UNRAVELLING THE CAUSAL RELATIONSHIP BETWEEN MANUFACTURING VALUE ADDITION AND ECONOMIC GROWTH IN NAMIBIA

Edwins Edson Odero
Department of Management Science
University of Namibia, **NAMIBIA**

ABSTRACT

This study examined the causal relationship between manufacturing value added and economic growth in Namibia. The study utilized time-series technique such as unit root, cointegration and Granger causality on annual data covering the period 1980 to 2015. The results of the Granger causality test showed no causal relationship running to or from any variable.

Keywords: Economic growth, value added, manufacturing.

INTRODUCTION

Structural revolution of a traditional economy influenced by primary activities into a modern economy where high-productivity activities in manufacturing play a key role remains a defining characteristic of economic development. Grunke (2015) states that the importance of manufacturing goes far beyond the employees, companies and investors directly involved in the industry. It affects everyone. The author further indicates that manufacturing provides the necessary foundation for an economically, socially and environmentally sustainable society. In addition, manufacturing drives technological innovations — industry accounts for over two-thirds of all commercial research and development, which is key to technological innovation and the creation of new, greener products and manufacturing processes.

The fastest trend by which any nation can achieve justifiable economic growth and development is neither by the level of its endowed material resources, nor that of its vast human resources, but technological innovation, enterprise development and industrial capacity Olamade, Oyebisi, and Olabode (2014). The authors gave an example of Germany and they stated that despite its poor natural resources, and the hurdles it faced from 1920s chronic inflation, Germany has effectively exploited the manufacturing sector and turn out to be the largest economy in Europe as well as the fourth largest in the world. In the modern world, manufacturing sector is regarded as a basis for determining a nation's economic efficiency (Amakom, 2012).

KPMG (2014) further indicates that very few countries have been able to grow and amass wealth without investing in their manufacturing industries. The report also states that and a strong and thriving manufacturing sector usually precipitates industrialization due labor-intensive, export-focused and nature of the industry. Enhanced value to commodities before they are sold, boosts revenues and as such raising average earnings per input. In addition, the manufacturing sector is more sustainable and less susceptible to external shocks than primary commodities.

Kadhikwa and Ndalikokule (2007) indicate that since Independence, Namibia has had a limited industrial development and continue to import most of the manufactured products, mainly from neighbouring South Africa. This is manifested by the few categories of manufactured products which the country is able to export. Manufacturing has an unusually low share in the national output, employment and exports of Namibia compared with countries such as Singapore, South Africa and Ireland. The manufacturing sector in Namibia accounted for an average of 10.3 percent of the GDP for the period 1995-2005, 8 percent of total employment in 2001, and 34.8 percent of exports for the period 1995-2005.

Given the importance of high productivity in boosting economic growth and the standards of living of the people, it is necessary to evaluate the role and performance of the Namibian manufacturing sector. In the light of the foregoing, there cannot be another appropriate time to evaluate the role of the Namibian manufacturing sector in the economic growth and the development of the country than now.

LITERATURE REVIEW

Szirmai (2009) argues, since the late 18th century, the manufacturing sector has been the main engine of growth, development and catch-up. The author further argues that manufacturing is important for growth. This is because (a) there is an empirical correlation between the degree of industrialization and per capita income in developing countries; (b) productivity is higher in the manufacturing sector than in the agricultural sector; (c) manufacturing is assumed to be more dynamic than other sectors; (d) developing countries with higher shares of manufacturing and lower shares of services show faster growth than the advanced service economies; (e) compared to agriculture, it is argued that the manufacturing sector offers special opportunities for capital accumulation; (f) the manufacturing sector offers special opportunities for economies of scale, which are less available in agriculture or services; (g) the manufacturing sector offers special opportunities for both embodied and disembodied technological progress; (h) linkage and spillover effects are stronger for manufacturing than for agriculture or mining; and (i) as per capita incomes rise, the share of agricultural expenditure in total expenditure declines and the share of expenditure on manufactured goods increases .

Ahmad and Dutta (2004) examined the correlation between growth of industrial sector and trade sector policies in Pakistan. They carried out an empirical analysis by using the annual time series data over the period 1973-1995 and applying the cointegration and error correction methods of estimation. Their results indicate a long run and stable relationship among industrial value added, capital stock, real exports and import tariff on collection rate and ratio of secondary school enrolment.

Carmen and Pilar (2004) studied the task played by manufacturing sector imports on real GDP and employment in China. They used quarterly time series data set over the period 1979-2002 and applying dynamic econometric technique of estimation and the study found a positive and long run relation between economic growth index and index of trade openness. Many studies have also established that trade performance of developing countries are less dependent on natural factors endowment and relative advantages given the inadequate competition, economies of scale, and technological spillovers.

Barua and Chakraborty (2006) analyzed the industrial sector performance in India between 1980 – 2003 using econometric estimation consisting of regression Theil index of regional inequality on a trade openness variable using time series. The study investigated high market and openness effects on industrial and exports performance. Major findings suggested that liberalization leads to high price cost margins and reduction in concentration of industries lowers producer surplus and hence boosts consumer welfare.

Njikam (2009) examined trade openness and development of industrial performance in Cameroon, while trying to explore whether a link exists between infrastructure and industrial performance during the two time periods, before and after trade openness. The study utilized the annual values during the import-substitution era (1986-94) and immediately after trade reform (1995-2003) for a sample of 29 industrial sectors. Panel data techniques were used in this study and the results indicated that development in infrastructure leads to enhanced productivity of industrial sector and in trade openness agenda, better quality of infrastructure must be given priority.

Dabla-Norris, Thomas, Garcia-Verdu and Chen (2013), researched on comparison of structural transformation across the world. Their study found out that a country's population, trade openness and FDI in non-resource sectors are absolutely and considerably associated with manufacturing value added for a panel of 168 countries over the period, 1970-2010. They also found that mining output share, arable land, and age dependency (young and old) are negatively and significantly correlated with manufacturing value added in those countries.

Abbas (2014) examined the effect of trade openness and liberalisation on economic growth using the panel fixed effect model in developing countries during the period of 1990–2011. The results showed that trade liberalization have a negative bearing on economic growth of the selected countries whereas real exports make a significant positive impact on it.

The above review shows that the few studies that had been carried out on the key drivers of manufacturing value added had been outside Africa. From a policy perspective, the results of this paper will serve as a useful platform to formulate series of new agenda and policies for manufacturing development in Namibia. The objective of this paper is to determine the causal relationship between manufacturing value addition and the growth level of economic growth in Namibia.

METHODOLOGY

In analyzing the relationship between manufacturing value added and economic growth in Namibia, this study uses the Granger causality test. Implementing this test requires the following three-step procedure:

Firstly, the study requires testing for unit root to determine the order of integration for two variables. Ideally, the data is wanted to be stationary in order to draw reliable conclusions. It follows that the null hypothesis to be tested is that the series contains unit root (non-stationary), while the alternative is that the series do not contain unit root. The null hypothesis can be rejected if the calculated test statistic is greater than at least one critical value. This study employs the Augmented Dickey - Fuller (ADF) test for statistic for unit root. This will avoid estimation of spurious regression whereby the relationship between variables may appear statistically significant, though there is no meaningful relationship among the variables. Hence, it is a necessary.

Secondly, is to test for cointegration in order to determine if there exists any long-run relationship among the variables. In other words, this is to determine if the variables do converge to some long-run equilibrium value. The Johansen cointegration is used in this regard. The null hypothesis is that there is no cointegration, while the alternative hypothesis is that there is cointegration. The null hypothesis can be rejected if at least one calculated test statistic is greater than the critical value and the opposite apply. If the test statistic reveals the presence of cointegration relationship among the variables then it also implies that there is a possibility of causality at least in one direction.

Lastly, the study will then conduct the Granger-causality. That is if there is cointegration there should be Granger-causality in at least one direction. In general different hypotheses are assumed and usually unsure about variables' cause and effect relationship. To cater for this Granger (1969) developed model based on lead and lag relations in forecasting. Granger causality test is considered a useful technique for determining whether one time series is good for forecasting the other. There are different situations under which Granger causality test can be applied. However, this study uses the option of a simple bivariate Granger causality where there are two variables and their lags. Granger used twin factors of VAR to find variables' causal relationship. The VAR can be considered as a means of conducting causality tests, or more specifically Granger causality tests. It assumes two series X_t and Y_t that define those messages set.

$$X_t = \alpha_0 + \sum_{i=1}^{k} \alpha_{1i} X_{t-1} + \sum_{i=1}^{k} \alpha_{2i} Y_{t-1} + \varepsilon_{1t}$$
…1

$$Y_t = \beta_0 + \sum_{i=1}^{k} \beta_{1i} X_{t-1} + \sum_{i=1}^{k} \beta_{2i} Y_{t-1} + \varepsilon_{2t}$$
…2

To determine the variables' relationship the following test are conducted on the coefficients.

(i) $\alpha_{2i} \neq 0 \; and \; \alpha_{1i} = 0$: meaning Y lead X or X lag Y.

(ii) $\beta_{1i} \neq 0 \; and \; \beta_{2i} = 0$: meaning X lead Y or Y lag X.

(iii) $\alpha_{2i} = 0 \; and \; \beta_{1i} = 0$: meaning both variables are independent.

(iv) $\alpha_{2i} \neq 0 \; and \; \beta_{1i} \neq 0$: meaning both variables are interactive each other and have feedback relationship.

Data and Data Sources

This study used annual time-series data covering the period 1980-2015. The variables included are MV: Manufacturing value added, in percentage and RY: Output, in percentage. The data series for both variables were obtained from the World Bank's website.

EMPIRICAL FINDINGS
Unit Root Test

The Augmented Dickey-Fuller (ADF) test was used to investigate the univariate characteristics of the variables as well as to ascertain the order of integration. Table 1, reports the results of the ADF unit root tests. The results show that all variables are stationary in levels. That is to say, the variables are integrated of order zero. Table 1 shows the results of the Augmented Dickey-Fuller (ADF) in levels and first difference. However, the results show that all the variables are stationary in levels, implying that they are integrated of order 0. The concept of being stationary or not containing unit root implies that the variables has zero mean, constant variance and the residuals uncorrelated over time. Thus, the result accrue are reliable.

Table 1: Unit root tests: ADF in levels and first difference

Variable	Model Specification	ADF	ADF	Order of Integration
		Levels	First Difference	
RY_t	Intercept	-4.271**	-8.558**	0
	Intercept and trend	-5.047**	-8.422**	0
MV_t	Intercept	-6.560**	-6.457**	0
	Intercept and trend	-6.574**	-6.520**	0

Source: author's compilation and values obtained from Eviews
*Notes: (a) ** means the rejection of the null hypothesis at 5%*

Testing for Cointegration

The results for the Johansen cointegration test based on trace and maximum Eigen values test statics are presented in table 2. The results for the maximum Eigen values test statistic shows two cointegrating equations. Similarly, the results of the trace statistic also show two cointegrating equations. This suggests that the null hypothesis of no cointegration could not be rejected, implying a long-run relationship among the variables.

Table 2: The Johansen co-integration test based on trace and maximal Eigen value

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	24.531	14.265**	r = 0	r >=1	34.760	15.495**
r <=1	r = 2	10.229	3.841**	r <= 1	r >= 2	10.229	3.841**

Source: author's compilation and values obtained from Eviews
Note: Both Max-Eigen value and Trace tests indicates 2 cointegrating equations at the 0.05 level (**).

Pairwise Granger Causality

The pairwise Granger causality test was conducted to determine the predictability between manufacturing value added and economic growth in Namibia. In this regard, the presence of a long-run relationship between the variables would imply causation at least in one direction.

Table 3: Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
MV does not Granger Cause RY	33	0.06878	0.9337
RY does not Granger Cause MV		0.03898	0.9618

Table 3 presents the result of Granger causality. The test was extended to the two null hypotheses as postulated in the table. The findings revealed that the null hypothesis that manufacturing value added does not Granger cause real output could not be rejected. Similarly, the null hypothesis that real output does not Granger cause manufacturing value added could also not be rejected. This is due to the fact that in both cases the probability values are greater the level of significance. Thus, it can be concluded that there is no causation between manufacturing value added and real output in either direction.

CONCLUSION

This study examined the causal relationship between manufacturing value added and economic growth in Namibia. The aim was to determine whether there exists any forecastability among the variables. That is to say, to establish which of the variables can help predict the other. The study was based on annual data covering the period 1980 to 2015, utilizing the techniques of unit root, cointegration and pairwise Granger causality. The results of the unit root test reveal that all the variables are integrated of order zero. The results of the cointegration showed a long-run relationship among the variables. The results of the Granger causality test showed no causal relationship running to or from any variable.

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