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**Causality Relationships between Total Exports  
with Agricultural and Manufacturing GDP in  
Tanzania**

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**Abstract**

This paper, investigates causal relationships among agriculture, manufacturing and export in Tanzania by using time series data for the period between 1970 and 2005. The empirical results show in both sectors there is Granger causality where agriculture causes both exports and manufacturing. Exports also cause both agricultural GDP and manufacturing GDP and any two variables out of three jointly cause the third one. There is also some evidence that manufacturing does not cause export and agriculture. Regarding cointegration, pairwise agricultural GDP and export are cointegrated, export and manufacture are cointegrated. Agriculture and manufacture are cointegrated but they are lag sensitive. However, three variables, manufacturing, export and agriculture both together are cointegrated showing that they share long run relation and this has important economic implications.

**Keywords:** Causality, agricultural and manufacturing GDP, export, Tanzania

**JEL classification:** C5, C12, C32, F14, F40

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# INTRODUCTION

## 1.1 Background to the Study

For many years both policy makers and academicians have shown greater interest in exploring the possible relation between international trade and economic growth. The reason is clear. Nations are concerned about the quality of life of their citizens which mainly comes from macroeconomic prosperity. Increasing GDP is the major target of any economy. There are many different approaches to achieve this goal; one possibility is to promote export. But this however raises questions, should a country promote export to speed up economic growth or should it primarily focus on economic growth to generate international trade?

Due to these contradictions, economists came up with different views concerning the role of export on growth. In many literatures, the export-led growth and growth-driven export hypotheses have become a debate for researchers and policy makers alike for almost three decades. The Export-led growth hypothesis generally reflects the relationship between exports and economic growth; in particular, that output growth is driven by exports. This relationship, however, remains the subject of debate. Several studies have established a positive relationship between export expansion and economic growth. Some studies provided empirical results to support this hypothesis of positive relation, such studies include Balasa (1978) Feder (1982). In addition Arnade and Vasavada 1995; Fosu 1996; Thornton 1996; Perry Sadorsky 1996 in Canada found that exports leads to the economic growth, while others have found contrasting evidence that export is caused by the economic growth (Al-Yousif 1999, Henriques and Sadorsky 1996; Harnhirun 1996), Evidence from the ASEAN Countries, while yet others demonstrated that there exists a bi-directional relationship between these variables such that export cause economic growth and economic growth cause export (Dutt and Ghosh 1994; Thornton 1997; Shan and Sun 1998; Khalafalla and Webb; 2001 in the study of case of Malaysia found bi- direction causality. Due to the above mentioned studies, it is contradicting that which one cause another one therefore most of developing countries are still in dilemma whether to open up their economies to promote international trade or whether they should concentrate on economic activities which will lead to the growth of international trade. A lot of debate has been going on in the world today such as Doha

Development Agenda; trade for aid discussion, etc; this is because some scholars believe that developing countries can achieve economic growth through free market while others believe that developing countries should protect their industries from imported goods and promote their economic activities which will lead to the economic growth. The question is that, Is it true that developing countries can benefit from opening up for trade? Why does international organization such as World Trade Organization (WTO) and developed countries pushing developing countries to promote free trade? Should developing countries concentrate on promoting domestic production rather than export?

It is widely accepted among economists that economic growth is an extremely complex process and admits that the economic growth is unpredictable and economist don't know how to raise it. But most of economists and policy makers agrees that economic growth is complicated process which depends on many variables such as capital accumulation (both physical and human), trade, price fluctuations, political conditions and income distribution, and even more on geographical characteristics, these and other related issues are interesting issues to discuss but they are beyond the scope of this paper. Thus this paper will focus on the role of export in the economic growth focusing in two major sectors of the economy. As export is one of components of GDP, the export-led growth hypothesis postulates that export expansion is one of the main determinants of growth. This ideas advocate that, exports can perform as an "engine of economic growth". It is believed that the association between exports and economic growth is often attributed to the possible positive externalities for the domestic economy arising from participation in world markets.

Following the highly successful East Asian export growth strategy during the 1970s and 1980s, export promotion strategy has received renewed attention and led economists to stress the vital role of exports as the engine of economic growth. Even now fast growth of China and India is believed to be contributed among other things by the expansion of their export, "The success of China and India largely caused by both the export led growth and access to technology through globalization" (Stiglitz, 2007). Exports imply access to the global market and permit increased production while trade encourages efficient allocation of resources; and trade contributes to economic growth by generating long-run gains (Easterly, 2007)

Nevertheless, the role of exports in the economies of developing countries has been subject to a wide range of empirical and theoretical studies. But it is widely

believed that exports are crucial in providing the impetus for economic growth in developing countries because exports of goods and services represent one of the most important sources of foreign exchange income that ease the pressure on the balance of payments and create employment opportunities. Thus, an export-led growth strategy aims to provide producers with incentives to export their goods through various economic and governmental policies. The experiences of Asian and Latin American economies provide good examples of the importance of the export sector to economic growth and development.

As mentioned above many studies have been done about export-lead growth but this study intends to take a logical further step to investigate the same issue for two major sector of Tanzanian economy namely, agriculture and manufacturing sectors. The reason is that, majority of papers surveyed focus on broad macroeconomic data nevertheless there is ground for attention to less aggregated variables. I believe that much could be learned from the export-led questions by assessing micro based data. However few studies have been done about whether export from particular sectors can promote economic growth. Some economists pointed out that export success is uneven, driven by a small number of “Big Hits” which can be generated from these small number of sectors (Easterly, 2007), Thus this paper attempts to further investigate the causality relationship between Tanzanian total export, agricultural GDP and manufacturing GDP from 1970 to 2005. The aim is to investigate the hypothetical causality and relationship for three major sectors of the Tanzanian economy, agriculture and manufacturing and total export because structural characteristics of particular sectors may definitely be an important consideration for growth in consideration of comparative and competitive advantage of that particular sector. In doing so, the paper employs a variety of analytical tools, including unit root tests, cointegration analysis and Granger causality tests coupled with vector auto regression (VAR) and vector error correction (VEC) analyses. The paper sets three hypotheses for testing the causality and cointegration for Tanzania (i) whether there is bi-directional causality between agricultural GDP, manufacturing GDP and total export, (ii) whether there is uni-directional causality between the three variables, (iii) whether there exists a long run relationship between agricultural GDP, manufacturing GDP and total export. Since these findings will have economic policy implications on Tanzania economic policy this paper is expected to make contribution to the empirical literature.

## 1.2 Objective of the Study

Since agriculture and manufacturing accounted for more than 60% of Tanzanian GDP and more than 80% of exports, it seems to be reasonable to study the relationship between GDP produced by these key sectors and total export. If for example, agricultural GDP and total export are cointegrated, then they share a long-run equilibrium relationship. This, in turn has important macroeconomic implications, since any economic policy which affects total exports will also have an impact on the agricultural sector in the long run and vice versa. Thus, the stress in this paper is mainly on establishing the existence and direction of Granger causality and cointegration between agricultural GDP, manufacturing GDP and total exports, rather than on explaining the determinants of these relationships. Identification of causality can help policy makers to obtain a better insight into the economic growth in Tanzania and to formulate effective economic policies and development strategies and decide whether economic policy of Tanzania should to promote international trade to speed up economic growth or to focus on the growth of the agricultural and manufacturing sector which in turn will result in increasing international trade.

This study is coming when the Tanzanian economy has been undergoing substantial changes since 1990s. The government has been trying to adopt different policies such as to open up to both foreign and domestic investments, abandon its policy of import substitution strategy and state control economy while adopting market economy with hope that trade will lead to successful economic growth. It has established different export strategy such as Export processing Zones and join Multilateral and Regional Trading blocks including the Southern African Development Community (SADC), the East African Community (EAC), the African Growth and Opportunity Act (AGOA) and the World Trading Organization (WTO) and currently negotiation on the Economic Partnership Agreements (EPAs) is going on, all this is just to try to increase and access to external market and promote its export with the anticipation that investors in Tanzania will enjoy expanded market as well as preferential treatment for their products so that they can promote export which will lead to economic growth. Economic intergration can permit expansion of the regional economy to generate the threshold scale necessary to trigger the much needed strategic complementarities, and to attract the adequate levels of

investment required for the development of modern manufacturing cores and the transfer of technology within the region (Krugman 1991)

While Tanzania is struggling to promote export it has been ignoring promotion of important sector such as agriculture and manufacturing which are main source of export. This overlook can be seen even in the government policies where very small budget and not much efforts has been allocated to these sectors as a results these sectors fail to perform well. Failure of these sectors can be witnessed by the opportunity given to Tanzania to access US market through AGOA but unfortunately Tanzania had too little to export to US. This is now making us to think whether Tanzania should continue to promote Export or should promote growth which will lead to the promotion of export? No doubt that in order to achieve economic development, priority in every sector is needed, yet priority criteria not likely to be much important but sequencing may be more important. This means that Tanzania should know what its priorities are and which sector should be prioritized first. Regarding importance of sequencing this paper analyses whether Tanzania should prioritize major sectors namely agricultural sector, and manufacturing sector and export by studying their relationship and which sector needs much attention than other. Empirical findings of this study will have major policy implication for the Tanzanian economy whether Tanzania should promote export or should promote major sectors namely Agriculture and manufacturing which in turn will promote exports.

The rest of this paper is organized as follows, overview of Tanzanian economy, literature review, research methodology, data type, empirical results, Finally, the conclusion and policy implication.

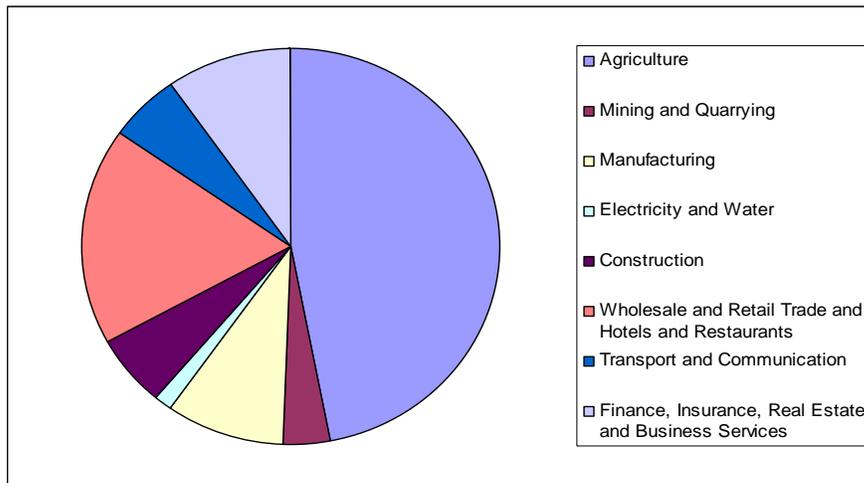
## **2. Overview of Tanzanian Economy**

### **2.1 Introduction**

Tanzania is a lower income country in the sub-Saharan Africa region, according to the classification made by the World Bank on the basis of income and region for year 2006. It has a population of 37.6 million people as of 2004 (NBS 2005) with an annual growth rate of 2.09. Tanzania is a large country in size, it contains a total area of 945,087 sq km including 59,050 sq km of inland water. Comparatively, the area occupied by Tanzania is more than 2.5 times larger than the size of the Japan. Tanzania is set to

become one of the fastest growing economies in Africa after years of structural adjustment including diversification of the public sector and privatization. By the end of 2006 the Tanzanian economy had grown, in real terms by 6.7% on average since 2000 (see table 6 in the appendix). Yet there are still concerns over the sustainability of this economic growth. However even after more that 45 years of independence and political stability one of the richest countries in terms of natural resources has remained among the poorest country in the world today with per capita GDP of less than \$ 400. The economy is characterized by a large share of agricultural goods, predominance of primary exports, low degree of industrialization and of economic diversification, high population growth rate, and high level of indebtedness. The economy depends heavily on agriculture (see figure 1). The performance of the overall Tanzanian economy has been driven by the performance of the agriculture sector, due to its large share in the total GDP.

*Figure 1: Gross Domestic Product By Kind Of Economic Activity At Constant 1992 Prices (Shs. Million) as at 2005*



Source NBS Tanzania (2006)

In comparison with other east African countries, Tanzania has substantial potentials to achieve faster and diversified economic growth necessary to raise welfare of her people. But the country is still facing a lot of economic and social problems. These problems are manifested in high poverty level as indicated by low income per capita, hunger, diseases, and low life expectancy. Escaping from these economic hooks and creating sustainable development Tanzania has to formulate and adopt good economic policies and strategies.

## **2.2 Tanzanian Agriculture sector**

Like most of developing economies, agriculture is the base of Tanzanian economy, which is accounting for about half of the national income, three quarters of merchandise exports and is a source of food and provides employment opportunities to about 80% of the population. It has linkages with the non-farm sector through agro-processing, consumption and export and provides raw materials to industries and a market for manufactured goods, therefore most of the sectors depends largely on the performance of Agriculture.

In Tanzania, agriculture is dominated by smallholder farmers (peasants) cultivating average farm sizes of between 0.9 hectares and 3.0 hectares each. About 70% of the crop area is cultivated by hand hoe, 20 percent by ox plough and 10 percent by tractor (NBS and Planning commission Tanzania 2005).

Although Tanzanian Government has been considering agriculture as its priority sector, and term agriculture as the back born of Tanzanian economy, but still agriculture sector is primitive and underdeveloped. The major constraints facing the agriculture sector are the falling labor and land productivity due to application of poor technology, dependence on unreliable and irregular weather conditions (rain-fed farming), high input costs and fluctuating market prices for farm produce as well as lack of agricultural extension officers.

Thus due to the above mentioned constraints, agricultural GDP has been growing at 3.3% per year since 1985, the main food crops at 3.5% and export crops at 5.4 % per year (NBS 2005). This growth is too low for Tanzania to achieve high economic growth and ultimately to achieve millennium development goals. While standard macroeconomic indicators in Tanzania have improved steadily over the past six years or so, agricultural output in per capita terms is falling at an alarming rate (Danielson, 2002) As noted above, an agriculture is an important sector in Tanzania; consequently, the fate of agriculture is likely to have substantial impact on the fate of entire economy. However, despite this low growth, agriculture continues to contribute around 80% of export earnings, and most industry in the country is also linked to the agricultural sector, whether producing farm inputs such as farm tools, or processing agricultural products: cigarettes, canned meats, beer and pyrethrum

For many years different policies has been adopted regarding development to agriculture sector, however, so far little has been achieved towards this goal. Much needs to be done regarding this important sector. Now, there is this movement of green revolution in Africa where the idea is that, using existing science and technology, agriculture can become the engine for Africa's economic growth. The same idea can be used to be applied in Tanzania as well where poor farming has been used.

### **2.3 Tanzanian manufacturing sector**

Manufacturing activities in Tanzania have exemplified a steady growth, registering average annual growth rates of over 4%. Nevertheless, manufacturing activities in Tanzania are relatively small and are at an infancy stage. Its contribution to GDP has averaged 8% over the last decade, with most activities concentrated on the manufacture of simple consumer goods, food processing, beverages, tobacco, textiles, furniture and wood allied products. Most of the present industries were established in the light of the import substitution strategy, whereas production focused in substituting previously imported goods in view of saving the country's meagre foreign exchange.

Although manufacturing sector is still low, but the sector is of significant importance as it employs about 48% of total monthly wage earners, making it the largest urban employer. It remains to be the most reliable source of government revenue in terms of import sales, corporate and income taxes and accounts for over half of government annual revenue collection. Though manufacture export has been on declining trend but it still earns the country a fifth of total foreign exchange earnings.

For a long time, Tanzania has been struggling to improve manufacturing sector by adopting different policy reforms, such policies like Import Substitution Industry and the sustainable industrial policy were adopted. Import substitution industry strategy proved total failure as most of these industries collapsed. The Sustainable Industrial Development Policy (SIDP) that was lunched in 1996 and was formulated to direct and guide industrial development in Tanzania after the fall of the Basic Industrial Strategy (BIS) in 1995. The SIDP which covered the period from 1996 to 2002, involved the revival of existing industries. Its emphasis was on food processing, textiles and leather sub sector and this was achieved through privatization of public enterprises in order to allow private sector become an engine for industrial growth and development. Further

more from 2001-2010 Sustainable Industrial Development Policy (SIPD) calls for the diversification of production patterns and products with investment in green field projects with the main focus on international competitiveness and expansion of exports. Nevertheless this sector is not doing well because of different impediments facing this sector which leads to high cost of production and make this sector less competitive.

## **2.4 Tanzania Export sector**

Like in many other sub Saharan African countries, export in Tanzania has been consistently dominated by agricultural products. Major exports from Tanzania are agricultural commodities which accounts for around 56 percent of total merchandise exports. The major agricultural exports are coffee, cotton, tea, tobacco, cashew nuts, and sisal, mostly are exported as raw material. Industrial exports have been on the rise following the adoption of trade liberalization, and the privatization of public enterprises. The value of total merchandise exports has been declining since 1996 as a result of declining agricultural exports caused by unfavorable weather conditions. The volumes of export of all major crops-both cash and goods, which have been marketed through official channels, have increased over the past few years (see figure 3). Since Tanzania's exports are principally of primary products (mining and agriculture), the sector shares of export earnings are determined more by trends in world prices than changes in export volumes.

On the other hand, Tanzania is anxious to achieve and maintain high economic growth through export promotion. Several strategies have been used to promote export in Tanzania such as establishment of export processing zones in order to fast track industrialization for export market. The government has adopted the concept as a policy option for export oriented industrialization and economic development with expectation to increase employment opportunities, easing the process of technology Transfer and improve Tanzania's economic growth through export-oriented investments but unfortunately too little has been achieved since the enactment of the Export Processing Zones Act in April 2002. The fundamental Goals of this are to promote high rates of growth that are necessary for achievement of the national objectives of poverty- reduction. The idea is that EPZ have the potential advantage of encouraging clustering, the thickening of markets and critical mass to validate infrastructure and transport

investments. Today, realization of the programme remains illusionary and implementation of the same intended special economic zones is marred by teething problems so far Tanzania failed even to utilize the AGOA opportunity compared with other African countries like Kenya therefore it seems as Tanzania has not had enough to export even though they had preferential treatment to access US market.

The question here is why the government decided to concentrate more on export promotion than promotion of production sectors? In Tanzania export promotion is seen as a first step in the process of liberalizing trade and integrating national economies into the global economy with the aim of achieving high and sustainable economic growth. Here under is some literature review about the relationship between export and economic growth, agriculture, manufacturing and economic growth from different perspectives.

### **3. LITERATURE REVIEW**

I did not find any study directly addressing the causality between agricultural and/or manufacturing GDP and total exports of Tanzania. Therefore, as a second best alternative, I have focused on studies about the relationship between exports and GDP growth of other countries. However I will also show literatures and theories about the relation of Agriculture, manufacturing, export and economic growth.

The argument concerning the role of exports as one of the main determinants of economic growth is not new. It goes back to the classical economic theories by Adam Smith and David Ricardo, who argued that international trade plays an important role in economic growth, and that there are economic gains from specialization. It was also recognized that exports provide the economy with foreign exchange needed for imports that cannot be produced domestically (Hayami and Godo, 2005).

The theoretical arguments have been supported by many empirical studies concerning the impact of export on economic growth. The relationship between exports and economic growth in Malaysia was investigated by Khalafalla and Webb (2001) using quarterly data from 1965 to 1996. Using cointegration and Granger causality tests, they found that the export-led growth hypothesis was valid that export in Malaysia leads to economic growth.

Also, there are several influential studies that provide a useful framework for analyzing the relationship between exports and economic growth, i.e., Baldwin and

Forslid (1996) in their paper “Testing for Trade-induced Investment-led Growth”, they found that domestic protection depresses investment and thereby slows growth. Foreign trade barriers also lower domestic investment, therefore trade and openness leads to domestic investment growth as a result is an economic growth. The basic idea of this literature is that exports increase total factor productivity because of their impact on economics of scale and other externalities such as technology transfer, improving skills of workers, improving managerial skills, and increasing the productive capacity of the economy. These studies state that another advantage of trade is that it allows for a better utilization of resources, which reflects the true opportunity cost of limited resources and does not discriminate against the domestic market.

There are also many studies analyzing the role of exports in the economic growth specifically for developing countries. Most of these studies conclude that there is a positive relationship between exports and economic growth, for example, Balassa (1978 and 1985), Jung and Marshall (1985).

According to UN Report 2006, 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 LDCs, exports also matters. Exports also matter because economic growth and the full utilization of productive capacities are constrained through the balance of payments. 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 the growth (UNCTAD, 2006). Developing countries like Tanzania faces shortage of capital and technology however through export these countries can import technology which can boost their domestic production.

Young and Bethune (2002) when studying the stage of economic development, export and economic growth, they found that export growth is positive contributor to economic development in low- income countries as well as middle income countries.

Various economists have studied the effects of export expansion on economic growth. Balassa (1978), using data from eleven countries, studied the effect of export growth on economic performance and found a positive and significant effect of export growth on output. In his study he found that both trade orientation and export promotion

variables are highly significant statistically. Furthermore, the regression coefficient of export promotion variable exceeds that of import substitution indicating that greater reliance on export promotion in response to external shocks permits reaching higher GNP growth rate. (Ndulu and Ndungu, 1998) concluded that even if the export sector expands at the expense of other sectors, a positive effect will be impacted on aggregate output.

There are also various studies that address the important issue of export composition. Crespo-Cuaresma and Wörz (2003), Fosu (1990), Greenaway, Morgan and Wright (1999), Harrison (1996), Hussain (1998), Srinivasan and Bhagwati (2001), Fouad (2003) analysis for Egypt argue that exports of manufacturing products are less sensitive to the cyclical changes in the international market compared to exports of raw and intermediate goods. Hence, countries that depend on the export of manufactured products are less affected by the cyclical changes in the world economy. Indeed, a major problem facing most developing countries such as Tanzania is the heavy dependency on the export of raw materials which are vulnerable to external shock.

Kavoussi (1984) divided his data into less-income and middle-income countries and found a positive relationship between export growth and economic growth in both groups of countries. Kugler and Dridi (1993) studied eleven countries and found that while for some countries, there was no common trend of export and other macroeconomic variables, for a majority of the less developed countries, export growth was also important in improving other sectors of the economy. Some country-specific studies have also confirmed the importance of export for economic growth. Khan and Saqib (1993), studied Pakistan and found a strong and positive association between export expansion and economic growth.

Moreover, an empirical result shows that Trade was the main engine of growth in South-East Asia. For instance, Hong Kong (China), Taiwan Province of China, Singapore and the Republic of Korea, the so-called Four Tigers, have been successful in achieving high and sustained rates of economic growth since the early 1960s because of their free-market, outward-oriented economies ( World Bank, 2003). The advocates of the export-led strategy and free trade point out that most developing countries that followed inward oriented policies under the import substitution strategy (ISS), mostly in Latin America and Africa, had poor economic achievements (Balassa, 1980), (Hayami and Godo, 2005) compared to those which switched to export oriented industries.

Chow (1987), while studying exports and industrial development in eight export-oriented newly industrialized countries, detected causality from exports to manufacturing GDP growth in Mexico, bi-directional causality between these variables for Brazil, Hong Kong, Israel, Korea, Mexico, Taiwan, Singapore, but found no causality in the case of Argentina. Kovacic and Djukic (1990) found that in Yugoslavia real aggregate GDP, manufacturing GDP and real exports are not jointly cointegrated, but manufacturing GDP causes exports. McCarville and Nnadozie (1995) concluded that Granger causality test confirms the relationship between export growth and GDP growth in the Mexican case.

Giles et al. (1992), who analysed the relationship in New Zealand between real GDP and exports of seven sectors, established that exports of live animals, and other food, beverages and tobacco cause GDP growth, and that economic growth led to increasing exports of metal products. Keong, Yusop and Liew (1998) found that export granger cause economic growth in both short run and long run in Malaysia. Biswal and Dhawan (1998) showed that total exports, manufactured exports and real GDP of Taiwan are cointegrated, and that there is bi-directional causality among these variables.

Khan and Saqib (1993) established positive relationships between real GDP, real exports, real manufactured exports, and real primary exports in a study for Pakistan. Rashid (1995) found no significantly positive export/economic growth effect while studying growth in real GDP, exports, real investments, industrial production, imports, and agriculture for India. Pomponio (1996) found little evidence in causal results in manufactured export and economic growth in China.

Arnade and Vasavada (1995), studying several Latin American and Asian countries, concluded that there is no causality between real agricultural output and agricultural exports in India. Shan and Sun (1998a), based on a multivariate analysis for Australia, found evidence for one-way causality running from manufacturing growth to export growth, but not for the export-led growth hypothesis in the aggregate level. In a similar study, Shan and Sun (1998b) reported bi-directional causality between exports and real industrial output for China. Sentsho (2000) also found two-way directional causality between export of mining and economic growth for Botswana.

In particular, there is a vast body of literature on the implications of exports for growth in developing economies. It tends to support the view that higher GDP growth is associated with a larger rate of export expansion. This view is supported for African economies as well. Given these potential contribution of the export sector to economic

growth, led to the World Bank and the International Monetary Fund (IMF) to introduce structural adjustment programmes which was initiated in the early 1980s in sub Saharan African countries sought, among other things, to promote export growth by improving incentives to producers in export sector.

The significance of exports in economic growth has also been supported by the literature on endogenous growth theory which spells out the importance of increasing return to scale and dynamic spill over impact of the export sector's growth. According to this theory, export may increase long run growth by allowing the economy to specialize in those sectors with scale economies. The non-export sector could also benefit from positive externalities such as improved management styles and more efficient production technologies generated by export sector through increased trade (Kruger, 1984).

As we have seen from the above literature review, three major arguments have been put forth to explain the effect of export on economic development. These include economies of scale, competition, and foreign exchange. The economies of scale argument stresses the benefits derived from expanding the scale of production. For countries with small markets, exports enable them to expand their markets and hence take advantage of the economies of scale. The competition argument stresses the importance of competition in the world market and the possible externalities effect on other domestically produced commodities. Competition with other countries forces a country to reduce inefficiency, and improve the quality of its products in order to compete favorably. This effort improves skills and ultimately, productivity in other sectors of the economy. Finally, exports enable countries to earn much needed foreign exchange. This may be more important for less developed countries like Tanzania that import a large proportion of their capital goods from industrialized countries.

To stress on the importance of export on economic growth, further arguments has been pointed out by the believers of free market by encouraging openness. In the paper *"Explaining Slow Growth in Africa"* Azam, Fosu and Ndung'u (1999) argued that for Sub-Saharan countries to develop they have to open up their economies. Open economies do grow more rapidly than close economies (Easterly, 1998). Many studies conclude that openness has positive effect on growth in Africa economies. For example, Sachs and Warner (1997) found that the lack of openness is by far the largest contributor to the dismal economic growth performance in Sub Sahara Africa countries.

Although it appears that there is much to celebrate about the joys of openness even for Africa's economies but still the some scholars debate that to open economy may have negative impact on growth. As Easterly (1998) argues, there are sorrows of openness as well, Open economies are more likely to be vulnerable to terms of trade shocks and capital inflow interruptions. The extent to which economies may be affected by international forces will, of course depend on the degree of their openness, which is multifaceted. Different measures of openness could actually be contradictory. For example, Export promoting policies that subsidize exports, may enhance openness, and increase growth, by the augmenting the size of export sector. That same policy, however, distorts international prices and thus reduces openness. Therefore these views show that openness still contradicting strategy to be adopted by developing countries for economic growth.

It is widely accepted that there is strong relationship between trade and growth. And for the country to be able to participate in the trade effectively it has to open its economy. There is evidence that developing countries that have been most successful in achieving and sustaining high growth rate are also the one that have taken the most advantage of trade opportunities (Azam, Fosu and Ndung'u, 1999). Their findings also suggest that, there is confirmation of strong influence of overall growth on trade performance. These countries have experienced high economic growth in the context of rapid expanding exports.

In contrary to the arguments above on the impact of export expansion on economic growth, some scholars suggest a mutual relationship between the export and growth. According to them, increased trade produces more income, and more income also facilitates more trade. Dodaro (1991) argued that the export would be dependent of the level of development. These drives lines of arguments seem to reveal the complex relationship between GDP growth and export growth. Given this arguments several analysts have examined this relations particularly the causality between the two economic indicators. However the empirical evidence from the study in this area appears mixed.

While we consider importance of export, let's see how agriculture and manufacturing can promote economic growth and lead to export expansion. Agriculture is the economic heart of most developing countries and the most likely source of significant economic growth. In Africa, it provides two thirds of employment, half of exports and over one third of Gross National Income (GNI). In Asia, where economic

growth and diversification have been rapid, agriculture provides jobs for 60 per cent of the working population and generates 27 per cent of GNI. The fastest rates of economic growth have occurred where agricultural productivity has raised the most – the reverse is also true. (DFID, 2003).

The supporters of importance of agriculture on economic growth believe that, Broad based economic development requires prior growth and productivity gains in agriculture. Few countries have developed diversified economies without first achieving growth in agriculture. It is recognized that for many poor countries to develop there is no realistic alternative and no more important challenge than to make agriculture work (DFID, December 2003). There is explicit consensus among economists that development of agriculture, which is the largest sector in the developing economies, is a necessary starting point for growth (Johnston and Mellor, 1961; Kuznets, 1964) as quoted in DFID 2003. To this, Todaro (1989) adds that without agricultural development, industrial growth either would be stultified, or if it succeeded, would create such severe internal imbalances in the economy that the problems of widespread poverty, and unemployment would become even more pronounced.

With the increased interest in growth theory, empirical work on economic growth has expanded enormously in the past decades. While most of this literature focuses on the determinants of aggregate economic growth, there has also been some emphasis on sectorial economic growth. The sectoral growth literature builds mainly on the dual economy model originating from Lewis (1954) and Hirschman (1958). This model seeks to explain economic growth by emphasizing the role of Agriculture and industry in interplaying between them. The basic dual economy model views the agricultural sector as merely the basis of an emerging economy, a generator of the capital necessary for take off towards the second stage of economic development, industrialization.

The sectoral growth study carried out in Ghana, Cote d'Ivoire and Zimbabwe conclude that the importance of Agricultural sector is apparent. It has an overall positive impact on industrial growth in Ghana. In Cote d'voire and Zimbabwe, industry also has a positive impact on growth in the agricultural sector. This finding supports the existence of positive growth link between agriculture and industry (Blunch and Verner, 2006). For all three countries there are significant long-run sectorial relationships among industry and agriculture sector.

The literature review has served to show that export can be engine of economic growth. Traditionally, it has been assumed that exports are exogenous to domestic output but this could be an inappropriate assumption because output can also affect exports. This means that economic growth can lead to an increase in export; therefore, by using this argument I study if the export of products of major sectors can lead to economic growth by analyzing the causality relationship between major sectors namely agriculture, manufacturing and export. This study tests the following hypotheses:-

- H<sub>1</sub>: There is bi-directional causality between agricultural/manufacturing GDP and total export
- H<sub>2</sub>: There is uni-directional causality between 3 variables.
- H<sub>3</sub>: There exists a long run relationship between agricultural/manufacturing GDP and total export

#### **4. RESEARCH Methodology**

##### **4.1 Research Methodology**

This paper uses the Granger causality test which takes into consideration the time series properties of the data to examine the incidence of causality and cointegration in three sectors in Tanzania. All necessary procedure followed before testing for causality, start with testing whether the data series are stationary and test if they are cointegrated and lastly test for causality with Wald tests in a VARD and VEC model was conducted. Furthermore graphs are used for further analyses and explanation. E-view econometrics software is adopted to develop results in this study.

##### **4.2 Unit Root/Stationarity**

Following Engle and Granger (1987), I have tested all the three time series for unit roots / stationarity. Casual test by using a graph and two different formal tests, namely, the augmented Dickey-Fuller (ADF) test, the Dickey-Fuller test with GLS detrending (DF-GLS) had been used to test unit root.

### 4.3 Cointegration

Two maximum likelihood tests, the trace (JT) and maximum eigenvalue (JME) tests, advocated by Johanson (1988, 1991) and Johansen and Juselius (1990) have been used to test for cointegration. The concept of cointegration is central in economics since variables which are supposed to be linked by some theoretical relationship should not diverge from each other in the long run. Such variables may drift apart in the short-run, but if they keep diverging without bound, then no equilibrium relationship exists among them. According to Granger (1988), standard tests for causality are valid only if there is cointegration between the variables. Therefore, in the presence of integrated variables, is a necessary pre-condition to test for causality is to check whether the variables are cointegrated.

### 4.4 Granger Causality

The concept of Granger causality as defined by Granger (1969) is as follows; A time series variable, say  $X$ , is causal for another time series variable  $Y$ , if the history of  $X$  ( $x_{t-1}, x_{t-2}, \dots, x_0$ ) helps predict  $Y$  ( $y_t$ ) with greater accuracy. In other words,  $X$  is causing  $Y$  if  $X$  temporarily precedes  $Y$ , so changes in  $X$  take place before changes in  $Y$ . Similarly, variable  $Y$  is said to cause variable  $X$  if the former helps improve the forecasts of the latter. Granger's notion of causality asserts that  $x$  causes  $y$  if the past lagged values of  $x$  can be used to predict  $y$  more accurately than merely by using the past lagged values of  $y$  (Kalirajan and Shand 1994).

Suppose that  $(y_t, x_t)$ , are jointly generated by the following bivariate vector autoregressive (VAR) process:

$$\begin{aligned} y_t &= \alpha_1 + \sum_{l=1}^L \beta_{1,l} y_{i,t-l} + \sum_{l=1}^L \gamma_{1,l} x_{i,t-l} + \varepsilon_{1,t}, \\ x_t &= \alpha_2 + \sum_{l=1}^L \beta_{2,l} y_{i,t-l} + \sum_{l=1}^L \gamma_{2,l} x_{i,t-l} + \varepsilon_{2,t}. \end{aligned} \tag{1}$$

As regards causality within this system, there are four possibilities. The first one, one-way or unidirectional causality from  $X$  to  $Y$  (denoted as  $x \rightarrow y$ ) occurs if in the first

equation not all  $\gamma_{1,i}$ 's are zero but in the second equation all  $\beta_{2,i}$ 's are zero. Similarly, there is one-way causality from  $Y$  to  $X$  ( $y \rightarrow x$ ) if in the first equation all  $\gamma_{1,i}$ 's are zero but in the second not all  $\beta_{2,i}$ 's are zero. Thirdly, there is two-way or bidirectional causality between  $Y$  and  $X$  ( $x \leftrightarrow y$ ) if neither all  $\gamma_{1,i}$ 's nor all  $\beta_{2,i}$ 's are zero. Finally, there is no causality between  $Y$  and  $X$  ( $x \nleftrightarrow y$ ) if all  $\gamma_{1,i}$ 's and  $\beta_{2,i}$ 's are zero Singh and Kónya (2006).

If variables are cointegrated causality should be studied using a vector error correction (VEC) model, which can be written as

$$\begin{aligned}\Delta y_t &= \alpha_1 + \alpha_y (y_{t-1} - \beta x_{t-1}) + \sum_{l=1}^{L-1} \delta_{1,l} \Delta y_{i,t-l} + \sum_{l=1}^{L-1} \phi_{1,l} \Delta x_{i,t-l} + \varepsilon_{1,t}, \\ \Delta x_t &= \alpha_2 + \alpha_x (y_{t-1} - \beta x_{t-1}) + \sum_{l=1}^{L-1} \delta_{2,l} \Delta y_{i,t-l} + \sum_{l=1}^{L-1} \phi_{2,l} \Delta x_{i,t-l} + \varepsilon_{2,t}.\end{aligned}\tag{2}$$

#### 4.5 Data Type and Sources

Annual data for thirty five years from 1970 to 2005 on Tanzanian total exports, agricultural and manufacturing GDP at current prices, in US dollars have been used. This data was primarily downloaded from the United Nation Statistics Division website as it was difficult to get data from Tanzania data bases. As data obtained from this website are total GDP, total export, percentage of agriculture to GDP and percentage of manufacturing to GDP, I transformed to total agricultural GDP and total manufacturing GDP.

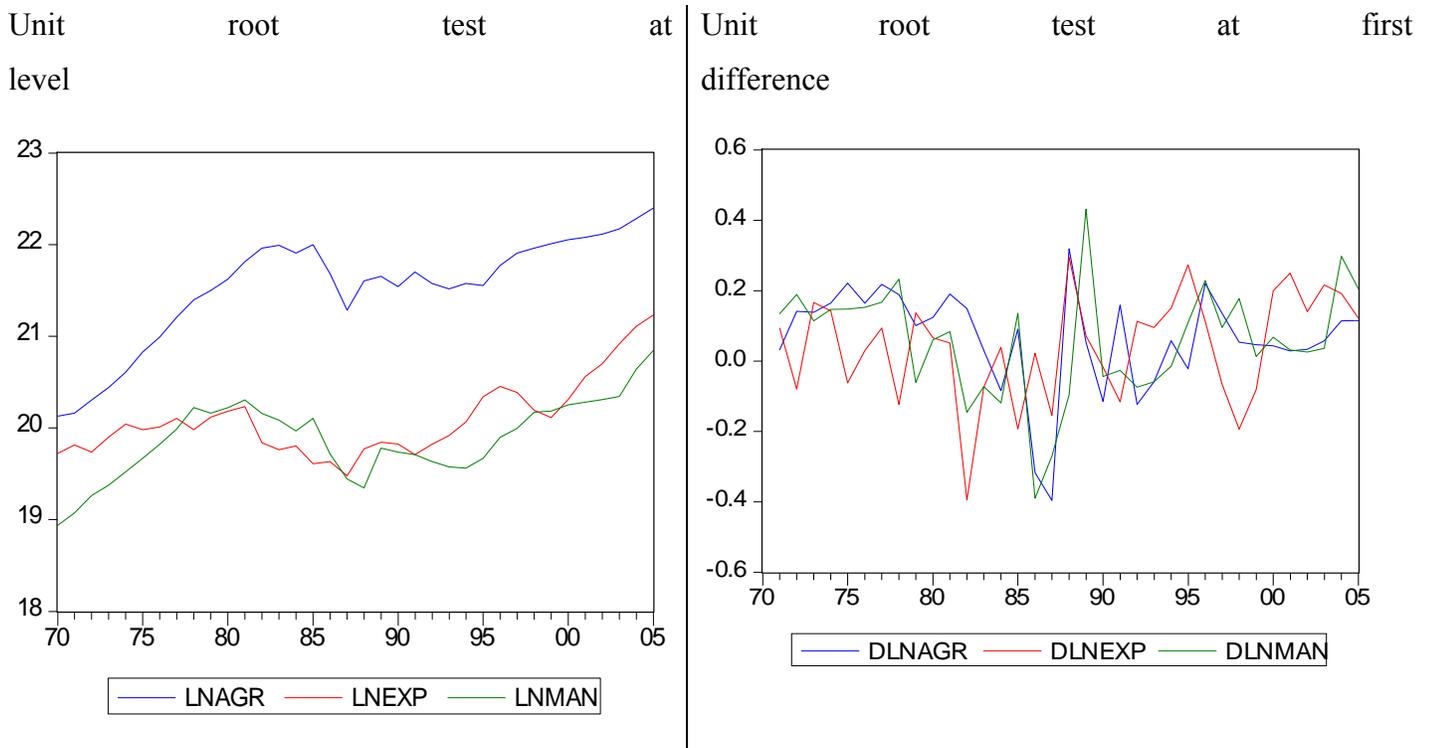
All data series were transformed to natural logarithms before further analysis, so that the first differences can be interpreted as growth rates as well as to reduce the variation in time-series data sets. The data series are denoted as LNAG (log of agricultural GDP), LNMGDP (log of manufacturing GDP) and LNEXP (log of total exports).

## 5. Empirical Results and Analysis

### 5.1 Unit root/stationarity test results

#### *Graphical Analysis*

Observation of the graphs below leads to the conclusion that the variables ; Export, manufacturing and agriculture are trended and therefore they are non-stationary. Including the trend line or the line of best fit to each of these series, shows that they have a slope. The plots of the first differenced variables (that is, DLNAGR DLNEXP, DLNMAN) are however stationary. This implies that these variables are likely to be integrated of order (I(1)). Plotting these variables on the same axis yields some useful insights into whether they are trended together or cointegrated. While observation of the graph reveals some insights as the variables are stationary or they are cointegrated, formal tests need to have been carried out.



#### **Formal Tests of Unit Roots**

As already pointed out, the graphical analysis to determine whether a series is stationary or not may not be a reliable approach. However, the graphical analysis is

useful in giving the first impressions about the properties of the time series. It is always important to use the scientific methods to test for the stationarity of the series. Unit-root / stationarity tests have been performed on the levels and first differences of the series the results are summarized in *Table 1* below. The ADF and DF-GLS, are I(1) implying that all variables have unit root. The null hypothesis that the variables have a unit root is not rejected in the case of all variables LNEXP, LNMAN and LNAGR. However, the null hypothesis that the first differences of these variables have a unit root is strongly rejected. Hence we conclude these variables are integrated of order one (I(1)) which is in conformity with our earlier conclusion using the graphs.

**Table 1: Unit Root Test Results**

<i>Variables</i>						
	<i>level</i>			<i>first difference</i>		
<i>Unit-Root</i>	LNEXP	LNAGR	LNMAN	DLNEXP	DLNAGR	DLNMAN
	<i>Test stat.</i>	<i>Test stat.</i>	<i>Test stat.</i>	<i>Test stat.</i>	<i>Test stat.</i>	<i>Test stat.</i>
<i>ADF</i>	0.638369	2.092572	1.1467	4.594403***	4.628045***	4.228874***
<i>DF-GLS</i>	0.702967	0.103	0.7144	4.57439***	4.684564***	4.105037***

ADF: Augmented DF test, DF-GLS: DF test with GLS detrending.

\*,\*\* and \*\*\* indicate significance at the 10%, 5% and 1% levels

## 5.2 Cointegration Tests

Johansen cointegration test has been conducted on the following pairs of Variables: Export and manufacturing; Export and agriculture; Manufacturing and agriculture; Export, manufacturing and agriculture.

Having established that the variables are integrated of order one, I apply the Johansen and Juselius (1990) procedure for estimating the number of co-integrating relationships to following equations.

$$LNEXP = \mu + bLNMAN + \varepsilon_t \dots\dots\dots (5.1);$$

$$LNEXP = \mu + bLNAGR + \varepsilon_t \dots\dots\dots(5.2);$$

$$LNMAN = \mu + bLNAGR + \varepsilon_t \dots\dots\dots (5.3);$$

$$LNEXP = \mu + bLNAGR/LNMAN + \varepsilon_t \dots\dots\dots(5.4).$$

The results are shown in the *Table 2* below

We fail to reject the hypothesis that there is no cointegrating relationship between these variables. Therefore, export, manufacturing and agriculture are cointegrated. However pair wise agriculture and manufacturing are not cointegrated with ‘no lag’ but with ‘2 lag’ they are cointegrated this shows they are lag sensitive.

**Table 2: Cointegration Results**

<i>Variables</i>												
LNAGR			LNAGR			LNEXP			LNMAN			
LNEXP			LNMAN			LNMAN			LNEXP			
<i>Cointegration</i>												
<i>Tests</i>												
<i>Lag</i>	<i>H0</i>	<i>Test stat.</i>	<i>Lag</i>	<i>H0</i>	<i>Test stat.</i>	<i>Lag</i>	<i>H0</i>	<i>Test stat.</i>	<i>Lag</i>	<i>H0</i>	<i>Test stat.</i>	
JT	0	r = 0	15.2215**	0	r = 0	11.35267	0	r = 0	15.4947***	0	r = 0	29.7971***
		r ≤ 1	0.129784		r ≤ 1	1.415408		r ≤ 1	3.841466		r ≤ 1	15.49471
				2	r=0	17.4307**					r ≤ 2	3.84466**
JME	0	r = 0	15.09156*	0	r = 0	14.246	0	r = 0	14.2646***	0	r = 0	21.1316***
		r ≤ 1	0.129784		r ≤ 1	3.841466		r ≤ 1	3.841466		r ≤ 1	14.2646
				2	r=0	16.52778**					r ≤ 2	3.841466*

JT: Johansen’s Trace test.

JME: Johansen’s Maximum Eigenvalue test

\*, \*\*and \*\*\* indicate significance at 10%, 5% and 1% level

### 2.3 Granger Causality Test Results

Granger causality has been conducted using VECM and VAR. The results are shown in *Tables 3* and *Table 4* respectively. A result shows that LNAGR causes both LNEXP and LNMAN, and LNEXP also causes LNAGR and LNMAN while LNMAN cause neither LNEXP nor LNAGR. Hence, there is two-way causality between agricultural GDP and total exports, but only one-way causality between agricultural GDP and manufacture, that agriculture causes manufacturing but manufacturing does not cause agriculture, this is theoretically plausible. There is also one way causality between export and manufacturing, running from the former to the latter. Furthermore both sectors any two variables together cause the third variable.

Table 3: Granger Causality Wald Tests

<i>Null hypothesis</i>	VECM
	$X^2$
<i>LNEXP</i> → <i>LNAGR</i>	6.450086*
<i>LNAGR</i> → <i>LNEXP</i>	4.432709**
<i>LNMAN</i> → <i>LNAGR</i>	1.348255
<i>LNAGR</i> → <i>LNMA</i>	6.903608**
<i>LNEXP</i> → <i>LNMA</i>	31.23831***
<i>LNMAN</i> → <i>LNEXP</i>	3.191251
<i>LNEXP, LNAGR</i> → <i>LNMAN</i>	42.88507***
<i>LNMAN, LNAGR</i> → <i>LNEXP</i>	10.74477*
<i>LNMAN, LNEXP</i> → <i>LNAGR</i>	14.21296**

\*, \*\*, and \*\*\* indicate significance at the 10, 5, and 1% levels.

Due to the absence of cointegration without lag between manufacture and agriculture, I tested causality by using VAR.

Table 4: **Granger Causality (Var Model)**

Pair wise Granger Causality Tests			
Null Hypothesis:	Obs	F-Statistic	Probability
LNAGRL does not Granger Cause LNMANG	34	15.7814	2.30E-05***
LNMANG does not Granger Cause LNAGRL		2.91077	0.07047*

\*, \*\*, and \*\*\* indicate significance at the 10, 5, and 1% levels.

## 6. Conclusion and Policy Implications

This paper aimed to ascertain cointegration and possible Granger causality among Tanzanian total export, agricultural GDP and manufacturing GDP. Since agriculture and manufacturing are two major sectors of the Tanzanian economy, the objective of this study was to investigate the relationship between GDP produced in these sectors and total exports. In order to establish causality, causality is tested with standard Wald tests within VAR and vector error correction (VEC) models.

The preliminary unit root tests suggested that all variables are all I(1). In spite of some sensitivity to the lag structure, the subsequent cointegration analysis results concluded for both sectors that there is a long-run equilibrium relationship between total exports and agricultural GDP, total export and manufacturing GDP, agricultural GDP and manufacturing GDP although this was sensitivity to the lag structure. But all three variables together are cointegrated.

I therefore conclude that there is two-way causality between agricultural GDP and total exports, there is one way causality between manufacturing and export and manufacturing and agricultural GDP such that export and agriculture Granger causality manufacturing GDP but manufacturing GDP does not granger cause neither export nor agriculture. Finally, in both total export, manufacturing and agriculture sectors any two variables jointly cause the third.

As agriculture and manufacturing together take a larger share of GDP in Tanzania, the findings of this study should have some policy implications regarding Tanzanian trade, agriculture and manufacturing sectors.

It is well known that export enables the economy to specialize in the production of goods in which it has cooperative advantage, resulting in optimal allocation of resources and enhanced overall productivity. Tanzania has large potential in improving its agriculture sector as well as export sector. As the country consider agriculture as the back born of its economy, major policies are required for the agriculture sector to contribute more in the economic growth.

The government should support farmers through training, provision of extension services and subsidization of farm inputs such as fertilizer and high quality seeds to make affordable to a majority of farmers in order to boost agriculture which in turn will boost export as well as manufacturing.

The provision of rural infrastructure such as road, drainage system, irrigation system, legal system such as property right on land, development of rural financial sector as well as ensuring that market functions well to enable farmers to trade profitably in agricultural products.

However Tanzania can modify its policies so that it can attract more FDI to the agriculture sector especially larger plantations of commercial crops by providing enough incentives to investors, attract more FDI to chemical industries i.e fertilizer.

There is need to expand value addition to Tanzania's export products. By exporting raw products, the economy is in effect exporting both jobs and the value of its products to other countries, leaving its own people unemployed and poor. However, the major policy emphasis is to promote manufacturing sector especially labor intensive industries to supplement the agriculture sector. Experience shows that labor intensive industries such as SME are essential to reduce poverty in low income countries (Sonobe & Otsuka 2006) But agricultural development is also indispensable in reducing poverty, simply because overall economic development is infeasible without agricultural development in poor economies where agriculture is dominant (Sonobe & Otsuka 2006). Since Tanzania has comparative advantage of cheap labor, to reduce poverty and to achieve sustainable development, the development of agriculture and industries especially labor intensive industries is necessary so as to increase non farm income.

As it has been seen in literature, theories and empirical studies, export is an important factor to achieve economic development even for developing countries. Results of this study confirm the same that, export causes both Agriculture and manufacturing. Thus there is need for the Government to continue promoting trade and export by formulating viable policies and infrastructures those will give incentive to investors in the export sector.

Government should put more emphasis on the SME promotion by encouraging cluster development such as garment, furniture, hand craft, etc which are facing hard competition for cheap imported products from China and other part of the world. By supporting SME projects in agro- processing, incubators, improving access to finance, promoting new investments/SMEs, supporting Industrial Support Organizations, skills development, promoting ICT, encourage regional development by using available local resource by various projects such as “One village one product, etc. Conclusively, development of agriculture sector and export promotion in Tanzania is the key to achieve development and self sustaining economy.

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APPENDIX

**Table 5: Trend of Tanzania's economy**

Indicator	Unit	1998	1999	2000	2001	2002	2003	2004	2005
<b>National Accounts and Prices</b>									
Change in GDP at Factor Cost-- Current Prices	Percent	19.7	16.6	12.2	13.7	14.1	12.8	14.8	14.3
Change in GDP at Factor Cost-- Constant 1992 Prices <sup>2</sup>	Percent	4	4.7	4.9	5.7	6.2	5.7	6.7	6.9
GDP Per Capita--Current Prices <sup>1</sup>	TZS	170831	193456	210231	231751	258925	286888	320000	356275

Source: NBS Tanzania(year)

**Table 6: Share of Manufacture and agriculture sector on GDP.**

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Agr	682338	708741	726098	739942	770510	796514	840275	882107	917395	970378	1020497
% GDP	51%	51%	50%	49%	49%	48%	48%	47%	47%	46%	46%
Mfg	106750	111894	117489	126887	131491	137809	144647	156219	169653	184218	200797
% GDP	7.94%	7.98%	8.11%	8.43%	8.34%	8.34%	8.27%	8.41%	8.65%	8.80%	9%
GDP	1345247	1401712	1448213	1505826	1577292	1653320	1749358	1857175	1962432	2094516	2237079

Source: National Bureau of Statistics Tanzania.

**Table 7: Descriptive Statistics : summary of main variables**

	LNAG	LNEX	LNMF
Mean	21.53673	20.09030	19.88875
Median	21.63982	19.99625	19.93358
Maximum	22.40021	21.23255	20.84793
Minimum	20.13008	19.47804	18.93993
Std. Dev	0.598591	0.412491	0.424008
Skewness	-1.018063	1.148606	-0.130264
Kurtosis	3.180769	3.884973	2.741635
Jarque-Bera	6.267735	9.090539	0.201941
Probability	0.043549	0.010617	0.903960
Observations	36	36	36

Figure 2; Gross Domestic Product by Kind of Activity

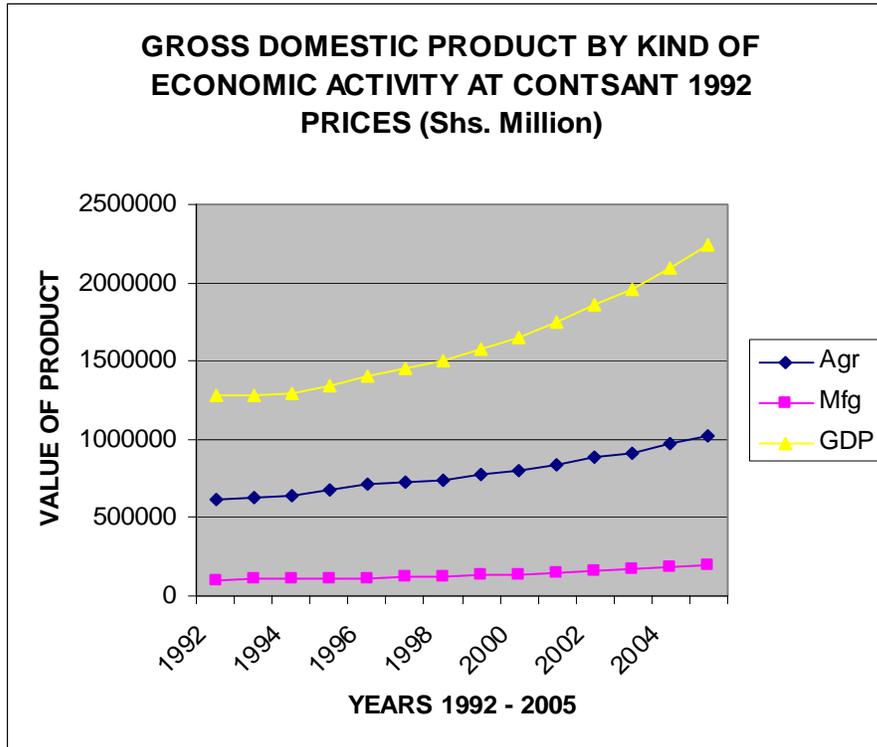


Figure 3 Export growth

