_{i,t-j} + \sum_{j=0}^{q_1} \hat{\alpha}_{2j} \Delta \ln EXP_{i,t-j} + \sum_{j=0}^{q_2} \hat{\alpha}_{3j} \Delta \ln Z_{i,t-j} + \partial ECM_{i,t-1} + \delta_{it} \tag{6}$$

In equations 5 and 6, $\hat{\alpha}_i$'s and $\hat{\delta}_i$'s are short-run dynamic coefficients of the model and $\bar{\alpha}$ and $\bar{\delta}$ are associated with error-correction terms lagged once for exports and economic growth models, respectively.

The next section presents the Toda and Yamamoto (1995) and Dolado and Lütkepohl (1996) (hence, TYDL) test for causality.

Multivariate TYDL Test for Causality

Toda and Yamamoto (1995), Zapata and Rambaldi (1997) and Gujarati (1995) argued that the use of F-statistic for the causality test in Vector Error-Correction Model (VECM) and Error-Correction Model (ECM) are not valid if variables were integrated and co-integrated. Due to the problems associated with VECM, ECM and VAR models, the current study adopted a more flexible and efficient Granger causality test developed by Toda and Yamamoto (1995) and Dolado and Lütkepohl (1996).

The TYDL is specified as follows:

$$\begin{aligned} \ln EX_{it} = & \hat{\alpha}_{10} + \sum_{j=1}^k \hat{\alpha}_{11,j} \ln EX_{i,t-j} + \sum_{j=1}^k \hat{\alpha}_{12,j} \ln Y_{i,t-j} + \sum_{j=1}^k \hat{\alpha}_{13,j} \ln Z_{i,t-j} + \sum_{j=k+1}^{k+dmax} \hat{\alpha}_{11,j} \ln EX_{i,t-j} + \sum_{j=k+1}^{k+dmax} \hat{\alpha}_{12,j} \ln Y_{i,t-j} \\ & + \sum_{j=k+1}^{k+dmax} \hat{\alpha}_{13,j} \ln Z_{i,t-j} + \lambda_{1i,t} \end{aligned} \tag{7}$$

$$\begin{aligned} \ln Y_{it} = & \hat{\alpha}_{20} + \sum_{j=1}^k \hat{\alpha}_{21,j} \ln Y + \sum_{j=1}^k \hat{\alpha}_{22,j} \ln FX_{i,t-j} + \sum_{j=1}^k \hat{\alpha}_{23,j} \ln Z_{i,t-j} + \sum_{j=k+1}^{k+dmax} \hat{\alpha}_{21,j} \ln Y_{i,t-j} + \sum_{j=k+1}^{k+dmax} \hat{\alpha}_{22,j} \ln FX_{i,t-j} \\ & + \sum_{j=k+1}^{k+dmax} \hat{\alpha}_{23,j} \ln Z_{i,t-j} + \lambda_{4i,t} \end{aligned} \tag{8}$$

This TYDL technique uses a modified Wald statistic in testing for the significance of the parameters of a VAR model. The modified Wald statistic is valid regardless of whether the variables are I(0), I(1), fractional co-integrated, co-integrated or not-co-integrated.

The next sub-section presents data, data source and variable description.

Data and Variable Description

The study covered a period of 1980 to 2021.

Real Gross Domestic Product (RGDP) growth rate was used to proxy Economic growth to control for inflation and also to obtain more superior estimations (Ariuna and Gibson, 2016; Altaee and Ai-Jafari, 2015; Araç and Özcan, 2014).

Exports (EX) is measured by total exports as a percentage of GDP. This approach was also considered by Odhiambo (2022) and Egbetunde and Akinlo (2014). A set of control variables, conventional variables in the endogenous models of economic growth, is included to account for other factors that are likely to influence economic growth. These include Gross Fixed Capital Formation (GFCF) as a percentage of GDP, Trade Openness (TOP) and Consumer Price Index (CPI) (Akimov, Wijeweera and Dollery, 2009). GFCF is the outlays in addition to fixed assets plus changes to the level of stock or inventories. GFCF supports investment and eventually promotes economic growth (Solow 1956; Hicks, 1969). Through higher competition, technological progress (Romer, 1986), promotes allocative efficiency in line with comparative advantages (Solow, 1956). Inflation reflects the effectiveness of the monetary policy and can affect growth through its influence on investment and savings decisions by households and firms. There could be three possible dimensions of the relationship between inflation and growth: a lack of a robust relationship (Sidrauski, 1967), a positive relationship (Mundell, 1963; Tobin, 1965) and perhaps an adverse relationship between these two variables (Brock, 1974; Stockman, 1981).

Data was obtained from the World Bank’s World Development Indicators (WDI).

Table 1: ARDL Bounds F-Test for Cointegration.

Models	Model 1: Dependent variable is LNRGDP		Model 2: Dependent variable is LNEXP	
Regressor				
Optimal Structure	lag	(1,1,1,1,1)	(1,1,1,1,1)	
F-statistics	5.024086		2.792585	
Significant level	Pesaran <i>et al.</i> , (2001), p. 300 Critical values: Restricted intercept and no trend, K=4		Pesaran <i>et al.</i> , (2001), p. 300 Critical values: Restricted intercept and no trend, K=4	
	Lower bounds I(0)		Upper bounds I(1)	Lower bounds I(0)
1 per cent level	3.29		4.37	3.29
5 per cent level	2.56		3.49	2.56
10 per cent level	2.20		3.09	2.20

The 1%, 5% and 10% significant are represented as ***, ** and * respectively.

Empirical Results and Analysis

ADF-Fisher panel unit root test

The ADF-Fisher test results show mixed order of integration, I(0) and I(1), for economic growth, exports and the control variables. The mixed order of integration justifies the use of the ARDL model. The ARDL approach is only applicable for the analysis of variables that are integrated of an order not more than one. Therefore, given the confirmation of the order of integration to be at most 1, the next section presents the ARDL bounds test for cointegration to check for both the long-run and the short-run relationships.

ARDL bounce test for cointegration approach.

Table 1 gives the empirical results of the ARDL bounds test for cointegration whilst Table 2 gives the estimated short-run and long-run coefficients. The respective diagnostic tests are presented in both tables. There are two models estimated: Model 1 and Model 2 with dependent variables of economic growth and exports respectively.

The results indicate that the computed F-statistics, using the Wald test, are greater than the upper critical bound at the 5% level of significance for both models and all categories. Thus, there is evidence for the existence of a long-run relationship between economic growth and exports along with some selected macroeconomic variables.

Table 2: Estimated Long-Run and Short-Run Coefficients

Panel A: Long-run coefficients:		
Models	Model 1 (dependent variable is LNRGDP)	Model 2 (dependent variable is LN(EXP))
Optimal lag Structure	ARDL(1,1,1,1) based on AIC	ARDL(1,1,1,1) based on AIC
LNEXP	1.554972***	
LNRGDP		0.583447***
LNTOP	-1.473913***	1.014373***
LNGFCF	0.904872***	-0.628915***
LNCPI	0.608036***	-0.380609***
C	18.25196***	-10.50614***
Panel B: Short-run coefficients		
Models	Model 1 (dependent variable is Δ LNRGDP)	Model 2 (dependent variable is Δ LNFX)
Δ LNEXP	0.480471***	
Δ LNRGDP		0.971232***
Δ LNTOP	-0.325268***	1.038873***
Δ LNGFCF	0.168848**	-0.474626***
Δ LNCPI	0.250292***	-0.609558***
ECM(-1)	-0.306077***	-0.625010***
Diagnostic tests	Statistics	Statistics
R-square	0.725901	0.889483
Adjusted - R-square	0.695446	0.877203
F-statistics		
DW Statistic	1.934717	1.704055
Effects Specification: Ramsey RESET Test		
t-statistic	0.237050 (0.8142)	0.327952(0.7936)
F-statistic	0.056193 (0.8142)	0.074829 (0.7936)

The 1%, 5% and 10% significant are represented as ***, ** and * respectively.

Table 2 Panel A shows the long-run results while Panel B gives the short-run results. Considering Model 1, exports statistically positively affect economic growth both in the short-run and long-run. The result is in line with the findings of Yilmaz and Sensoy (2022) and Chiwira, Muchingami and Jambani (2023). However, Trade Openness is detrimental to economic growth both in the short-run and long-run. Possible implication could be the negative impact of imports to economic growth prospects of Botswana. The CPI has a positive and statistically significant effect on economic growth. Thus, macroeconomic stability positively affects economic growth. This could also suggest the existence of a maximum threshold beyond which inflation begins to negatively affect economic growth. The GFCF is important and necessary as a driver of economic growth, both in the short-run and long-run.

Model 2, economic growth propels exports in both the short-run and the long-run. The result is in line with the findings by Kurniawan and A'yun (2021). This could suggest a bidirectional causal relation between economic growth and exports.

The error correction terms (ECM (-1)) of -0.306077 and -0.625010 for models 1 and model 2 respectively are negative and significant as expected, thus validating the existence of a long-run relationship between all the variables in the estimated models as well as a long-run bidirectional causality between exports and economic growth. This implies that shocks or disequilibrium from the previous year converges back to the long-run equilibrium path in the current year.

The regression for the underlying ARDL models for all categories fits well as indicated by the statistically significant F-statistics at 1% level of significance. The fact that the overall fit of the models are significant implies that the models can be used for meaningful inferences. The Durbin-Watson test shows that the variables in the models are free of autocorrelation; that is the values of the Durbin-Watson statistic are within 1.5-2.4, thus solidifying the relevance of the result.

The next section presents the results of the causality test.

Causality Test: Granger Causality Approach

Table 3 shows direct and indirect causalities between exports and economic growth, including some control variables and Figure 2 shows the pictorial overview of the causality test results.

Table 3: Granger Causality: Exports and Economic Growth, including some control variables

Null Hypothesis:	Obs	F-Statistic	Prob.
LNEXP_BOT does not Granger Cause LNRGDP_BOT	41	0.01038	0.9194
LNRGDP_BOT does not Granger Cause LNEXP_BOT		6.11972	0.0180
LNGFCF_BOT does not Granger Cause LNRGDP_BOT	41	0.00219	0.9629
LNRGDP_BOT does not Granger Cause LNGFCF_BOT		0.03552	0.8515
LNTOP_BOT does not Granger Cause LNRGDP_BOT	41	0.03002	0.8634
LNRGDP_BOT does not Granger Cause LNTOP_BOT		2.14971	0.1508
LNCPI_BOT does not Granger Cause LNRGDP_BOT	41	1.66965	0.2041
LNRGDP_BOT does not Granger Cause LNCPI_BOT		4.56332	0.0392
LNGFCF_BOT does not Granger Cause LNEXP_BOT	41	0.02634	0.8719
LNEXP_BOT does not Granger Cause LNGFCF_BOT		0.01083	0.9177
LNTOP_BOT does not Granger Cause LNEXP_BOT	41	2.14641	0.1511
LNEXP_BOT does not Granger Cause LNTOP_BOT		2.83368	0.1005
LNCPI_BOT does not Granger Cause LNEXP_BOT	41	4.14042	0.0489
LNEXP_BOT does not Granger Cause LNCPI_BOT		3.00352	0.0912
LNTOP_BOT does not Granger Cause LNGFCF_BOT	41	0.00172	0.9672
LNGFCF_BOT does not Granger Cause LNTOP_BOT		0.01690	0.8973
LNCPI_BOT does not Granger Cause LNGFCF_BOT	41	0.07493	0.7858
LNGFCF_BOT does not Granger Cause LNCPI_BOT		1.55907	0.2194
LNCPI_BOT does not Granger Cause LNTOP_BOT	41	0.72141	0.4010
LNTOP_BOT does not Granger Cause LNCPI_BOT		7.20417	0.0107

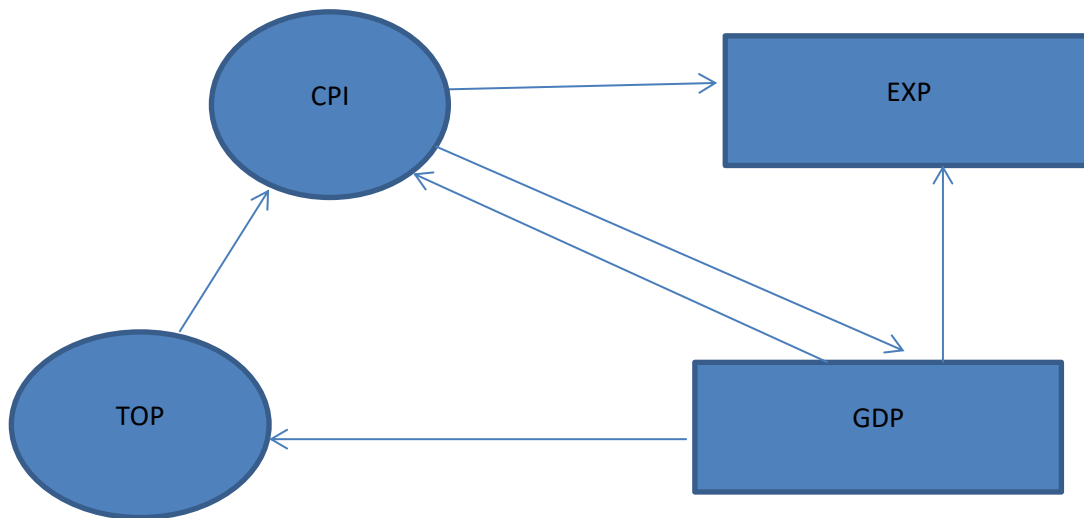


Figure 2: Granger Causality: Exports and Economic Growth, including some control variables – Pictorial view.

Economic growth granger causes exports and indirectly granger causes exports through trade openness and consumer price index as shown in both Table 3 and Figure 2. The findings are in line with studies by Kalaitzi and Cleeve (2018) and Dinç and Gökmen (2019). There is a bidirectional causality between economic growth and the consumer price index. Thus, Botswana needs to ensure a health and stable macroeconomic environment to harness the positive intertwined relationship between exports and economic growth as presented under both the ARDL and the granger causality results.

Conclusions

The study showed that exports and economic growth statistically positively affect each other both in the short-run and long-run. Bidirectional causality from economic growth to exports was realized. Botswana's economic journey reflects both successes and challenges, with a focus on diversification for sustained economic growth and resilience.

While Botswana's export-oriented strategies and industrialization efforts are intertwined, the prioritization depends on specific economic contexts and goals. Industrialization, with its potential for sustained economic growth, aligns with Botswana's long-term vision of being an upper income economy by 2036. The regional trade agreements like the AfCFTA present Botswana with a platform to enhance its trade initiatives, particularly as a small country. The reduced trade barriers and expanded market access can contribute to economic growth by creating new opportunities for businesses, facilitating cross-border collaboration and tapping on value chain beneficiation. However, a balanced approach considering both export-oriented industrialization strategies and import substitution strategies is crucial for the realization of sustainable economic growth.

Acknowledgments

The authors have read and agreed to the published version of the manuscript. The authors appreciate the financial support provided by BA ISAGO University

Author Contributions: Conceptualization, O.C., L.M. and L.J; methodology, O.C; formal analysis, O.C; writing—original draft preparation, O.C., L.M. and L.J; writing—review and editing, O.C.

Funding: This research was funded by BA ISAGO University.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to restrictions.

Conflict of Interest: The authors declare no conflict of interest.

References

- A. Giles, J., & Williams, C. L. (2000). Export-led growth: a survey of the empirical literature and some non-causality results. Part 1. *The Journal of International Trade & Economic Development*, 9(3), 261-337.
- Abbas, S. (2012). Causality between exports and economic growth: Investigating suitable trade policy for Pakistan. *Eurasian Journal of Business and Economics*, 5(10), 91-98
- Abrego, M. L., de Zamaroczy, M. M., GURSOY, T., NICHOLLS, G. P., PEREZ-SAIZ, H., & ROSAS, J. N. (2020). *The African Continental Free Trade Area: Potential Economic Impact and Challenges*. International Monetary Fund.

- African Development Bank. (2023). *Botswana Economic Outlook*. Retrieved December 18, 2023 from <https://www.afdb.org/en/countries/southern-africa/botswana/botswana-economic-outlook>
- African Development Bank. (Online): Botswana: African Development extends US\$80m line of credit to help industrialization and regional integration. Retrieved January 12, 2024 from <https://www.afdb.org/en/news-and-events/botswana-african-development-extends-us-80m-line-of-credit-to-help-industrialization-and-regional-integration-19231/>
- Akimov, A., Wijeweera, A., & Dollery, B. (2009). Financial development and economic growth: evidence from transition economies. *Applied Financial Economics*, 19(12), 999-1008.
- Ariuna, T., & Gibson, N. (2016). Financial development and economic growth: evidence from Southern African Development Community countries. *Journal of Developing Areas*, 50(4), 81-95.
- Bakari, S. (2021). Reinvest the relationship between exports and economic growth in African countries: New insights from innovative econometric methods.
- Bank of Botswana. (2022). *Monetary Policy Committee Decision-December 1*. Retrieved November 21, 2023 from <https://www.bankofbotswana.bw/sites/default/files/news-files/Monetary%20Policy%20Committee%20Decision-December%202022.pdf>
- Bonga, W. G., Sithole, R., & Shenje, T. (2015). Export sector contribution to economic growth in Zimbabwe: A causality analysis. *The International Journal of Business & Management*, 3(10), 452 – 464.
- Brock, W. A. (1974). Money and growth: The case of long-run perfect foresight. *International Economic Review*, 15(3), 750-777.
- Çetintaş, H., & Barişik, S. (2009). Export, import and economic growth: The case of transition economies. *Transition Studies Review*, 15(4), 636-649.
- Chiwira, O., Muchingami, L., & Jambani, L. (2023). Exports and economic growth: relationships and threshold analysis for the Southern Africa customs union. *International Journal of Research in Business and Social Science (2147-4478)*, 12(8), 274-288.
- Darrat, A. F. (1986). Trade and development: The Asian experience. *Cato Journal*, 6(2), 695 – 699.
- Dolado, J. J., & Lütkepohl, H. (1996). Making Wald tests work for cointegrated VAR systems. *Econometric reviews*, 15(4), 369-386.
- Ee, C. Y. (2016). Export-led growth hypothesis: empirical evidence from selected Sub-Saharan African countries. *Procedia Economics and finance*, 35, 232-240.
- Egbetunde, T., & Akinlo, A. E. (2014). Financial integration and economic growth in Sub-Saharan Africa. *Journal of Sustainable Development in Africa*, 16(6), 83-96.
- Elbeydi, K. R., Hamuda, A. M., & Gazda, V. (2010). The relationship between export and economic growth in Libya Arab Jamahiriya. *Theoretical and Applied economics*, 1(1), 69.
- Emery, R. F. (1967). The relation of exports and economic growth. *Kyklos*, 20(4), 470-486.
- Engle, R. F., & Granger, C. W. (1987). Cointegration and error correction: representation, estimation, and testing. *Econometrica: Journal of the Econometric Society*, 55(2), 251-276.
- Fitch Solutions Business. (2023). *Botswana Growth Will Pick Up Slightly In 2024*. Retrieved November 22, 2023 from <https://www.fitchsolutions.com/bmi/country-risk/botswanan-growth-will-pick-slightly-2024-03-10-2023>.
- Gokmenoglu, K. K., Sehnaz, Z., & Taspinar, N. (2015). The export-led growth: A case study of Costa Rica. *Procedia Economics and Finance*, 25(1), 471-477.
- Gujarati, D. N. (1995). *Basic econometrics*. New York: McGraw-Hill.
- Guntukula, R. (2018). Exports, imports and economic growth in India: Evidence from cointegration and causality analysis. *Theoretical & Applied Economics*, 25(2), 471-477.
- Harris, R., & Sollis, R. (2003). *Applied Time Series Modelling and Forecasting*.
- Heckscher, E.F. (1919). The effect of foreign trade on the distribution of income. *Ekonomisk Tidskrift*, 21(2), 1-32.
- Helpman, E., & Krugman, P. (1989). *Trade Policy and Market*. Structure, The MIT Press.
- Herzer, D. (2007). How does trade composition affect productivity? Evidence for Chile. *Applied Economics Letters*, 14(12), 909-912.
- Hicks, J. (1969). *A theory of economic history*. Oxford, Clarendon Press.
- Hüseyini, İ., Eren, M., & Çelik, A. K. (2017). Examining the relationship among economic growth, exports and total productivity for OECD countries using data envelopment analysis and panel data analyses. *Montenegrin Journal of Economics*, 13(3), 63-73.
- International Monetary Fund. (2023). *IMF Executive Board Concludes 2023 Article IV Consultation with Botswana*. Retrieved December 18, 2023 from <https://www.imf.org/en/News/Articles/2023/08/30/pr23296-botswana-imf-executive-board-concludes-2023-article-iv-consultation-with-botswana>
- Johansen, S., & 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.
- Jones, R. W. (2008). Heckscher-Ohlin Trade Flows: A Re-Appraisal. In *The New Palgrave Dictionary of Economics*. Palgrave Macmillan. https://doi.org/10.1057/978-1-349-95121-5_11162
- Jordaan, A. C., & Eita, J. H. (2009). Testing the export-led growth hypothesis for Botswana: A causality analysis. *Botswana Journal of Economics*, 6(10), 2-14.

- Kalaitzi, A. S., & Chamberlain, T. W. (2020). Exports and economic growth: Some evidence from the GCC. *International Advances in Economic Research*, 26(2), 203-205.
- Kalaitzi, A. S., & Cleeve, E. (2018). Export-led growth in the UAE: multivariate causality between primary exports, manufactured exports and economic growth. *Eurasian Business Review*, 8(3), 341-365.
- Kurniawan, M. L. A., & A'yun, I. Q. (2022). Dynamic Analysis On Export, FDI and Growth in Indonesia: An Autoregressive Distributed Lag (ARDL) Model. *Journal of Economics, Business, & Accountancy Ventura*, 24(3), 350-362.
- Lam, T. (2015). A review of modern international trade theories. *American Journal of Economics, Finance and Management*, 1(6), 604-614.
- Maddala, G. S., & Wu, S. (1999). A comparative study of unit root tests with panel data and a new simple test. *Oxford Bulletin of Economics and statistics*, 61(S1), 631-652.
- Maizels, A., Campbell-Boross, L. F., & Rayment, P. B. W. (1968). *Exports and economic growth of developing countries. Exports and economic growth of developing countries*. Cambridge University Press.
- Malefane, M. R. (2020). Trade openness and economic growth in Botswana: Evidence from cointegration and error-correction modelling. *Cogent Economics & Finance*, 8(1), 1783878.
- Malefane, M. R., & Odhiambo, N. M. (2016). The evolution of trade policy in Botswana. *Global Journal of Emerging Market Economies*, 8(1), 22-34.
- Mehta, S. N. (2015). The dynamics of relationship between exports, imports and economic growth in India. *International Journal of Research in Humanities & Social Sciences*, 3(7), 39-47.
- Mensah, A. C., & Okyere, E. (2020). Causality analysis on export and economic growth nexus in Ghana. *Open Journal of Statistics*, 10(5), 872-888.
- Mmmegi Online. (2023). *Gvt formalizes deal with De Beers*. Retrieved January 13, 2024 from <https://www.mmegi.bw/business/govt-formalises-deal-with-de-beers/news>
- Mundell, R. (1963). Inflation and real interest. *Journal of political economy*, 71(3), 280-283.
- North, D. C. (1955). Location theory and regional economic growth. *Journal of political economy*, 63(3), 243-258.
- Odhiambo, N. M. (2022). Is export-led growth hypothesis still valid for sub-Saharan African countries? New evidence from panel data analysis. *European Journal of Management and Business Economics*, 31(1), 77-93.
- Ohlin, B. (1933). *Interregional and International Trade*, Harvard University Press, Cambridge MA.
- Oxley, L. (1993). Cointegration, causality and export-led growth in Portugal, 1865–1985. *Economics Letters*, 43(2), 163-166.
- Panas, E., & Vamvoukas, G. (2002). Further evidence on the export-led growth hypothesis. *Applied Economics Letters*, 9(11), 731-735.
- Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, 16(3), 289-326.
- Pesaran, M. H., Shin, Y., & Smith, R. P. (1999). Pooled mean group estimation of dynamic heterogeneous panels. *Journal of the American statistical Association*, 94(446), 621-634.
- Popovici, O. C., & Călin, A. C. (2016). Economic growth, foreign investments and exports in Romania: A VECM analysis. *The Romanian Economic Journal*, 19(61), 95-122.
- Rani, R., & Kumar, N. (2018). Is there an export-or import-led growth in BRICS countries? An empirical investigation. *Jindal Journal of Business Research*, 7(1), 13-23.
- Romer, P. M. (1990). Endogenous technological change. *The Journal of Political Economy*, 98(5), 71-102
- Sağlam, Y. ve Egeli, H. A. (2015). İhracata dayalı büyüme hipotezi: Türkiye örneği. *Dokuz Eylül University Journal of Graduate School of Social Sciences*, 17(4), 356-369.
- Sağlam, Y., & Egeli, HA (2015). Export-based growth hypothesis: The case of Türkiye. *Dokuz Eylül University Journal of Graduate School of Social Sciences*, 17(4), 517-530.
- Saleem, A., & Sial, M. H. (2015). Exports-growth nexus in Pakistan: Cointegration and causality analysis. *Pakistan Economic and Social Review*, 53(1), 17-46.
- Sekwati, L. (2010). Botswana: A note on economic diversification. *Botswana Journal of Economics*, 7(11), 79-85.
- Shihab, R. A., Soufan, T., & Abdul-Khaliq, S. (2014). The causal relationship between exports and economic growth in Jordan. *International Journal of Business and Social Science*, 5(3), 302-308.
- Sidrauski, M. (1967). Inflation and economic growth. *Journal of political economy*, 75(6), 796-810.
- Solow, R. M. (1956). A contribution to the theory of economic growth. *The quarterly journal of economics*, 70(1), 65-94.
- Solow, R. M. (2016). Resources and economic growth. *The American Economist*, 61(1), 52-60.
- Stockman, A. C. (1981). *Effects of inflation on the pattern of international trade* (No. w0713). National Bureau of Economic Research.
- Sulaiman, M., & Saad, N. M. (2009). An analysis of export performance and economic growth of Malaysia using co-integration and error correction models. *The Journal of Developing Areas*, 34(1), 217-231.
- Sunde, T. (2017). Foreign direct investment, exports and economic growth: ADRL and causality analysis for South Africa. *Research in International Business and Finance*, 41(1), 434-444.
- Tang, C. F., Lai, Y. W., & Ozturk, I. (2015). How stable is the export-led growth hypothesis? Evidence from Asia's Four Little Dragons. *Economic Modelling*, 44(1), 229-235.

- Temiz Dinç, D., & Gökmen, A. (2019). Export-led economic growth and the case of Brazil: An empirical research. *Journal of Transnational Management*, 24(2), 122-141.
- Thornton, J. (1996). Cointegration, causality and export-led growth in Mexico, 1895–1992. *Economics Letters*, 50(3), 413-416.
- Tivatyi, K. S., Shou, J. M., & N'Souvi, K. (2022). Study on import and export-led economic growth: Cases of Botswana, Namibia, South Africa, and Zimbabwe in Southern Africa. *Open Journal of Business and Management*, 10(2), 670-700.
- Tobin, J. (1965). Money and economic growth. *Econometrica: Journal of the Econometric Society*, 33(4), 671-684.
- Toda, H. Y., & Yamamoto, T. (1995). Statistical inference in vector autoregressions with possibly integrated processes. *Journal of econometrics*, 66(1-2), 225-250.
- United Nations Development Programme. (2020). *UNDP Botswana Exporter Development Programme*. Retrieved January 8, 2024 from <https://www.undp.org/botswana/publications/botswana-exporter-development-programme>
- United Nations Development Programme. (2024). *Economic Diversification Drive Initiative*. <https://www.undp.org/botswana/economic-diversification-drive-initiative> Retrieved
- United Nations Economic Commission for Africa. (2023). *Active private sector participation key to the successful implementation of the AfCFTA in Botswana*. Retrieved December 18, 2023 from [https://www.uneca.org/stories/active-private-sector-participation-key-to-the-successful-implementation-of-the-afcfta-#:~:text=Gaborone%2C%2025%20October%202023%20\(ECA,regional%20economic%20growth%20and%20development](https://www.uneca.org/stories/active-private-sector-participation-key-to-the-successful-implementation-of-the-afcfta-#:~:text=Gaborone%2C%2025%20October%202023%20(ECA,regional%20economic%20growth%20and%20development)
- Uysal, Ö., & Sultan, S. A. T. (2019). The causal relationship between economic growth and export: The case of Russia. *İstanbul İktisat Dergisi*, 69(1), 43-65.
- Vijayasri, G. V. (2013). The Importance of International Trade in the World. *International Journal of Marketing, Financial Services & Management Research*, 2(9), 111-119.
- World Bank. (2022). *Free Trade Deal Boosts Africa's Economic Development*. Retrieved December 18, 2023 from <https://www.worldbank.org/en/news/press-release/2022/06/30/free-trade-pact-could-help-lift-up-to-50-million-africans-from-extreme-poverty>.
- World Bank. (2023). World Bank Open Data. Retrieved December 12, 2023, from The World Bank: <https://data.worldbank.org/>
- World Trade Organisation. (2023). *Botswana President: Inclusive, sustainable trade will allow Africa to realize full potential*. Retrieved December 18, 2023 from https://www.wto.org/english/news_e/news23_e/pls_02may23_e.htm
- Yilmaz, E., & Sensoy, F. (2022). The relationship between growth and exports: what if the impact is negative? Evidence from Turkey. *Journal of Economics Finance and Accounting*, 9(3), 104-112.
- Zapata, H. O., & Rambaldi, A. N. (1997). Monte Carlo evidence on cointegration and causation. *Oxford Bulletin of Economics and statistics*, 59(2), 285-298.

Publisher's Note: SSBFNET stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



© 2024 by the authors. Licensee SSBFNET, Istanbul, Turkey. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).

International Journal of Research in Business and Social Science (2147-4478) by SSBFNET is licensed under a Creative Commons Attribution 4.0 International License.