

CAUSAL RELATIONSHIP BETWEEN MANUFACTURING AND OTHER SECTORS OF THE NAMIBIAN ECONOMY

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ABSTRACT

This paper explored the causal relationship between manufacturing and other sectors of the Namibian economy. The analyses were carried out using the simple pairwise Granger-causality test to determine the causal relationship based on lead and lag relationship in forecasting as developed by Granger (1969). The study used annual data for the period 1980 to 2015 obtained from the World Bank's website. The results showed that there was no causal relationship between manufacture and the agricultural sector. Similarly, there was no causal relationship found between manufacturing the industry sector as well as manufacturing and service sector in the Namibian context. These findings on Namibia could be due to the fact that the manufacturing sector is very small. Therefore, its linkage to the other sectors could also be nonexistent if not weak.

Keywords: Causal, manufacturing, economic growth, Namibia.

1. INTRODUCTION

It has been widely debated that the surest trend through which a nation can achieve continuous economic growth and development is neither by its vast human resources nor the level of its endowed material resources but technological innovation and industrial capacity (Olamade, Oyebisi and Olabode, 2014). Germany for example, in spite of its poor natural resources, and the challenges it experienced from 1920s recurring inflation, Germany has adequately exploited the manufacturing sector and risen to become the biggest economy in Europe. In the innovative world, manufacturing sector is viewed as a basis for determination of a nation's economic efficiency (Amakom, 2012).

Yellow (2010) argues that economic growth is central because it enhances the quality of life of the whole population and also generates revenue and employment opportunities in the country. Long run economic growth is also viewed as healthy in the economy of the nation (Fourie and Burger, 2009). Nakale (2016) states that diamond mining in Namibia has been one of the biggest contributors to growth over the years. The author further opines that the enhanced growth in the early to mid-2000's can be accredited to the expansion in the mining sector which resulted from relatively higher prices and increased volumes from the mining production.

Kuznets (1966) sampled long-term development blueprints of countries using empirical analyses of their national accounts and opined that the increases in the share of manufacturing in GDP is a factor of modern economic advancement, which is considerably different from lower growth rates realised in the world before the dawn of industrial revolution.

The role of the manufacturing sector in the development of any economy cannot be over emphasized. Szirmai (2009) analysed that there was an empirical interaction between the degree of industrialization and per capita income in developing countries. Tybout (2000) opines that manufacturing sector was observed as an engine of growth and an opportunity for various spill overs to other sectors.

In view of the increasingly important role of the manufacturing sector in the Namibia's economy, there has been little evidence to show how the manufacturing sector growth has varied in relation to other important financial and noneconomic variables. This study addressed how other variables relate to manufacturing sector growth in Namibia. Exploring the explanatory power of these variables will fill the knowledge vacuum that currently exists in the study of manufacturing sector growth in Namibia.

2. LITERATURE REVIEW

Arguments about the capability of the manufacturing sector to improve the growth of the economy imply that the sector has a significant ability to fuel economic growth. Pilat (1994) argues that high potency of factors of production could boost manufacturing output tremendously. This expansion in productivity is credited to the effort of manufacturing concerns to counter the varied consumer needs and the obtainment of technology. Empirically, a number of studies have examined the potential of the manufacturing sector in relation to the growth of the economy.

Necmi (1999) assessed whether Kaldor's findings were still acceptable beyond the glory days of hasty industrialization and catch-up of the 1970s. An instrumental variable econometric technique for 45 mostly developing countries for the period 1960-1994 was applied. The results affirmed Kaldor's argument that "manufacturing is an engine of growth" for most of the developing countries included in the study, with the possible exception of countries in sub-Saharan Africa.

Adenikinju and Alaba (2000) carried out an empirical study which examined the Nigerian manufacturing sector's performance with regards to the relationship between productivity, performance and energy consumption with the manufacturing organizations for the period 1970 to 1990. Applying an aggregate model, the researchers measured the changes in the total factor productivity of the sector relative to the change in energy consumption. The studies found that efficiency and productivity of the Nigerian manufacturing organizations are indeed related to the energy supply and energy price. While the energy resources were found to play a critical role in the manufacturing sector though, it was also discovered that energy alone cannot effectively improve the performance of the manufacturing sector in Nigeria.

Dasgupta and Singh (2006) carried out a cross-sectional regression study for 48 developing countries for the period 1990 to 2000 and the results indicated that manufacturing continued to play a role as an engine of growth, whereas services played a similarly important role during that period.

Salami and Kelikume (2011) specifically analysed the relationship between the manufacturing sector and other sectors of the Nigerian economy for the period 1986 to 2010. The Granger causality test within the vector auto regression method was utilized. The results showed no causal relationship between the manufacturing sector and economic growth.

Similarly, there was no causal relationship between the manufacturing sector and financial sector output. However, there was a unidirectional causal relationship between the manufacturing sector with building and construction as well as a bidirectional causal relationship with hotel and restaurant.

Similar to Dasgupta and Singh, in India, Kathuria and Raj (2013) analysed the hypothesis for all 15 states of India in the period 1994-1995 to 2005-2006, and the results indicated that manufacturing had surely played as an engine of growth in India, despite its declining share in GDP. On the contrary, Sheridan (2014) made use of cross-sectional data of 86 countries for the period of 1970 to 2009 to analyse the connection between manufacturing exports and growth using regression tree analysis. The results indicated that in order for a country to appraise manufacturing sector as a benefit for economic growth it firstly needs to be developed. The study conceded that manufacturing exports have a positive relationship to economic growth in countries with higher education and manufacturing exports have a negative relationship to economic growth in countries with lower education.

Szirmai and Verspagen (2015) analysed the link between the value added share of manufacturing and growth of GDP per capita using, random effects, fixed effects, Hausman-Taylor estimations and between effects models for a lopsided panel of 92 countries. This association was analysed for three periods, 1950–1970, 1970–1990 and 1990–2005, and measured with the results of the service sector. They focused mainly on the results of conservative Hausman-Taylor estimations, Szirmai and Verspagen's study which focused on the contribution of manufacturing to GDP per capita growth conditional on the level of education and stage of development. The results indicated that manufacturing acts as an engine of growth for low and for some middle income countries, provided they have a sufficient level of human capital.

Raufu, Chase and Harper (2017) examined the analytical power of the independent variables of FDI, interest rates, inflation, labour costs and government incentives with respect to manufacturing sector growth in Sub-Saharan African countries from 2008 – 2010. The studies found that there was no meaningful link between manufacturing sector growth and any of the independent variables.

The literature above reveals that most studies focussed on the relationship between economic growth and manufacturing sector with the exception of the study by Salami and Kelikume (2011). This study however only looked at the linkages of manufacturing sector with other sectors and not with economic growth. The study intends to fill the literature gap on this subject matter as there are no studies on Namibia yet in this regard.

3. METHODOLOGY

3.1 Data analysis and model

The study used annual data for the period 1980 to 2015 obtained from the World Bank's website. The study follows the approach of Salami and Kelikume (2011). However, the approach was modified in terms of the variables used. Following Szirmai and Verspagen (2015) the variables used are manufacturing value added as percentage of gross domestic product, agriculture value added as a percentage of gross domestic product, industry value added as a percentage of gross domestic product and service value added as a percentage of gross domestic product. As it is the case in Salami and Kelikume (2011), the simple pairwise

Granger-causality test to determine the causal relationship based on lead and lag relationship in forecasting as developed by Granger (1969). This technique is very good in determining the predictability among the variables. The Granger causality test assumes two series X_t and Y_t that define those messages set.

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

...1

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

...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.

4. Empirical Findings and Analysis

Table 1 below shows the results of the pairwise Granger causality tests. The results reveal no causal relationship between manufacture and the agricultural sector. Similarly, there was no causal relationship found between manufacturing the industry sector as well as manufacturing and service sector in the Namibian context. These findings are not peculiar as Salami and Kelikume (2011) also partially found similar results. More so, the linkages found in that study were relatively weak. These findings on Namibia could potentially be due to the fact that the manufacturing sector is very small. Therefore, its linkage to the other sectors could also be nonexistent if not weak. This is a typical case of a developing country with the exception of countries that has industrial policies in place that are being actively pursued in hope to realize economic growth.

Table 1: Pairwise Granger causality

Null Hypothesis:	Obs	F-Statistic	Prob.
AGR does not Granger Cause MAN	34	1.14540	0.3321
MAN does not Granger Cause AGR		0.83095	0.4457
IND does not Granger Cause MAN	34	0.34641	0.7101
MAN does not Granger Cause IND		0.78189	0.4669
SER does not Granger Cause MAN	34	0.48697	0.6194
MAN does not Granger Cause SER		0.76428	0.4748
IND does not Granger Cause AGR	34	0.85193	0.4370
AGR does not Granger Cause IND		0.31254	0.7340
SER does not Granger Cause AGR	34	0.85193	0.4370
AGR does not Granger Cause SER		0.10441	0.9012
SER does not Granger Cause IND	34	0.31254	0.7340
IND does not Granger Cause SER		0.10441	0.9012

5. CONCLUSION

This study examined the causal relationship between manufacturing and other sectors of the Namibian economy. The analyses were carried out using the simple pairwise Granger-causality test to determine the causal relationship based on lead and lag relationship in forecasting as developed by Granger (1969). The study used annual data for the period 1980 to 2015 obtained from the World Bank's website.

The results indicated that there was no causal relationship between manufacture and the agricultural sectors of the economy. Similarly, there was no causal relationship found between manufacturing the industry sector as well as manufacturing and service sector in the Namibian context. These findings could be due to the fact that the Namibian manufacturing sector is very small and as a result its linkage to the other sectors could also be nonexistent if not weak.

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