An Econometric Time-Series Analysis of the Dynamic Relationship between Foreign Trade and Economic Growth in a Developing Country: Evidence from Namibia

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Abstract: Economists have an inclination for quantifying the relationships amongst variables at both micro and macro levels. In this study, the possibility of a long-run relationship between foreign trade and economic growth in Namibia is assessed. Exports, foreign direct investment and exchange rates were used as potential predictors of economic growth, while real gross domestic product served as a proxy to economic growth. Quarterly time-series macro-economic secondary data sets were utilised from the period 1990 to 2013. Firstly, the study found positive relationships amongst the four variables used in the study. Indeed, this positive relationship suggests that the economy of Namibia can potentially be expanded by means of foreign trade. The result is also in line with broad economic theory. Secondly, the study found that economic growth responds stronger to changes in exports and foreign direct investment compared to changes in exchange rates. Thirdly, co-integrating relationships were found amongst the variables used in the study, implying a long-run relationship amongst these variables. Lastly, the study found that exports indeed Granger-cause economic growth. The implications of the research are that the results of the research could be used to improve economic policy for Namibia and other developing countries.

Keywords: Foreign trade; economic growth; co-integration; causality; time-series analysis; developing countries; Namibia

JEL Classification: C5; E6; O5

1. Introduction

Trade, especially foreign trade is a potent tool in the process of promoting and stimulating economic growth in contemporary economies due mainly to globalisation (Ogbokor, 2002). In the face of increasing globalisation, the arguments in favour of closed economies are limited (Ogbokor, 2001). Thirwall (2011), further

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strengthening the case for trade, using econometric procedures and a data-set based on 133 countries covering the years 1995 to 2006, observed the growth rates of individual countries to be positively related to their export performance than with any other single economic parameter. In addition, Thirwall noted that for a greater part of the period after 1950, the export performance of developing countries lagged behind that of the developed industrial countries, with their market share of the global trade declining. He, however, acknowledged that in recent years a number of developing countries, especially the Asian economic miracle countries, also referred to as the Asian "Tigers", have successfully reversed this trend as a result of a "big push" in their manufacturing activities, which has resulted mainly from government incentives.

Historically, trade is and has remained a powerful propeller of economic growth. Trade has contributed significantly to the effectiveness and efficiency of allocation of resources, as well as, transmitting growth from one part of the world to another (Thirwall, 2000). In specific terms, the strong demand in Europe, and in Britain in particular, for food and raw materials in the nineteenth century led to a "big push" in economic activities on the part of countries such as Canada, Argentina, South Africa, Australia and New Zealand just to mention a few (Love, 1987). It was also consistently observed that as the demand for these countries' exports increased, investment in these economies also rose. Trade was considered to be beneficial to both countries that are involved in international trade. These facts have also been widely acknowledged in the work of Marshall (1890). Unfortunately, countries belonging to the southern hemisphere are not getting an equitable share of the anticipated benefits from trade. This is mainly due to a weakening demand for developing countries' traditional exports, including the uncompetitive nature of a majority of their exports in foreign markets (Schipke, 2005).

Other studies in the literature have attempted to investigate the possibility of a relation between exports, in particular and economic growth in general (Edwards, 1993). Most of the early studies in this regard, linked various measures of export growth with growth in income, suggesting that these two variables were significantly positively correlated (Appleyard, 2006). Furthermore, exports' are regarded as the "engine of growth" (Sharer, 1999). Simultaneously, several other studies that focussed on individual countries over time using econometric time series techniques have suggested statistically significant relationships between growth in both exports and imports, including income growth (Greenaway et al, 2002). In a number of such studies, particularly for middle-income countries seems to suggest a strong positive correlation between trade and economic growth. This is as a result of the direct effect of export earnings on Gross National Product (GNP), as well as, the indirect effects arising from balance-of-payments often associated with the increased capacity to import needed capital and intermediate inputs.

There is also the possibility that increased income could lead to greater imports and increased efficiency could also lead to greater exports. Thus, the causality may run from growth to trade rather than from trade to growth (Chow, 1987). Another argument in the literature concerning the relationship between trade and growth points to the fact that growth in exports generally has a positive effect on a country's growth and development, since it stimulates increased saving and investment (Krueger, 1998). These effects on aggregate saving could arise in two ways. First, it could arise from a higher inclination to save in the export sector. Second, it could also result from the impacts on total saving of any changes in the distribution of income tied to the growth in the export sector.

With respect to the Southern African Development Community (SADC), including Namibia, trade will continue to play an important role in the growth of these economies. This is so, for the following interrelated reasons: trade is pertinent to these economies in view of the wealth it generates through receipts and various specialized taxes for the state treasury. Besides, it creates jobs for a number of people, and therefore supports livelihood for many households. With the concepts of globalisation and export-led industrialism gaining increased popularity in the world, there is the urgent need for Namibia to give more vigorous and appropriate attention to its export sector.

In consideration of the research background, the driving objective of this study is to empirically assess the relationship between foreign trade and economic growth in Namibia through the use of the Vector Auto-regression (VAR) approach. The study is considered to be vital for the following reasons: Firstly, the study will assist the Namibian government with a strategy, which it can consider adopting that may in turn lead to export-led growth. Secondly, the study will contribute to the existing literature concerning foreign trade and economic growth. Thirdly, the study will shed light on the connection between trade and economic growth in Namibia, which policy makers could in turn capitalise on, when it comes to trade policy formulation and implementation. Further, in recognition of the deficiency in modelling, the study will invoke and apply Vector Auto-regression technique so as to ensure robustness of results. The study could also be replicated in other developing countries.

2. Socio-Economic Facts about Namibia

Namibia became an independent country on 21 March 1990 after a protracted struggle that lasted for close to one hundred and six (106) years. In geographic terms, the country is surrounded by Angola and Zambia to the north, Botswana and Zimbabwe to the east, South Africa to the south, with the Atlantic Ocean constituting its western frontier. Namibia covers a landmass of approximately 24,268 square kilometres (Ministry of Land and Resettlements, 2013). Namibia is classified as an upper middle-income country. It has a per capital income of approximately USD

6,800 per annum based on 2012 data (Government of Namibia, 2013). The economic system of Namibia is anchored on the principles of free market forces. Namibia is often described as a mineral paradise. This is because of the presence of a lot of minerals, especially solid minerals such as diamond, gold, copper, uranium and zinc. Namibia is heavily dependent on the extraction and processing of these minerals for export. The mining sector is the main propeller of its economy (Ogbokor, 2005). The mining sector alone accounts for about 50% of the revenue accruing to the government treasury. However, its contribution of about 8% to the country's total gross domestic product (GDP) is rather low. The sector also employs only about 3% of the country's total labour force (Government of Namibia, 2009).

Namibia is the fourth leading producer of uranium in the world. Fishing and tourism are two other pertinent sectors in the economy of Namibia. Namibia depends heavily on international trade, especially imports for the continuity of its economy. Over 50% of its cereal needs are imported (Schlettwein, 2013). This is even higher during drought years. The country's Gini coefficient of 0.7 makes income gap a fundamental development issue in its economy. Surprisingly, the country also has a high per capita income, especially when compared to the rest of Africa (Government of Namibia, 2010). The current unemployment figure of 29.2% is very high and has been opened to a series of debates (Government of Namibia, 2011). Classifying subsistence farmers, as well as, those in the informal sector as part of the unemployed is highly controversial and lacks economic reasoning. The leading sectors in Namibia, namely, mining, tourism, livestock and meat production, as well as, fisheries are highly vulnerable to external economic cum ecological shocks. Foreign demands in all these sectors, is cyclical, seasonal and highly unpredictable (Government of Namibia, 2012).

As a result of historical factors, the Namibian economy is still very much connected to the South Africa's economy. For instance, the Namibia dollar is pegged to the South African Rand on the basis of one-to-one, making monetary policy management a very tricky issue for the Bank of Namibia (BoN) to handle (Bank of Namibia, 2010). Namibia, including South Africa, Botswana, Lesotho and Swaziland are all bona fide members of the Southern African Customs Union (SACU). Namibia obtains about 40% of its budget revenues from the common revenue pool of SACU (Sherbourne, 2010). In 2007, Namibia for the first time, since attaining an independent status achieved a budget surplus. However, Namibia could not sustain this development in the subsequent years that followed mainly as a result of the global recession that inevitably led to a reduction of its income from the common SACU revenue pool.

Namibia's major trading partners are South Africa, European Union (EU), Angola, Botswana, Germany, the United States of America and more recently China. Its imports are principally made-up of food products, construction materials and manufactured goods. Similarly, the country's exports are essentially solid minerals,

beef, cattle, fish, karakul pelts and grapes. Population-wise, Namibia is made-up of about 2.2 million people with a labour force of approximately 870,000. Its government is increasingly relying on the strategy of Export Processing Zones (EPZs) as a way of boosting industrialisation activities, especially manufacturing. However, the imbursement from this process is still highly unsatisfactory and unstable (Bank of Namibia, 2012).

Other major socio-economic challenges currently facing the economy of Namibia, besides low industrialisation activities are: poverty, natural disasters, especially drought and flooding; rural–urban dichotomy, heavy dependence on mining, high capital outflows, highly skewed income distribution, exchange rate volatility, HIV/Aids pandemic, inflation, especially imported inflation; cross border smuggling, especially Tobacco products and Marijuana, and human capital constraints just to mention a few of them (Government of Namibia, 2014). The various efforts on the part of the Namibian government, so far, in order to respond to these challenges through its various National Developments Plans (NDPs) seem not to be yielding fruitful results.

3. Literature Review

A number of studies have been conducted over the years relating to the relationship between foreign trade and economic growth for many countries. One of the earliest empirical studies that is widely acknowledged is that of Emery (1967). He investigated the relationship between exports and economic growth for 48 developed, as well as, 48 developing countries. He made use of time series macroeconomic annual data covering the period 1953 to 1963. He relied upon a simple regression model in pursuing his investigating. In addition, he treated gross national product (GNP) as the dependent variable and total exports as the independent variable. The results indicate that there is a strong positive relationship between exports growth and economic growth. Further, his results suggest that, in order to increase economic performance, countries should emphasise export-oriented policies as against an import substitution policy. One would have expected the researcher to have also made use of a multiple regression model in his study, in order to find out the effect of other macroeconomic variables that influences economic growth. The period covered by the study also seems to be rather too short. There is a strong possibility that, the results of the study would have been different, if the period of the study is extended to cover more years.

Maizels (1968) tested the relationship between the rate of change in exports and the rate of change in the GDP for nine developing countries for the period between 1951 and 1962. He observed a significant relationship between export and growth rate and GDP growth rate. However, the study did not shed light on the issue of causality. In addition, the period covered by this study should have been extended to cover more

years. Mathews (1973) probed into the relationship between Britain's economic growth, foreign trade and her payments problem. He used time series data covering one hundred years for the study. He observed that, a number of factors, particularly institutional factors have suffocated productivity growth in the economy. The period covered by the study seems to be too lengthy. One would have expected the author to have possibly divided the period covered by the study into two or more periods in order to effectively analyse the changes occurring over time, as well as, to carry out a comparative analysis between each of the identified sub-periods.

Papanek (1973) in his study of 85 developing countries estimated the impact of foreign capital, foreign aid, foreign private investment and domestic savings on economic growth. His study confirmed the existence of a positive relationship between economic growth and domestic savings. Further, he observed that both foreign aid and foreign private investment positively influenced economic growth. All the independent variables taken together accounted for approximately 37 percent of the systematic variation in economic growth; implying that the explanatory power of the model used for the study is weak.

Syron & Walsh (1975) argued that Emery's approach is rather too simplistic. They attempted to extend Emery's analysis and to show that the relationship between exports and economic growth is more complex than he suggests. In light of this reasoning, they divided Emery's sample of 50 countries into two categories, namely, developed countries (DC) and less developed countries (LDC). They relied on the percentage growth in real GNP per capita and percentage growth in real exports. They concluded that the DCs and the LDCs had different growth-exports relationships, and that about 85 percent of the growth in LDCs is induced by exports, while 62 percent of growth in the DCs arises from export stimulation. The study also suggested the need to disaggregate exports into meaningful categories, and subsequently determine the impact of each of the various identified sub-sectors on the economic growth of the domestic economy.

Gupta (1975) examined the impact of foreign capital inflows on economic growth of forty developing countries. His findings indicate that economic growth as measured by growth rate of GDP is directly related to all forms of foreign capital inflows. Also, contributing to the literature on trade and economic growth, Ram (1976) estimated this relationship for India for the period 1950 to 1971. He claimed that exports performed a dominant role in the economic growth of India during the period under consideration. By utilizing a double-log transformation regression model, he was able to generate elasticity values. He noted that a 1 percent increase in the earnings of total exports is associated with a 0.73 percent rise in economic growth. The use of double-log transformation regression models, which allowed the researcher to determine the responsiveness of economic growth to changes relating to the independent variables used in the model is highly commendable.

Fajana (1979) observed the existence of a positive and strong relationship between export and output changes, and hence provides empirical support for the thesis that trade has been an important factor in Nigeria's growth. Also, his results suggest that exports have greater impact on the economic growth of Nigeria in relation to the inflow of foreign capital. His model used visible trade balances, and current account balances as measures of foreign capital inflow. However, the use of net capital inflow as a proxy to foreign capital inflow would have most likely produced a more robust result.

Feder (1982) estimated the impact of the export sector, as well as, the non-export sector on economic growth for a sample of 31 semi-industrialized countries over the period 1964 to 1973. He dichotomised the national economy into two main sectors. The first sector produces export goods for international markets, while the second sector produces goods exclusively for the domestic market. Feder employed a simple production function model to test the marginal factor productivities in the two sectors that were identified in the study. He noted that the factor productivity obtained in the export sector was higher compared to the one that was obtained for the non-export sector. Feder maintained that international competition and foreign investment were mainly accountable for this difference. Therefore, a higher economic growth in the economy can arise by encouraging the relocation of economic resources from a less productive sector into a more productive sector.

Jung & Marshall (1985) used Granger causality test procedures to analyse the relationship between export growth and economic growth. The authors did not perform stationary and co-integration tests throughout the study. They found that export-led growth was supported in 4 of the 37 countries studied, namely, Indonesia, Egypt, Costa Rica and Ecuador. Further, Iran, Kenya and Thailand supported the growth-led export hypothesis. In addition, Greece and Israel supported the growth reducing exports hypothesis. Countries with rapid growth rate, such as, South Korea, Taiwan and Brazil provided no statistical evidence to support the export-led growth hypothesis.

Chow (1987) explored the causality between export growth and industrial development in eight Newly Industrializing Countries (NICs): Argentina, Brazil, Hong Kong, Israel, Korea, Mexico, Singapore and Taiwan. He used time-series data covering the period 1960 to 1980. The results indicate that there was no causality between export growth and industrial development for Argentina, while in Mexico there is a unidirectional causality running from manufactured goods exports to manufactured output. In addition, there is bidirectional causality between the growth of exports and industrial development in Brazil, Hong Kong, Israel, Korea, Singapore, and Taiwan.

Also, contributing to the discussion, Ahmad & Kwan (1991) investigated the relationship between exports and national income for 47 African developing

countries during the period covering 1981 to 1987. The study uses both pooled time-series and cross-sectional data. Their finding suggests that, there is no evidence of causality for most of the countries that were investigated. However, in some cases, the study observed a rather weak causality running from economic growth to exports in some of the countries used in their study.

Jin (1995) probed into the export-led growth hypothesis for the "Four Little Dragons", namely, Hong Kong, Singapore, South Korea and Taiwan, using quarterly data from 1973 to 1993. He used a five-variable VAR model and the relationship between exports and economic growth was analysed though Variance Decomposition (VDC), Impulse Response Function (IRF) and integration. All variables were found to be of integration one. *S*ince there was no existing co-integration, no error correction terms needed to be included in the VAR model. The result also indicated that exports have a significant effect on the growth of the four economies that were investigated. Furthermore, a bidirectional relationship from economic growth to export growth was found significant in all these countries, except Taiwan. IRF's also provided feedback from export growth to economic growth and vice versa in all four countries. Therefore, the results, indeed, supported the export-led growth hypothesis.

Baharumshah & Rashid (1999) measured the connection between export and income in respect of Malaysia by employing quarterly data. They included imports in the system equation in order to explain Malaysia's economic growth. The Johansen procedure and vector error correction model (VECM) also came into play in the study. The authors tested the long-run relationship between export, imports and GDP as a result of multivariate co-integration. VECM also suggests that export causes economic growth. The hypothesis that growth in exports doesn't Granger cause growth in GDP is rejected for both agriculture and manufacturing exports. In addition, the hypothesis that growth in output does not Granger cause exports is also rejected. Hence, the results have a two-way Granger causality relationship between growth rate of exports and growth rate of output. Granger causality tests also rejected non-causality from exports to imports, as well as, from imports to exports. This means that, there is a feedback relationship between all categories of exports and imports in the long-run.

Love & Chandra (2004) investigated the relationship between exports and economic growth over the periods 1950 to 1998, 1970 to 2000 and 1965 to 1997 for India, Pakistan and Sri Lanka respectively. They use Johansen's multivariate co-integration framework for testing the causality. Their findings conclude that export growth effects economic growth positively in the case of India and Pakistan, and that; there is bidirectional causality between exports and growth in the case of India. However, there is no evidence of causality in the case of Sri Lanka, since the terms-of-trade coefficient has a negative sign, indicating that any increase in exports and income will affect the terms-of-trade negatively.

Yang (2008) examined the relationship between exports and economic growth over the period 1958 to 2004 based on 44 countries. The results from most of the countries used in the study gave credence to the export-led growth hypothesis, while a few of them proved otherwise. The author also observed that, due to the problem of data availability in the developing countries, the real exchange rate can serve as a good tool for distinguishing between situations of exports-driving growth and growth-driving exports' situations.

Kehinde et al., (2012) studied empirically the impact of international trade on economic growth in Nigeria from 1970 to 2010. The study made use of multiple regression models, co-integration and error correction procedures. The study revealed that three variables, namely, export, foreign direct investment and exchange rate are statistically significant at 5%. These variables were also observed to be positively related to real GDP, while other variables such as import, inflation rate, openness exert a negative influence on real GDP. The study demonstrates that increase participation in global trade helps Nigeria to reap static and dynamic benefits of international trade. Both international trade volume and trade structure towards high technology exports resulted in positive effect on Nigeria economy. In addition, the authors recommended that the government of Nigeria should design appropriate strategies that can boost exports, stimulate foreign direct investment and maintain exchange rate stability in order for its economy to achieve greater growth rates.

Arodoye and Iyoha (2014) econometrically assessed the relationship between foreign trade and economic growth in Nigeria by employing quarterly time-series data-sets for the period 1981 to 2010. A vector autoregressive model was used, in order, to account for feedbacks. The result of the study confirms a stable, long-run connection between foreign trade and economic growth. The result also confirms that the principal sources of Nigeria's economic growth variation are largely propelled by foreign trade innovations and "own shocks". The study, therefore, considers the adoption of trade as a potent policy instrument for catalyzing the process of economic growth in Nigeria. The technical procedures used by the authors of this study are highly penetrating, and therefore, commendable.

The inferences that could be drawn from the existing literature reviewed, so far, are the following. In a number of countries foreign trade, indeed, contributed to economic growth in various ways. However, the extent to which foreign trade will boost economic growth varies from country to country. The fundamental question that follows is: Will Namibia necessarily enjoys greater economic growth as a result of increased foreign trade? This is an empirical issue that needs further probing. To the best of the knowledge of the researchers, no study based on Namibia has specifically investigated the possibility of a dynamic relationship between foreign trade and economic growth through the use of Vector Auto-Regression (VAR)

technique. This further justifies the need for this kind of study so as to produce high level econometric analysis for the country.

4. Methodology

4.1. Methodological Framework

The study employed the Vector Auto-regression (VAR) approach. VAR is a system of dynamic linear equations where all the variables in the system are treated as endogenous. The reduced form of the system gives one equation for each variable, which specifies that variable as a function of the lagged values of its own and all other variables in the system (Gujarati, 2004). In general, a VAR model describes the evolution of a set of *k* variables (endogenous variables) over the same sample period (t = 1,T) as a linear function of their past evolution. The variables are collected in a k x 1 vector y_t, which it has as the ith element $y_{i,t}$ the time t observation of variable y_i.

Let $Y_t = (y_{1t}, y_{2t}, \ldots y_{nt})'$ denotes an *(n* x *1)* vector of time series variables.

A reduced form ρ – lag vector autoregressive (VAR(ρ)) model has the form;

$$Y_t = c + \Phi_1 Y_{t-1} + \Phi_2 Y_{t-2} + \ldots + \Phi_\rho Y_{t-\rho} + \varepsilon_t \quad (4.1)$$

Where there is a vector of endogenous variables, c is k x 1 vector of constants (intercept), Φ_i are (*k* x *k*) coefficient matrices (for every i=1,…,p) and ε_t is an (*k* x *1*) vector of error terms satisfying the following conditions;

$E(e_t) = 0$ −error term has mean zero

$E(e_t e_t') = \Omega$ − the contemporaneous covariance matrix of error terms is Ω (n x n positive definite matrix) and

$E(e_t e_{t-k}') = 0$ for any non-zero k – there is no correlation across time; i.e. no serial correlation in individual error terms.

Therefore, the vector Y_t is defined using an unrestricted vector auto-regression (VAR):

$$z_t = A_1 z_{t-1} + \ldots + A_k z_{t-k} + \mu_t \quad (4.2)$$

where; z_t is $(n \times 1)$ vector of variables; A_i is an $(n \times n)$ matrix of parameters, u_t denotes residuals or $(n \times 1)$ vector of innovations. The vector, z_t, consists of (n) potentially endogenous variables. Each variable in the model is regressed on both its lagged values and the lagged values of other variables in the system. From the existing literature, the following variables has been identified; real gross domestic product (RGDP), exports (XPORT), foreign direct investment (FDI) and exchange

rate (EX). The benefit of this approach is its ability to model all endogenous variables jointly as opposed to one equation at a time.

4.2. Data Sources

The study utilised secondary data-sets. More elaborately, the study uses macro-economic time-series annual data-set for the period 1990 to 2013. The explanatory variables used in this study are exports, foreign direct investment and exchange rate, while real gross domestic product serves as the dependent variable. The macro-economic data-set used in this study are sourced from the Bank of Namibia, National Planning Commission of Namibia and the Namibia Statistical Agency.

5. Econometric Results

5.1. Testing for Unit Roots

This test is used to establish either the presence or absence of unit roots in the model. Estimations based on time-series data will in most cases either produce spurious or nonsensical results if the datasets are not stationary over time, hence the necessity of this procedure. In this regard, the Augmented Dickey-Fuller (ADF) test is employed because of its technical superiority over most of the other techniques of testing for univariate characteristics of time series. Table 1 presents the results of the unit root tests for the time-series as utilized. The results show that all the variables are stationary in levels with the exception of real GDP and exports. This implies that foreign direct investment and exchange rate are of order of integration I (0) processes as confirmed by both the ADF and PP tests. Upon establishing that some series are non-stationary in levels, the next step was to difference them once. Taking the first difference resulted in real GDP and exports variables becoming stationary, suggesting that they are of I (1) processes. Against this background, the hypothesis of the presence of a unit root was rejected.

Table 1. Unit root tests; ADF and PP in levels and difference

Variable	**Model Specification**	**ADF**	**PP**	**ADF**	**PP**	**Order of Integration**
		Levels	**Levels**	**First Difference**	**First difference**	
$lnRGDP_t$	Intercept and trend	-2.257	-2.024	-3.670**	-5.043**	1
	Intercept	-0.469	-0.456	-3.670**	-5.067**	1
$lnXPORT_t$	Intercept and trend	-2.126	-1.562	-1.834	-4.818**	1
	Intercept	-0.759	-0.386	-1.914	-4.857**	1

	Intercept and trend	-3.029	-5.338**	-5.955**	-7.940**	0
$lnFDI_t$	Intercept	-2.666**	-5.386**	-6.237**	-8.154**	0
	Intercept and trend	-3.735**	-4.353**	-4.006**	-6.262**	0
$lnEX_t$	Intercept	-3.836**	-4.368**	-3.972**	-6.318**	0

Notes: ** means the rejection of the null hypothesis at 5%

Source: Author's compilation

5.2. Testing for Co-integration and Vector Error Correction Model Estimation

Table 2 displays the results for the Johansen co-integration test based on a VAR system of four variables. The null hypothesis is that there is no co-integration among the variables. Both the Trace and Maximum Eigen value tests show that there is co-integration among the variables. This is because the calculated t-statistics are consistently greater than the critical value at 5 percent significance level. In this regard, the null hypothesis of no co-integration is rejected and that indeed, there are co-integrating vectors amongst these variables. This provides a prima facie justification for the estimation of a vector error correction model. The long-run relationship equation is obtained and the coefficients are normalized in order to express one endogenous variable as a function of the rest. The result of the normalized co-integrating equation is as follow:

$$\Delta \ln RGDP = 1.011 + 0.163\Delta \ln XPORT + 0.167\Delta \ln FDI + 0.840\Delta \ln EX \quad (5.1)$$

From the above results, the null hypothesis of no long-run relationship between the dependent and independent variables is rejected. In fact, there is a positive relationship between economic growth, exports, foreign direct investment and exchange rate. In particular, a 1 percent increase in export results in a 16.3 percent jump in economic growth, while a 1 percent increase in foreign direct investment leads to a 16.7 percent rise in economic growth. Similarly, a 1 percent change in exchange rate will result in a rise in economic growth to the tune of 8.4 percent.

Table 2. Johansen Co-integration Test

Maximum-Eigen-Test¤				Trace-Test¤			
H_0: rank=r¤	H_a: rank = r¤	Statistic¤	95%¶ Critical Value¤	H_0: rank=r¤	H_a: rank=r¤	Statistic¤	95%¶ Critical Value¤
r=0¤	r=1¤	31.232¤	27.584¤	r=0¤	r>=1¤	79.816¤	47.856¤
r<=1¤	r=2¤	19.576¤	21.132¤	r<=1¤	r>=2¤	25.584¤	29.797¤
r<=2¤	r=3¤	10.271¤	14.265¤	r<=2¤	r>=3¤	10.008¤	15.495¤
r<=3¤	r=4¤	0.737¤	3.841¤	r<=3¤	r>=4¤	0.737¤	3.841¤

Note: Both the Maximum-Eigen and Trace tests indicate 1 co-integrating equation at the 0.05 level.

Source: Author's compilation

5.3. Stability Tests

This study adopts various diagnostic tests in order to confirm the stability of the econometric model used in the study. In this regard, the study tested for serial correlation, heteroscedasticity and normality. The results confirmed the absence of autocorrelation and conditional heteroscedasticity. Further, the model was also found to be normally distributed and, indeed, stable. These results are displayed in Table 3.

Table 3. Diagnostic Checks

Test	Null hypothesis	t-statistic	Probability
Langrange Multiplier (LM)	No serial correlation	33.823	0.411
Jarque-Bera (JB)	There is normality	11.290	0.504
White (Chi-square)	No conditional heteroscedasticity	40.591	0.179

Source: Author's compilation

5.4. Granger-Causality Test

Since the estimations concerns foreign trade-economic growth nexus, and are carried out within a dynamic configuration, it is of utmost importance to establish whether these variables can predict one another using the Granger-causality test. In particular, the Granger-causality statistics are examined to determine whether lagged values of one variable do help to predict another variable. Table 4 summarizes the results of the Granger-causality tests for the four-variable VAR. It should be noted that the p-values associated with the F-statistics helps to determine whether the relevant sets of coefficients equals to zero. The results show that exports, indeed, assists in predicting output. This suggests Granger-causality running from exports to economic growth. In other words, Namibia government, through amended policy implementation, would need to increase its export activities in order to experience economic growth.

Table 4. Granger-Causality Test

	Dependent Variable in Regression			
Regressor	RGDP	XPORT	FDI	EX
RGDP	0.00	0.379	0.296	0.839
XPORT	0.004**	0.00	0.550	0.834
FDI	0.250	0.755	0.00	0.974
EX	0.353	0.985	0.847	0.00

Notes: (a) ** means the rejection of the null hypothesis at 5%.

Source: Author's compilation

6. Conclusion and Recommendations

This study investigated the dynamic relationship between foreign trade and economic growth in Namibia, using modern econometric time-series procedures. Firstly, the study found positive relationships amongst the four variables used in the study. This positive relationship suggests that the economy of Namibia can potentially be expanded by means of foreign trade. The result is also in line with economic theory as analysed in the study. Secondly, the study found that economic growth responds stronger to changes in exports and foreign direct investment compared to changes in exchange rates. Thirdly, co-integrating relationships were observed amongst the variables used in the study. This suggests a long-run relationship amongst these variables. Lastly, the study found that exports indeed Granger-cause economic growth.

The main recommendations flowing from the results of the study which are applicable to Namibia and similar developing countries are the following:

Diversification strategy: Although diversification of the economy has been the driving objective of the country's trade policy, Namibia is still far from realising this

noble objective. Namibia should as a matter of priority, commit more logistical and financial resources towards the fulfilment of this important objective.

Exports and value-addition activities: Over the years, most of the exports of Namibia consisted of primary products namely solid minerals, fish, meat and fruits. These products normally attract low rewards in terms of their value in foreign markets. Besides, they are also not competitive at this stage. Further, in most cases their prices and demand are externally determined. It is recommended that value-addition centres be set-up in order to add some degree of value to these exports by way of processing before these products are exported. In this regard, the country needs to consider establishing polishing factories for purposes of polishing its solid minerals, as well as strengthening its manufacturing capacity to process items like fruits into drinkable forms just to mention a few processes.

Trade and investment promotion: Investment whether domestic or foreign direct investment (FDI) could be used to increase a country's economic activities and further induce more trade with the possibility of positively affecting a host country's economic growth. Therefore, Namibia should aggressively encourage both domestic investment and FDI in its export-oriented industries by providing the necessary incentives and support.

Regional trade agreements and economic blocs: Regional economic blocks are increasingly playing a useful role when it comes to the promotion of trade, especially foreign trade. Analogously, trade agreements can help smaller economies like Namibia to attract domestic and foreign investment by creating larger markets and reaping dynamic gains from trade. In this regard, Namibia should explore in greater terms the opportunities that its membership of SACU and SADC offers, while correspondingly breaking new grounds for its exports through new trade agreements and partnerships.

Transport infrastructure development: Infrastructure in the form of a reliable transportation system/network (air, road, sea, railways) serves as an impetus, when it comes to trade, especially foreign trade. There is an urgent need for the Government of Namibia to overhaul its transportation system, while correspondingly considering expanding it.

Trade facilitation through efficient customs' procedures: Efficient customs procedures will help a country to offer a business-friendly environment for companies. In addition, export procedures and which are efficient, will facilitate export-oriented projects. In Namibia, export procedures and clearance systems are inefficient. In order for Namibia to realise the full benefits from participating in foreign trade, it must be ready to eliminate these bottlenecks through a general overhauling of its customs clearance systems.

Import tariffs reduction: High barriers to imports can induce tariff jumping, as well as negate the competitive advantages offered by a host country and consequently affect investors' choice of location. Tariffs on goods entering into Namibia are generally considered to be on the high side. Given this situation, Namibia should consider a general downward revision of its tariffs system. In this regard, preference should be given particularly to capital imports and intermediate inputs meant for manufacturing.

Export promotion strategies and investment: Export promotion strategies can positively contribute to export competitiveness. This is even considered to be more important in the launching of new exports. In this context, Namibia should actively participate in forums such as trade fairs, trade shows and trade exhibitions within and outside its territory.

Access to banking services: Access to banking services also matters to encourage a country's export-oriented industries. In this regard, there is a strong need for Namibia to improve upon its banking system/infrastructures in order to make it efficient, competitive and responsive, when it comes to providing various banking services to its export-oriented industries.

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