AGRICULTURAL EXPORTS AND ECONOMIC GROWTH IN NAMIBIA

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ABSTRACT

The main objective of this paper was to analyse the relationship between agricultural export and economic growth in Namibia. The study made use of time series quarterly data covering the period between 1990 and 2014. The stationarity, long run, and short dynamics between Gross domestic product (GDP) and agricultural exports in Namibia were estimated through the employment of Augmented Dicky Fuller test, Johansen co-integration test, and error correction techniques respectively. The empirical findings of the study show that the agricultural exports have a positive and insignificant effect on economic growth while non-agricultural exports have a positive and significant effect on Gross Domestic Product (GDP). The study also revealed that agricultural exports, non-agricultural exports, gross domestic fixed capital formation, and consumer price index are long run determinants of economic growth in Namibia.

Keywords: Error correction model, agricultural exports, economic growth, Namibia.

INTRODUCTION

The structure of the Namibian economy has not changed considerably in terms of the contribution of primary, secondary and tertiary activities to GDP. A high percentage of Namibian exports are primary resources, and the government have been putting much effort to develop industries. The terms of trade are rapidly deteriorating, reflecting the widening gap between imports and exports as a proportion of GDP during the period from 5% in 1993 to 12% in 1999 (Jordaan and Eita, 2007). There is relative faster growth in import volumes compared to export of manly unprocessed goods against the import of consumer and capital goods. The fourth National Development Plan (NDP 4) identifies agriculture as one of the priority sector of the Namibian economy with significant growth potential.

The past economic trend of the agricultural sector shows that Namibia's economy as a whole grew by 4.6% per annum between 2000 and 2001 while the growth in agriculture over the same period was merely 1.4% per annum. For a sector that underpins the livelihood of about 70% of the population, this trend is a cause for concern. Despite its marginal contribution to Gross Domestic Product (of about 5% in 2008), it plays an important role in Namibia's social, political, and economic condition, as it employs about 30% of the labour force (Secretariat, 2014). The agriculture sector remains central to the lives of the majority of the population. Directly or indirectly, it supports over 70 percent of the country's population.

As about 80% of the rural population are engaged in agricultural activities most of whom are subsistence farmers, recurrent droughts have meant that at least half of the food

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consumed in Namibia is imported which in turn has an adverse impact on the balance of payments. Overall contribution from agricultural trade as a percentage of GDP has been in the negatives from 2008-2010 with -1.61%, -1.22 and -0.85% respectively (Secretariat, 2014). A lack of domestic manufacturing industries largely explain Namibia's high propensity to import, which can also be explained by the relative weakness of the balance of payment constraints. The First National Development Plan aimed at improving the level of household food security, raising the value of agricultural exports, while reducing the level of agricultural imports. The country has developed a Special Industrialisation Programme (SIP) as a vital intervention to bring about urgent transformation of the economy in terms of production and trade relations , with food processing and agro-industry being one of the Identified sub-sector within the manufacturing sector in which Namibia has revealed comparative advantage, according to the. The government encourages local sourcing of agricultural products, retailors of fruits, vegetables and other crop products must purchase 27.5% of their stock from local farmers (Newsham & Thomas, 2011).

Despite these laudable efforts, Namibia's agricultural sector is still characterized by low yields, attributable to low level of inputs and limited areas under cultivation among others. The duo crisis of food and finance around the world had left agricultural exports and economic growth on its lowest ebb in Namibia.

In 2009 Namibia's exports contracted by more than 12% largely due to the global financial crisis. The contractions in exports lead to the contraction in Namibia's economic growth underlining the importance of trade to Namibia's economic growth. Namibia has been a net exporter of livestock, meat products, and grapes and a net importer of crops, grains and horticultural products. Agricultural exports (particularly livestock, meat and table grapes) constitute an important part of Namibia's trade portfolio (Newsham & Thomas, 2011). However, agricultural export diversification, in the sense of diversifying the number of agricultural products produced, may not be a viable option due to natural limitations (geography and climate), especially if directed towards the export markets. Such a strategy may be possible if it is heavily subsidised, which raises the question of long term sustainability. Looking at all these trends one tends to wonder about the real contribution of agricultural export to the Namibian economy.

Although several studies have outlined the theoretical relationship between agriculture and economic growth, disagreements still persist. The causal dynamics between agriculture and economic growth is an empirical question worthy of further investigation. In a critique of previous empirical analyses on the role of agriculture in economic-growth (Tsakok & Gardner, 2007) argued that most early studies based on econometric investigation of cross-sectional data for a panel of countries have significant limitations and have not provided definitive results. The relevant outstanding research that has motivated this study is the relationship between agricultural export and economic growth in Namibia.

The paper is organized as follows: the next section presents a literature review. Section 3 discusses the methodology. The empirical analysis and results are presented in section 4. Section 5 concludes the study.

LITERATURE REVIEW

A huge body of literature is available on the role of exports in economic growth. The theory of international trade by the classical economist Adam Smith, stating that no country can

supply all its needs directly from the labour of its own citizens. This brings about exportation and importation of goods and services from one country to another, and exports generally play an important role in economic growth and development of most developing countries. Exports have a great impact on major economic aggregates such as gross domestic product (GDP), government revenue, foreign exchange earnings and external reserves (Ojo, Awe & and Ogunjobi, 2014).

Shombe (2008) stated that increased exports and export diversification are an absolutely essential part of the strategy of supporting the momentum of growth as productive employment opportunities expand. Although domestic demand makes a critical contribution to economic growth in the less-developed countries (LDCs), exports also matters. Exports matter because economic growth and full utilization of productive capacities are constrained through the balance of payment. Each component of demand has an import content which is essential for the continuation of ongoing economic activities and their expansion, and countries need foreign exchange to pay for imports. Analysis of the LDCs within this framework shows that export growth has made a positive contribution to economic growth Developing countries face shortages of capital and technology. However through export these countries can import technology which can boost their domestic production.

McMichael (2009) indicated that the agricultural sector generally contributes to economic development in four major ways; product contribution, factor contribution, market contribution and foreign exchange contribution. Siboleka (2014) found agriculture to be an engine for economic growth in various studies in certain countries. In developing countries, agriculture was found to be declining in terms of its contribution to economic growth. A stronger role for agriculture in terms of economic growth was observed across Asian states and it was concluded that by increasing value addition in the agriculture sector, general economic growth can benefit.

Faridi (2012) argue that literature focus on total export as the only source of growth, but agriculture's share to total export is generally substantial in developing countries. It was found very surprising that empirical research on the contribution of agricultural exports to economic growth has been to some extent ignored in the literature despite its role in the development process being long recognised. But various economists have argued that rising agricultural exports play a crucial role in economic growth. For example, Ijirsha (2015) stated that agricultural exports can be as lucrative and profitable as any other sector of the economy with respect to returns on investment. Therefore, the discrimination against agriculture and the negative perception about the agricultural sector should be corrected so that the sector can contribute optimally to GDP upon channelling investment to agriculture because of high potentials for employment, food security and exports.

In terms of empirical studies, most studies lean toward general exports and economic growth nexus, with a few paying particular attention to agricultural exports and economic growth. Below are few selected empirical studies on both. Ekanayake (1999) analysed the causal relationship between economic growth and export growth using the error correction and cointegration models. The study was on eight Asian developing countries covering the period from 1960 to 1997. The results of the study concluded that there was a bi-directional causality between export growth and economic growth in all the developing countries included in the analysis except Malaysia. There existed strong evidence for long run Granger causality in all countries.

Dawson (2005) examined the contribution of agricultural exports to economic growth in least developed countries. The study was based on two models; the first model was based on agricultural production function, including both agricultural and non-agricultural exports as inputs. The second model was a dual economy model where both agricultural and non-agricultural was further sub divided into exports and non-export sector. A fixed and random effects model was estimated using a panel data of sixty two less developed countries for the period 1974 – 1995. The study provided evidence from less developed countries that supported the theory of export led growth.

Aurangzeb (2006) examined the relationship between economic growth and exports in Pakistan based on the analytical framework developed by (Feder, 1983). The author tested the validity of the hypothesis that economic growth increased as exports expanded by using time series data from 1973 to 2005. The study showed that the export sector had significantly higher social marginal productivities. Hence, the conclusion was that an export oriented and outward looking approach was needed for high rates of economic growth in Pakistan.

Katircioglu (2006) examined the relationship between agricultural output and economic growth in Cyprus with annual data from 1975-2002 through the use of cointegration and Granger causality. The study indicated the presence of a long-run relationship and provides statistical evidence of bidirectional causality between agricultural output and economic growth.

Francis, Iyare & Lorde (2007) study looked at a relationship between agricultural export diversification and economic growth in the Caribbean countries using annual data from 1961 to 2000. Cointegration and error-correction model were used to explore the contributory relationship in seven (7) Caribbean countries. The study showed that in a short-run, agricultural export diversification results in economic growth in Barbados and Belize, while Costa Rica, Haiti and Jamaica show the same results in the long run. Furthermore, non-causality exists in Trinidad and Tobago.

Sanjuan-Lopen and Dawson (2010) estimated the relationship between GDP and agrarian & non agrarian exports using panel cointegration techniques with data from 42 developing countries. The study showed a long-run relationship and that agricultural exports elasticity of GDP was 0.07, the non-agricultural export elasticity of GDP was 0.13.

Using multiple regression analysis Izuchukwe (2011) examined the contribution of the agricultural sector on the Nigerian economic development for the period 1987 to 2007. A positive relationship between GDP and domestic saving, government expenditure on agriculture, foreign direct investment was revealed between 1987 and 2007. The study further revealed that 81% of the variation in GDP could be explained by domestic savings, government expenditure and foreign direct investment. Similarly, Olajide, Akinlabi and Tijani (2012) employed the ordinary least squares regression method on data for the period 1970 to 2010, in Nigeria. The results revealed a positive cause and effect relationship between GDP and agricultural output.

Ojo et al (2014) employed the technique of co-integration and error correction model with time series data for the period 1982 to 2012. The study revealed that agricultural export, net capital flow, agricultural output and world prices in Nigeria's major agricultural commodities are long-run determinants of economic growth.

Based on the afore-mentioned literature on the impact of agricultural exports on economic growth, it can be safely concluded that there are mixed findings due to environmental differences and data used in different studies. This can also be as a result of different methodologies that were used in researching this issue. There seemed to be no study on Namibia that has specifically looked at this subject, this study intended to give an insight of the situation in Namibia.

METHODOLOGY

This paper employed a technique used by Ojo et al (2014). In particular, the study employed cointegration and error correction modelling approach. The following econometric model specified is presented as follows;

$$lnGDP + \beta_0 + \beta_1 lnAGX + \beta_2 lnCAP + \beta_3 lnNAX + \beta_4 lnCPI + e_t \quad (1)$$

Where GDP represents Gross Domestic Product, CAP represents Gross Fixed Capital Formation, AGX represents Agricultural Exports, NAX represents Non Agricultural Exports, and CPI represents CPI used as a proxy for inflation. e_t is a random error term, β_0 and β_{1-4} are the intercept and slope coefficients respectively.

Unit Root Test

The usage of ordinary least squares (OLS) methodology on time series data usually requires that the data be stationary to avoid the problem of spurious regression. A variable is said to be stationary if it has mean, variance and auto covariance that is constant no matter at what point its measure. A non-stationary time series may become stationary after differencing a number of times. A difference stationary series becomes stationary after successive differencing. The order of integration of a series is the number of times it needs to be differenced to become stationary. A series integrated of order I(n) becomes stationary after differencing n times. In this study the stationarity test was carried out using the Augmented Dicky Fuller (ADF) test. The decision rule states the series is stationary if the ADF test statistic is greater than the critical value, and that it is non stationary if it is less than the critical value. If the series are found to be nonstationary in levels but stationary in first difference, one can proceed to test for cointegration.

Cointegration Test

Cointegration test is conducted in order to determine the existence of a long run relationship among the variables. Since the model involves a number of variables, the appropriate test for cointegration was the Johansen test which was developed by Johansen (1989) and Johansen and Juselius (1990). Cointegration gives a threshold of information whether the set of non-stationary variables have a long run equilibrium relationship or not. The test helps in determining and detecting the number of cointegrated vectors in a model. Selecting "r" cointegration vector is based on two statistics known as maximal eigenvalue and the trace statistic. To test for cointegration the null hypothesis for r cointegrating vectors was tested against the alternative hypothesis for (r+1) cointegrating vectors. The null hypothesis of no cointegration is rejected when the calculated test statistic is greater than the critical value and the opposite applies. If cointegration is found then the error correction modelling approach can be estimated.

Error Correction Model

Given a co-integration situation, which indicates a long run relationship among the variables, there is a probability that in a short run there will be disequilibrium (Gujarati, 2004). The short run dynamics of the variables under study were captured by error correction model estimates. The methodology of Johansen takes its starting point in the Vector Auto Regression (VAR) of order p given by:

$Y_t = \mu + \lambda_1 Y_{t-1} + \lambda_2 Y_{t-1} + \cdots \ldots \ldots \ldots \ldots \lambda_k Y_{t-k} + e_t$ (2)

The VAR can be re-written in dynamic form as:

$\Delta Y_t = \mu + \sum_{i=1}^{k} \lambda i \, \Delta Y_{t-i} + e_t$ (3)

Where: Y_t is a × 1vector of integrated variables in a model, $\lambda_k$is a × 1matrix of parameters, e_t is a px1 vector of stochastic term and p is the number of rows in a matrix (×1= total elements of column vector).

The information about the long run properties of the model are contained in matrix λ. If λ has rank zero (r=0), where r is the number of cointegrating relationships, then the system is not cointegrated. If λ has rank p (r=p, i.e. full rank), all the variables in Y_t are stationary and are all cointegrated, indicating a long-run relationship between the variables under study. Oseni and Onakoya (2012), described the error correction term as:

$e_t = Y_t - \beta X_t$ (4)

Where: β is a cointegrating coefficient (long-run parameter) and e_t is the error from the regression of Y_t on X_t. Then ECM is simply defined as:

$\Delta Y_t = \alpha e_{t-1} + \gamma \Delta X_t + \mu_t$ (5)

Where: μ_t is iid (a white noise error term), e_{t-1} is the equilibrium error that occurred in the previous period, α and γ are short-run parameters. The ECM equation above implies that ΔY_t is explained by the lagged e_{t-1} and ΔX_t. If there is a zero change in X_t and e_{t-1} is positive, then Y_{t-1} is above its equilibrium value and the value will start falling in the next period to correct the equilibrium error, hence the name Error Correction Model (ECM). Error correction reconciles the short run behaviour of an economic variable to its long run behaviour (Gujarati and Dawn, 2009).

Data and Data Source

Given the nature of the research work, secondary data was required. The data were sourced from the World Bank, Bank of Namibia (BoN) statistical bulletins (various issues) and Namibia Statistics Agency (NSA). The data set used consists of quarterly observations over 1990 to 2014.

RESULTS

Unit Root Test

The Augmented Dickey Fuller (ADF) test was used to conduct the unit root test in order to determine the order of integration. Table 1 presents the results of the unit root test and reveals that all the variables are stationary in first difference. Therefore, these variables are integrated of order one I(1). The results meet the necessary condition for co-integration test analysis because all series are integrated of the same order.

Table 1: Unit Root Tests for ADF in Levels and First Difference

Variable	Level		First difference		
	Intercept	Trend and Intercept	Intercept	Trend and Intercept	Order of Integration
LNGDP	-0.62	-2.53	-3.48**	-3.48**	1
LNCAP	-0.53	-3.41**	-3.14**	-3.08**	1
LNCPI	-2.21	-2.77	-9.61**	-9.56**	1
LNAGX	-2.24	-2.77	-7.21**	-7.22**	1
LNNAX	-1.05	-2.22	-4.22**	-4.29**	1

*Source: Author's compilation and values obtained from Eviews. Note: ** means the rejection of the null hypothesis at 5%.*

Cointegration Test

Table 2: Johansen Cointegration Trace and Maximum EigenvalueTest

Maximum Eigen Test				Trace Test		
Hypothesized No. of CE (S)	Max-Eigen Statistic	0.05 Critical Value	Prob.**	Trace Statistic	0.05 Critical Value	Prob**
None *	38.21456	33.87687	0.0142	80.10780	69.81889	0.0060
At most 1	16.79506	27.58434	0.5976	41.89324	47.85613	0.1617
At most 2	14.08188	21.13162	0.3584	25.09818	29.79707	0.1580
At most 3	10.18416	14.26460	0.2001	11.01630	15.49471	0.2105
At most 4	0.832144	3.841466	0.3617	0.832144	3.841466	0.3617

Source: Author's compilation using Eviews.
Note: Both Max-eigenvalue and Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
** denotes rejection of the hypothesis at the 0.05 level*

Table 2 presents the result of the Johansen cointegration test on trace and maximum eigen value test statistics. Both test statistics reveal that there is one cointegrating equation. This is because at null hypothesis of cointegration rank (r=0) the max-eigen value of 38.2145 is greater than the 5% critical value of 33.8768. The trace statistics also indicate 1 co-integrating equation since trace value of 80.1078 is greater than the 5% critical value of 69.8188. The evidence of cointegration in the study indicates that, agricultural export, gross domestic capital formation, non-agricultural export and consumer price index are long-run determinants of economic growth in Namibia. The result of the Johansen statistics therefore rejects the null hypothesis of no co-integration among the variables.

Error Correction Model

Table 3: Error Correction Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLNCAP	0.175277	0.057476	3.049571	0.0031
DLNCPI	0.001520	0.002041	0.744831	0.4585
DLNAGX	0.002129	0.001980	1.075389	0.2854
DLNNAX	0.286231	0.032330	8.853375	0.0000
ECT(-1)	-0.096133	0.043454	-2.212296	0.0298
C	0.001302	0.000441	2.951699	0.0041

R-squared	0.925110	Mean dependent var	0.006544
Adjusted R-squared	0.920487	S.D. dependent var	0.013463
S.E. of regression	0.003796	Akaike info criterion	-8.243149
Sum squared resid	0.001167	Schwarz criterion	-8.073087
Log likelihood	364.5770	Hannan-Quinn criter.	-8.174670
F-statistic	200.1172	Durbin-Watson stat	2.190839
Prob(F-statistic)	0.000000		

Source: Author's compilation using Eviews.

The short run association was explored by employing an error correction model (ECM). Error correction model allows the introduction of previous disequilibrium as independent variables in the dynamic behavior of existing variables. This makes it useful in capturing short run and long run relationships among the variables. The following is the interpretation of the short run results of the model: The double log model was used to find the percentage values of the variables as the results are shown in table 3. Overall model shows the best goodness of fit, explained by an R^2 of 0.92. The Durbin Watson test value of 2.19 shows an absence of autocorrelation in the model.

The value of the coefficient of agricultural exports is 0.0021 which suggests that a one percent increase in agricultural export results in an increase in GDP by 0.21 percent. This shows the positive relationship between agricultural exports and GDP, which is statistically insignificant. This can be because the production of most agricultural products are carried out by individual families with small income and therefore, they produce on a small scale and the products are exported in their raw state with no value added to them. So, the receipts from the agricultural exports are very low, which contributes a very insignificant amount to GDP. The coefficient of CAP is 0.1752 which indicates that a one percent increase in the CAP leads to an increase in GDP by 18 percent. The coefficient has the expected sign (according to the theory of investment multiplier) and it is statistically significant. The value of the coefficient is quite high which shows the strength of the impact is strong. The coefficient of non- agricultural exports is 0.2862, which points out that a one percent increase is non-agricultural export results in an increase in GDP of 29 percent. The result reveals a positive relationship between the NAX and GDP, and it is statistically significant as well, these results are compatible with the studies of Sanjuán-López and Dawson (2010). In general, a positive relationship between non-agricultural exports and the GDP in developing countries is because non-agricultural exports consist of manufactured goods and mining which are value added products and have high prices in the world market. Thus, Namibia is no exception. The speed of adjustment from the disequilibrium that occurs in the short run to the long run equilibrium depends on the magnitude of the ECT. In the current study, the results show that 9.6 percent of the equilibrium error in GDP is corrected each quarter. It is negative and statistically significant as desired.

CONCLUSIONS

The main focus of the study was to investigate the relationship between agricultural Export and Economic growth in Namibia, from period 1990-2014. For economic analysis, the ADF test was used to test for stationarity. The Error Correction Test was used in determining the short-run dynamic relationships between the variables. The co-integration test results indicated that there is a long run relationship between Agricultural Export and economic growth in Namibia, and confirmed that it could be used to make long-run prediction about economic growth in the country.

Following the results of the study, long run growth policies can be recommended to the government of Namibia, citrus paribus. Findings regarding agricultural export's contribution to Economic growth imply that the government of Namibia can use the agricultural export development policy to spur economic growth at the national level. Since the results reveal a positive and significant relationship between agricultural export and economic growth in Namibia, as a policy, famers should be encouraged to form Cooperatives for them to be open to loan schemes which will help in increasing productivity. Research activities on improving the quality of agricultural products produced and sold overseas should be financed by the government. Farmers should also be trained on mechanisms of adding value to their products before they go to the market.

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