International Journal of Economics and Management Sciences
Vol. 2, No. 12, 2013, pp. 41-51

MANAGEMENT JOURNALS
managementjournals.org

Tanzania Manufacturing Export and Growth: A cointegration Approach

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ABSTRACT

This paper examines the long run relationship between exports and growth of Tanzania manufacturing sector. It does so by estimating an endogenous growth model on time series data from 1961 till 2010. The paper also estimates the short -term dynamic behaviour of Tanzania's growth function of manufacturing value added via the error correction model. The results suggest a long run relationship between exports and growth. Analysis of aggregate statistics of trends in performance of Tanzania manufacturing suggest that manufactured exports have grown faster than growth in recent years due to the fragmentation and internationalization of industrial activity. Furthermore the paper shows that the error correction term is correctly signed and statistically significant. Tanzania has experienced a positive growth ranging at 5 percent annually for the last decade from 2000s.

Keywords: *Exports, Growth, Cointegration Analysis.*

1 INTRODUCTION

This paper set out to investigate the long run relationship between exports and growth of Tanzanian manufacturing sector. Specifically, it uses long span of data from annual surveys of industrial production, industrial census, economic surveys and statistical abstracts enables the paper to examine trends in various patterns of major manufacturing variables along with empirical estimation of the long run relationship. Ultimately it uses endogenous growth model framework to estimates the Error Correction Model [ECM]. Several factors motivate the analysis of this paper. The most critical ones are that, in recent years, the relation between export and economic growth in developing countries has become a central topic of debate among development economists. To whether and to what extent does export raise economic growth in developing countries, and if it does, why is one of the critical questions. Already there are number of empirical studies linking economic growth to the openness of the trade regime (Little, Scitovsky and Scott, 1970; Balassa, 1971 and 1982; Bhagwati, 1978; Krueger, 1978; Heitger 1987; World Bank 1987; Romer 1989; Quah and Rauch 1990; Michaely, Papageorgiou and Choksi, 1991; Thomas, Nash and Associates, 1991; Dollar, 1992; Edwards, 1992; Harrison, 1995; Savvides, 1995; Bakht, 1998; Onafowora and Owoye, 1998).

Furthermore, some other studies find little empirical evidence to support a link between trade and economic growth (Sachs, 1987; UNCTAD, 1989; Agosin, 1991; Taylor, 1991; Shafaeddin, 1994; Clarke and Kirkpatrick, 1992; Greenaway and Sapsford, 1994; Karunaratne, 1994; Jenkins, 1996; Greenaway, Morgan and Wright, 1997). Secondly, the emergence of endogenous growth theory has provided a theoretical framework for undertaking empirical work on the relation between trade policies and economic growth. The contributions of this paper are based: (i) it augments Lucas's (1988) human capital model of endogenous growth by incorporating an index of trade liberalisation; and (ii) it empirically examines validity of the augmented Lucas model in the context of Tanzanian economy. From the empirical literature point of view, this paper is motivated by the historical trends of the Tanzania manufacturing sector.

After long time attempt to develop an inward looking recent attempts have pointed on outward looking that makes Tanzanian manufacturing export oriented. This in turn expects an export led growth manufacturing development similar to what was observed in Europe and East Asian economies. Whether such expectation has materialised is one of the preoccupations of this paper. To investigate this the paper applies cointegration analysis. Such a *cointegration analysis,* not only searches for a linear combination of non-stationary time series

that is itself *stationary*, but also makes an attempt (using an *error correction* term) to investigate the dynamic behaviour of the process of adjustments from short run disequilibria to long run equilibrium. It follows therefore that this paper empirically analyses the relation between manufacturing exports of Tanzania and manufacturing growth over the period of 1960 till 2010 in the context of the endogenous growth model. After this introduction, the next section discusses trends in Tanzanian manufacturing growth and export from 1960 till 2010. The third section gives theoretical framework for cointegration between export and growth, section four provides the empirical results and the fifth section give summary and conclusion of the paper.

2 TRENDS IN TANZANIAN MANUFACTURING GROWTH AND EXPORTS FROM 1960-2010

2.1 Tanzania Manufacturing Development in the Post Independence till 1990s.

Trends in growth of Tanzania manufacturing can be traced from the early 1960s when the Tanzania became independent. Initially the sector generated significant growth in gross output especially in the 1970s. It peaked in 1978, and then declined over the period 1981-1988 (Mnenwa R. and E. Maliti (2009), Musambya, M. (2011)) It will be recalled that soon after independence, policies towards manufacturing focused on strengthening production of industrial commodities; to raise the growth of the sector and its contribution to the economy, to increase industrial efficiency; and create employment opportunities for Tanzanians. Great efforts were made to practically implement the decision of establishing industries that manufactured goods that were being imported; to develop processing industries to increase the value of crops and to develop industries that manufactured machines and other equipments. Industries that produced raw materials for other industries were accorded importance. This was the time when Tanzania developed capital goods industries such as, a factory to produce ox-ploughs that is Ubungo Farm Implements (UFI) was established in 1970 with the capacity of producing 2,500,000 hand hoes and 30,000 ox-ploughs annually. A factory for agricultural implements in Mbeya was established in 1984, with the capacity of producing 1,500,000 hand hoes and 10,000 ox-ploughs annually.

Furthermore, in 1981 a factory for assembling tractors *Valmet* was established with a capacity of assembling 500 tractors annually. Further, a fertilizer factory was established with a capacity of producing 100,000 tons of fertilizer annually and a total of 11 textiles factories were established in Dar es Salaam, Arusha Morogoro, Mwanza, Mara, Tabora and Mbeya regions. Later on the contribution of the industrial sector increased by four folds as by the 1980s, industries contributed 10 percent of the GDP. Employment in the industrial sector increased five times when large and medium factories employed 85,493 people at the beginning of 1980. It is also estimated that small scale industries employed 255,550 people. Investment in the industrial sector in the 1980s reached 50 percent as compared to only 10 percent before the Arusha Declaration. Exports increased by more than 100 percent from 9.9 percent in 1966 to 22.3 percent in the 1980s. Also in this period many factories were established creating many employment opportunities; and increasing the avenues for taxation and reduced dependency on imports especially materials for schools, clothing, food, domestic tools and fertilizer.

Large industries in textile production which had been closed have been revived and are operating. Those industries include Sunguratex now (NIDA); Mbeya Textiles; Kilimanaro Textile (in Dar-es Salaam and Arusha); Mwanza Textiles and Urafiki Textiles. The contribution of the industrial sector in exports which are not natural products has picked up in a short period. However, from the late 1970s this growth halted. The gross real output value of the year 1988 was about one third of the real gross output value during the peak year of 1978. The decline was followed by a rise between 1989 and 1993, and then a further decline over the period 1992-1996. This was followed by some recovery after 1995. In connection to that, the collapse of manufacturing production intensified during the period of economic crisis. Following major economic reforms adopted in 1986, the sector has been subjected to substantial re-structuring aimed at increased growth capacity utilization and overall efficiency. It will be recalled that after the introduction of Import Substitution and Basic Industrialization Strategies the Tanzanian manufacturing sector became a fast-growing sector.

However, rapid expansion of industrial production particularly in the 1960's and 1970's was followed by a collapse in the early 1980's. Inefficiency due to high protection in the form of tariffs and non tariffs instruments, scarcity of foreign exchange, excessive state involvement in industrial production (including subsidization), anti export bias are among possible factors, why the objectives of industrialization of this sort were not achieved. The production of goods, which were formerly imported, was accompanied by imports of capital goods and intermediate inputs. Two implications of this phenomenon may be identified. First the desired production levels could only be maintained if the productivity of the import substituting industries was high enough to generate foreign exchange to facilitate importation of inputs. Secondly, the import substitution industrialization objective could be realized if, foreign exchange saved by producing manufactured goods was high enough to cope with the requirements of imported inputs to keep industry operating at the desired levels.

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Hence, it can be concluded that trends in growth of manufacturing sector of Tanzania reflect three periods of industrial development in the post-independent Tanzania namely: a period of expansion, 1974-1980, a period of collapse 1981-1990 and a period of adjustment, privatisation and re-structuring, 1991-2000s. The empirical question posed in this section follows from the historical development of the Tanzanian manufacturing described here: what influenced the underlying growth of the manufacturing sector over the whole period (1966-2010)? Has growth in manufacturing sector productivity? There was certainly an expectation that after the reforms local firms would operate in a more competitive environment so as to enhance their efficiency and productivity. Whether or not there are changes in growth and exports after the reforms is a question addressed below.

2. 2. Tanzania Manufacturing Growth after Reforms

This section examines performance of the sector during and after the reforms. This is the era when Tanzania manufacturing witnessed substantial changes after Tanzania embarked on comprehensive reforms from late 1980s. The reforms that were significant entails trade liberalization, abandoning of import substitution strategy and establishment of empowerment of the private sector to take the lead in direct production. In implementing such changes most of the state owned factories were privatized and massive campaigns to attract foreign direct investment in manufacturing sector was introduced. There are all signs to believe that Tanzania manufacturing sector has been changing. In this paper information from the Annual Survey of Industrial Production conducted by National Bureau of statistics (2010) are used to describe the aspects of growth in Tanzania manufacturing. Based on such data, the manufacturing sector of has been growing at between 8 and 10 percent. For instance in 2008 it grew by 9.9 percent, at 2001 constant price, compared to the growth of 8.7 percent recorded in 2007. The data available also shows that Tanzania's manufacturing sector has now shown the signs of overcoming the difficult years of 1980's and 90's and has been accelerating the growth during the last five years. This implies that the sector has even a greater potential via linkages with the rest of the economy, including agriculture and the country's natural resource base. For instance data available shows that for overall growth of Tanzania economy, manufacturing sector contributes about 8.5 percent to GDP.

Further findings are that the manufacturing sector of Tanzania is still dominated by labour-intensive simple, single and independent production units, operating in a competitive product markets(Shafeaddin, S.M., (2005): "UNIDO (1999): UNIDO (2002): UNIDO (2010):UNIDO (2011): URT (2010): URT (2011): "URT (2012): VETA (2010): World Bank (2012a), World Bank (2012b): Ziderman, A. (2002). Very few are complex and organized as interlinked business entities. Both mining and manufacturing sectors are largely dominated by single establishments. On the other hand, the study confirms that industrial sector in Tanzania is dominated by agroprocessing sub-sectors such as food processing, beverage and tobacco. The agroprocessing sub-sector constituted about 70 percent of industrial production in Tanzania reflecting the role of agriculture as the mainstay of the Tanzanian economy. The survey results present 62.4 percent of manufacturing firms being established during the last fifteen years (i.e, between 1995/6 and 2009/10). More interesting is the 21 percent of the manufacturing firms that were established during the last five years.

These are new with increased manufacturing capacities and export capabilities.In connection to labor intensity technology, the overall level of employment has important implication on observed growth. Brief analysis of employment in Tanzania manufacturing is provided below. According to the Economic Surveys (2012) a total of 110,839 persons were engaged by 729 manufacturing firms, which offered information about their employment situation. Furthermore, the survey shows that 98.9 percent (i.e., 109,582 workers) of the total employees were Tanzanians whereas 1.1 percent (1,257 workers) were foreigners. Analysis of gender participation in the manufacturing employment revealed that about 30 percent of workers to constitute female gender workers in year 2012. However, there are wide variations in female gender employment between and within sub industry sectors. The female gender employment is high in manufacturing of tobacco, textile and plastic products. As expected, the share of females employed in formal and large scale basic metals, mining and metal products sectors was low.

2.3 Tanzanian Manufacturing Value Added After reforms

Employment and Growth of manufacturing influences the size and direction of the growth path of manufacturing value added and ultimately exports. If employment carefully self select skilled labour that can produce competitive products, then export led growth is guaranteed. In this section the paper make use of recent analysis of United Nations Industrial Development Organization (UNIDO) to describe the status of Tanzania manufacturing vale added along with a comparison with selected countries. Based on UNIDO survey of 2012, Tanzania's MVA has grown significantly in the last decade. Between 2000 and 2010, MVA increased from US$ 894 million to US$ 1,992 million in constant US$ 2000 terms (see Table 2). What is remarkable is the stability of the country's growth trajectory. The growth rates in the first and second half of the decade were above 8

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percent per year, outpaced only by China and Mozambique. At the same time, MVA growth has been complemented by economic growth. China, Mozambique, Uganda and Tanzania had the highest GDP growth rates for the period 2000-2010 (10.5 percent, 7.8 percent, 7.4 percent and 7.0 percent, respectively), implying that there is indeed a strong link between industrialization and economic development.

Despite this performance, the relevant question is whether Tanzania can sustain this growth trend, especially if it continues to focus on natural resource based activities. In this regard, it must be mentioned that the value addition from metals and other extractive industries is still very limited. Accordingly, one sensible strategic option for the country is to upgrade within this important sector and to thus move into higher value added activities.

This is in line with the idea that the structural change necessary for improving a country's economic development has to take into account the comparative and competitive advantages of the country. This does not always imply that a major shift from low-technology to high-technology manufactures is needed. In particular, for countries at an early stage of industrialization, structural transformation can start within well-established sub-sectors. Increasing value addition through enhanced processing in natural resource-based industries could, therefore, be a possible starting point for Tanzania. For a complete picture of Tanzania's MVA performance in relative terms, it is necessary to take the country's size into account. Applying a capacity indicator to MVA, the industrial base of Tanzania remains one of the lowest in the world with an MVA per capita of only US$ 44 in 2010, despite a growth rate of 5 percent per annum since 2000 (Table 3). This growth has enabled Tanzania to overtake Zambia and to substantially reduce the gap to Kenya in MVA per capita terms. However, from a global perspective, this comparison shows that MVA growth in Tanzania is less impressive than it appears at first glance. In fact, the group of East African neighbours remains quite far behind their more industrialized comparators. For instance, South Africa as the main reference point for countries in the region has an MVA value far above that of Kenya or Tanzania.

Table 1: Value Added of Tanzania (2000-2010) Manufacturing Compared with selected countries.

Manufacturing value added (consistent US$ 2000 million)				**Annual growth rate (%)**		
Country	**2000**	**2005**	**2010**	**2000-2005**	**2005-2010**	**2000-2010**
China	384,942.3	630,818.5	1,115,270.8	10.4%	12.1%	11.2%
Mozambique	452.3	896.6	1,017.4	14.7%	2.6%	8.4%
Tanzania	894.1	1,318.3	1,991.7	8.1%	8.6%	8.3%
Uganda	439.7	591.4	834.2	6.1%	7.1%	6.6%
Zambia	329.4	420.4	549.8	5.0%	5.5%	5.3%
Indonesia	45.785.8	58,367.9	70,687.4	5.0%	3.9%	4.4%
Botswana	245.7	293.2	368.3	3.6%	4.7%	4.1%
Kenya	1,309.2	1,522.5	1,882.2	3.1%	4.3%	3.7%
Malaysia	28.946.8	36,300.0	40,694.8	4.6%	2.3%	3.5%
Malawi	202.6	152.6	271.0	-5.5%	12.2%	3.0%
South Africa	22,926.7	26.678.2	28,849.6	3.1%	1.6%	2.3%
Mauritius	941.0	910.8	1,041.8	-0.6%	2.7%	1.0%

Source: World Development Indicators

Export Performance of Tanzanian Manufacturing

The main hypothesis tested in this paper is a on whether or not there is a long run relationship between export growth and growth in manufacturing sector of Tanzania that can be used to account for the observed trends in development of Tanzanian manufacturing and perhaps the entire industrialization path. But to put the export and growth into picture, the paper uses available assessment from recent studies conducted in Tanzania manufacturing. Specifically the UNIDO survey on manufacturing conducted in the year 2012 also highlighted some development aspects of Tanzania manufacturing. Based on the findings of UNIDO survey and their statistics summarised in Table below, Tanzania has recorded the highest growth rate in manufactured exports (31 percent per annum) among the comparators from 2000-2010, growing from US$ 129 million to US$ 1,904 million. It is important to mention that this significant increase mainly took place in the second part of the decade (45 percent per annum between 2005 and 2010) despite the financial crisis which negatively affected the export performance of most economies in the world, including China and Kenya. Notwithstanding the good growth performance of Tanzania's manufactured exports, it must be noted that nearly half of the country's manufactured exports in 2010 were resource-based products (mostly base and precious metal ore)4. Hence, Tanzania's manufactured trade performance is not as impressive as it seems at first glance. In fact, the current

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reliance of industrial growth on a few products that have low value addition and high price fluctuation calls for measures to diversify the export basket to lower the economy's vulnerability and to sustain growth. To evaluate this impressive growth performance, caution is also warranted when interpreting the growth rates. Countries with a small export base (e.g. Tanzania)

Table 2: Manufactured Exports for Tanzania and Comparators, 2000-2010

Manufactured exports (US$5 million)				Annual growth (%)		
Country	2000	2005	2010	**2000-2005**	**2005-2010**	**2000-2010**
Tanzania	129	292	1,904	18%	45%	31%
Uganda	30	120	401	32%	27%	30%
China	228.407	722,628	1,518.587	26%	16%	21%
Zambia	310	529	1,408	11%	22%	16%
Malawi	68	126	294	13%	19%	16%
Kenya	586	1,988	2,525	28%	5%	16%
Rwanda	22	42	93	14%	17%	15%
Mozambique	60	207	272	28%	-4%	11%
South Africa	18,355	32,465	46,842	12%	9%	10%
Indonesia	42,990	55,118	94,804	5%	11%	8%
Malaysia	87,643	120,622	165,590	7%	7%	7%
Botswana	2,654	4,254	4,398	10%	1%	5%
Ghana	477	1,079	653	18%	-10%	3%
Mauritius	1,457	1,368	1,424	-1%	1%	0%

Source: UN Comtrade (Rwanda values for 2001-2010)

3 THEORETICAL FRAMEWORK FOR COINTEGRATION BETWEEN EXPORT AND GROWTH

In this section, the paper descries a theoretical framework that displays the whole concept of cointegration. This is what in turns help the subsequent estimates of the paper. To describe the framework, let $= (y_{it}, \ldots, y_{nt})'$ Denote an *(n x 1)* vector of 1 (1) time series is coitegrated if there exists an (n x 1) vector $\beta = (\beta_1, \ldots, \beta_n)'$ such that $\beta' Y_t = \beta_1 y_{it} + \ldots + \beta_n y_{it} \sim I(0)$

In words, the nonstationary time series in Y_t are cointegrated if there is a linear combination of then that is stationary or I (0). If some elements non-zero coefficients is cointegrated. The linear $\beta' Y_t$ combination is often relationship. The intuition is that I (1) time series Y_t with a long-run equilibrium relationship cannot drift too far apart from the equilibrium because economic forces will act to restore the equilibrium relationship. In this paper a long run relationship between export and growth is assessed with the possible cointegration between the two variables in mind.

In practice there are various forms of cointegration. The most significant that might be relevant for this paper are two; the normalization and the fact that cointegration can exhibit a common trend. In the case of cointegration one might consider the cointegration vector β in (12.2) is not unique since for any scalar c the linear combination $c\beta' Y_t = \beta^{*\prime} Y_t \sim I(0)$. Hence, some normalization assumption is required to uniquely identify β . A typical normalization is

$$\beta = (1, -\beta_{2,}, \ldots, -\beta_n)'$$

so that the cointegration relationship may be expressed as

$$\beta' Y_t = y_{1t} - \beta_{2y2y} - \ldots - \beta_n y_{nt} \sim I(0)$$

or

$$y_{1t} = \beta_2 y_{2t} + \ldots + \beta_n y_{nt} + u_t$$

Where $u_t \sim I(0)$. In (12.3), the error term u_t *is often referred to as the disequilibrium error or the cointegrating residual. In long-run equilibrium, the disequilibrium error* u_t is zero and the long-run equilibrium relationship is

$$y_{it} = \beta_2 y_{2t} + \ldots + \beta_n y_{nt}$$

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If the (nx1) vector Y_t is cointegrated there may be $0 < r < n$ linearly independent cointegrating vectors. For example, let n=3 and suppose there are r = 2 cointegrating vectors $\beta_1 = (\beta_{11}, \beta_{12,}\beta_{13})'$ and $\beta_2 = (\beta_{21,}\beta_{22,}\beta_{23})'$

Then $\beta'_1 Y_t = \beta_{11}y_{1t} + \beta_{12}y_{2t} + \beta_{13}y_{3t} \sim I(0), \beta'_2 Y_t = \beta_{21}y_{it} + \beta_{22}y_{2t} + \beta_{23}y_{3t} \sim I(0)$ and the (3 x 2) matrix forms a basis for the space of cointegrating vectors.

$$\beta' = \begin{pmatrix} \beta'_1 \\ \beta_2 \end{pmatrix} = \begin{pmatrix} \beta_{11} & \beta_{12} & \beta_{13} \\ \beta_{21} & \beta_{22} & \beta_{33} \end{pmatrix}$$

The linearly independent vectors β_1 and β_2 in the cointegrating basis B are not unique unless some normalization assumptions are made. Furthermore, any linear combination of β_1 and $\beta_{2,} = c_1\beta_1 + c_2\beta_2$ where c_1 and c_2 are constants, is also a cointegrating vector. For cointegration and common trends it is considered that; if the (n x 1) vector time series Y_t is cointegrated with $0 < r < n$ cointegrating vectors then there are n – r common 1 (1) stochastic trends. To illustrate the duality between cointegration and common trends, let Y_t $(y_{lt,} y_{2t})^1 \sim 1(1)$ and suppose that Y_t is cointegrated with cointegrating vector $\beta = (1, -\beta_2)^1$. This cointegration relationship may be represented as

$$y_{1t} = \beta_2 \sum_{s=1}^{t} \varepsilon_{1s} + \varepsilon_{3t}$$

$$y_{2t} = \sum_{s=1}^{t} \varepsilon_{1s} + \varepsilon_{2t}$$

The common stochastic trends is $\sum_{s=1}^{t} \varepsilon_{1s}$ Notice that the cointegrating relationship annihilates the common stochastic trend:

$$\beta' Y_t = \beta_2 \sum_{s=1}^{t} \varepsilon_{1s} + \varepsilon_{3t} - \beta_2 \left(\sum_{s=1}^{t} \varepsilon_{1s} + \varepsilon_{2t} \right) = \varepsilon_{3t} - \beta_2 \varepsilon_{2t} \sim I(0)$$

For the case of manufacturing export and growth the cointegration might result due to the fact that while manufacturing value added is the key indicator of industrial performance, manufactured export is another important indicator used to assess industrial competitiveness in global markets. Take, for instance, the case of a highly protected economy. Inward-looking policies may distort the real competitive performance of a country as industries are not exposed to international competition and imports are restricted. However, such cointegration is not obvious or in some instances not straightforward. There could be some factors observed or unobserved that might influence such likelihood hence must be measured. It is therefore necessary to investigate empirically the long run relationship between export and growth in manufacturing.

Model Specification

In estimating model for this paper we adopt previous strategy in paper like (Dilip Dutta, et al, 2006) that consider L_t as the number of workers, q_t be a measure of the average quality of workers and u be the fraction of working hours workers spend on production of goods, such that $uq_t L_t$ is the total effective workforce used to produce output, $Y_{t.}$ In the Lucas model, Y_t depends on the physical capital stock, $K_{t,}$ the effective work force, $uq_t L_t$, and the average skill level of human capital (workers), $q_{a:}$

$$Y_t = A_t K_t^b (ug_t L_t)^{1-b} q_a^{\gamma y}$$

where the term q_a^{γ} represents externalities from average human capital (AHC) and A_t stands for the technology level which is assumed to be constant.

In equilibrium, all works are assumed to have the same skill level ($q=q_a$). So the Lucas model becomes:

$$Y_t = A_t K_t^b (uL_t)^{1-b} q_t^{\,1+\gamma-b}$$

From the above function we get the returns to scale:

$$(2+\gamma-b) > (2-b) > 1$$

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In the Lucas model (1988), the increasing returns to scale due to externalities from average human capital are the driving force for an economy's sustained positive growth rate. The sustained growth depends on the value of γ.

For simplicity, Lucas also assumed that the workers use of fraction (u) of their non-leisure time in current production, devoting the remaining (l-u) to human capital accumulation, and thus

$$\Delta q_i / q_i = \delta_i u_i$$

Where δ_i denotes the positive coefficient representing workers; skill formation in sector i. Such skill formation takes place more in sectors producing 'high-technology goods: the export sector in particular and the industrial sector in general. Under trade liberalization policy, both the export and industrial sector in developing countries come in contact with more advanced technology through import and/or foreign investment. Therefore, it is likely that worker's skill level (internal and external) will increase. In particular for this paper the production function is estimated in log-linear form (with an error term, u_t), the following equation may be written:

$$LogVA_t = \alpha_O + \alpha_1 LK_t + \alpha_2 LL_t + \alpha_3 LEXP_t + \alpha 4_4 LTAF_t + \alpha_5 LHC_t + EC_{t-1} - + u_t$$

It is expected that the elasticity parameters $(\alpha_1, \alpha_2 + \alpha_3, \alpha_5) > 0,$ and $\alpha_4 < 0.$ this leased to the specific of general ECM of the industrial production function of the following form:
Where EC_{t-1}= error-correction term lagged one period.

4 EMPIRICAL RESULTS

This section presents results of the estimates made in this paper. The estimates are for assessing whether or not there is a long run relationship between observed export performance and trends in growth of Tanzania manufacturing. The data available for the assessment is from Annual Surveys of Industrial Production of Tanzania supplemented with other sources especially the statistical abstracts issued by the National Bureau of Statistics. The data are from 1960 till 2010. The findings in the table below provide a unit root test for stationarity. The tests take into account both the level and the differences of all key variables in the model specified above. The paper employs the famous Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) unit-root tests. Based on the results indicated in the table below the paper fails to reject the existence of unit roots. In this respect it is an evidence of non-stationarity, at least in the levels of the log of value added, log of labour log of export and that of human capital. This calls for considering the second level differences that confirms stationarity. In the table 5 the paper introduces the Phillips –Perron (PP) unit-root test. Using this test it is easier to see that all the variables are stationary in both levels and differences. It follows therefore that the variables in the model estimated are integrated of order 1.

Table 3: DF-ADF Unit Root Tests for Stationarity

		DR		ADF (1)	
Variable	**Levels or First Diff.**	**Without Trend**	**With Trend**	**Without Trend**	**With Trend**
LogVA	Levels	-0.48	-2.77	-0.46	-2.87
	First Diff.	-5.24	-5.82	-2.81	-2.21
LK	Levels	-2.85	-4.32	-2.54	-5.48
	First Diff.	-3.55	-3.29	-3.29	-3.70
	Second Diff	-5.81	-5.84	-5.91	-5.42
LL	Levels	-3.92	-2.71	-2.52	-2.69
	First Diff.	-3.44	-2.94	-2.65	-1.34
	Second Diff	-5.99	-6.90	-4.66	-4.92
LEXP	Levels	-0.93	-2.45	-0.88	-2.30
	First Diff.	-5.77	-5.62	-2.35	-2.35
LTAF	Levels	-3.24	-2.27	-3.66	-2.82
	First Diff.	-4.92	-5.38	-2.28	-2.45
LHC	Levels	-0.07	-2.74	-0.38	-2.78
	First Diff.	-3.22	-3.88	-2.77	-2.39

Notes:

(i) 96% critical values for DF & ADF statistics (variables in level) -3.01 (without trend) 7 -3.65 (with trend).
(ii) 95% critical for DF & ADF statistics (variables in first df.) = -3.02 (without trend) &-3.66 (with trend).

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Table 4: DF-ADF Unit Root Tests for Stationarity

Variable	Levels or First Diff.	Constant No Trend	Constant Trend
	Levels	-0.44	-2.36
	First Diff.	-5.18	-5.44
	Levels	-2.93	-2.56
LK	First Diff.	-2.54	-3.25
	Second Diff	-5.23	-5.78
	Differences		
LL	Levels	-3.78	-2.22
	First Diff.	-2.22	-2.24
	Second Diff	-6.27	-6.56
LEXP	Differences		
	Levels	-0.89	-3.09
LTAF	First Diff.	-5.23	-5.66
	Levels	-2.65	-1.89
LHC	First Diff.	-5.22	-6.55
	Levels	-0.97	-1.46
	First Diff.	-4.11	-4.44

Note: (i) The critical values for PP statistic at 95 per cent level are -2.90 (for constant and no trend) and -3.46 (for constant and trend).

It will be recalled that in the previous stage the paper focused on assessing whether or not the variables in our model are integrated. The findings were that all the six variables are integrated of order one. Hence in this section we move to the next step which determines whether any combinations of the variables are cointegrated. In order to undertake this important step of the analysis the paper first establishes the relevant order of lags (*p*) of the *vector autoregressions* (VAR) model. In particular the paper select 1 for the order of the vector autoregressions. Findings from such estimates are shown in the table below via Johansen Juselius (JJ) method.

Table 5: Test for Cointegration

Null	*Alternative*	Statistic	95% Critical Value
	Maximal Eigen value Test		
$r = 0$	$r = 1$	65.12	38.15
$r \leq 1$	$r = 2$	42.14	32.55
$r \leq 2$	$r = 3$	28.18	38.22
$r \leq 3$	$r = 4$	12.56	24.16
$r \leq 4$	$r = 5$	9.26	13.55
	Trace Test		
$r = 0$	$r \geq 1$	133.45	96.11
$r \leq 1$	$r \geq 2$	95.18	80.26
$r \leq 2$	$r \geq 3$	55.62	19.14
$r \leq 3$	$r \geq 4$	28.08	25.36
$r \leq 4$	$r \geq 5$	14.22	16.66

Notes: (i) $_r$ stands for the number of cointegrating vectors

In interpreting the results we address the major hypothesis of this paper. To begin with it is worthwhile recalling that the maximal eigenvalue test suggests r = 1, while the trace statistic shows r =3. According to these findings the paper cannot reject the fact that there exists a long run relationship between the growth in manufacturing measured by value added and exports controlling for other determinants.

Table 6: Estimates of Long-Run Cointegrating Vector (Linearised)

LogVA	LK	LL	LEXP	LTAF	LHC
1.00	0.88	-7.33	-0.83	-0.64	1.56
	(0.69)	(5.65)	(0.75)	0.49)	(1.17)

Note: Figures in parentheses indicate standard errors.

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Estimation of an Error-Correction Model

In this section we estimate an *error-correction* model (ECM). The ECM shown in *Table 8* is found to fit the data best. In the model, growth rates of labour force lagged one year, real exports lagged one year and real fixed capital formation (at above the 10 per cent level of significance) have emerged as significant determinants of the growth rate of industrial value added in Tanzania. The error correction coefficient, estimated at -0.21 is statistically significant at the 5 per cent level, has the correct sign, and suggests a moderate speed of convergence to equilibrium. The diagnostic test statistics show no evidence of misspecification, no serial correlation, nor any problem of heteroscedasticity and no problem of nonnormality in the residuals.

Table 7: Estimation of an Error-Correction Model

Regressor	Parameter Estimate	T-Ratio	P-Values
Intercept	-5.12	-2.40	0.03
Δ^2 LK	0.09	1.60	0.14
Δ^2 LL(-1)	2.00	5.42	0.00
Δ LEXP(-1)	0.07	2.34	0.04
Δ LTAF(-1)	-0.01	-0.32	0.75
LHC(-1)	0.07	1.12	0.25
EC(-1)	-0.21	-2.43	0.03
AdjR^2=0.79			
D.W. =1.79			
Serial Correction =1.31 (0.25)			
RESET = 0.01 (0.92)			
Normality = 0.46 (0.79)			
HET = 0.02 (0.89)			

Note: Figures in bracket indicate p-values

5 SUMMARY AND CONCLUSIONS

This paper set out to investigate the long run relationship between exports and growth of Tanzanian manufacturing sector. In particular it uses data comes from a broad range of sources including annual surveys of industrial production, industrial census, economic surveys and statistical abstracts. Using such information it examined trends in various patterns of major manufacturing variables along with empirical estimation of the long run relationship. Endogenous growth model framework facilitated was then used to estimates the Error Correction Model [ECM]. In setting the analysis the paper indicated that after long time attempt to develop an inward looking recent attempts have pointed on outward looking that makes Tanzanian manufacturing export oriented. However, there is a question of whether reforms have facilitated growth in manufacturing sector and ultimately exports. To investigate this paper applied cointegration analysis. Such a *cointegration analysis*, not only searched for a linear combination of non-stationary time series that is itself *stationary*, but also made an attempt (using an *error correction* term) to investigate the dynamic behaviour of the process of adjustments from short run disequilibria to long run equilibrium.

The descriptive information confirmed four waves of manufacturing dynamics from the early 1960s when the Tanzania became independent. The first was that of 1960s when the sector generated significant growth in gross output especially in the 1970s. It peaked in 1978, and then declined over the period 1981-1988. Then we have post reform period from m1990s. This is the period where not much have been done to empirically assess the outcomes. In the empirical investigation of the aggregate growth function of industrial value added in Tanzania, cointegration and error correction modelling approaches have been applied. In estimating the cointrgration between exports and manufacturing growth the paper finds strong evidence of the correlation between these two key variables. In order to determine the short-term dynamics around the equilibrium relationship, the Paper estimated error correction model (ECM). Such estimates revealed that capital, labour and exports significantly affect growth in Tanzania manufacturing.

The results of the study seem to suggest the importance as well as the imperative for developing countries to embark on comprehensive trade liberalisation policies in order to accelerate and sustain economic growth. It follows therefore that increased growth in Tanzania manufacturing has driven manufactured export growth. On the other hands access to the global market in Tanzania has acted as a catalyst to increase production of domestic manufacturing firms. There are potentially more evidences on this issue. From an economic perspective, Tanzania's current export and MVA performance contribute to overall GDP growth. The major risk of the current trend is that despite the strong growth rates, its effect on inclusive development and employment generation is questionable. In particular, the potential for skills learning, technology transfer, innovation and

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employment absorption of mineral extraction-based exports will be an important consideration as Tanzania becomes a more established exporter. The discussions in Section C attempt to highlight the opportunities for Tanzanian industry in more detail, and also argue how resource-based exports can be utilized to support further industrialization. As far as Tanzania's export structure is concerned, a positive story is starting to emerge. Tanzania has more than doubled the share of manufactured goods within exports in the last decade. Further findings are that Tanzania has experienced a positive growth ranging at 5 percent annually for the last decade from 2000. In terms of exports manufactured products made up nearly 50 percent of all exports in Tanzania. Therefore in comparison with countries that are at a similar stage of development, Tanzania has succeeded in catching up with Kenya in this respect, while overtaking Rwanda and Zambia.

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