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CONTRIBUTION OF AGRICULTURE IN THE ETHIOPIAN ECONOMY: A TIME-VARYING PARAMETER APPROACH

ZG Alemu[1], K Oosthuizen[2] & HD van Schalkwyk[3]

Abstract

The objective of this study was to perform causality tests between agriculture and the rest of the economy using a Granger (1969) causality test procedure. Years of bi-directional causality were found between agriculture and manufacturing and services sectors before 1975. During this period, markets were major actors of economic activity and various positive measures, which encouraged the participation of the private sector in economic activity, were implemented. The contribution of agriculture to growth in the manufacturing and services sectors was not significant between 1978 and 1998. This can be attributed to two factors. Firstly, various policies that discouraged private sector participation in economic activity were implemented during the socialist era (between 1978 and 1992). Secondly, although markets were major actors of economic activity between 1992 and 1998, the economy was in a process of transition. Thus little can be expected in such a short time. The contribution of agriculture to growth in the manufacturing sector has been improving since 1989. It is concluded that the freer agriculture is from policy constraints, the higher its contribution becomes to growth in the manufacturing and services sectors.

1. INTRODUCTION

Agriculture is the largest sector in the Ethiopian economy, accounting for over 50% of GDP and employing over 85% of the labour force (MEDaC, 1999). Previous studies have not gone past pointing the contribution of agriculture to economic growth such as supply of food, raw materials, foreign exchange and supply of labour for industrial employment. This paper attempts to fill the gap by investigating causation between growth in agriculture and non-agriculture by means of Granger (1969) causality test procedures.

[1] *Post graduate student, Department of Agricultural Economics, University of the Free State.*
[2] *Professor, Department of Agricultural Economics, University of the Free State.*
[3] *Professor, Department of Agricultural Economics University of the Free State.*

Three-fourths of Ethiopian manufacturing output constitutes food, beverages, textile, tobacco, leather, printing, paper and non-metallic minerals (Befekadu & Berehanu, 2000). Food is the largest contributor, accounting for close to 30%, followed by textiles and beverages, which account for over 20% and 10% respectively. It is hypothesized that manufacturing depends on agriculture for some of its raw materials; thus, growth in agriculture is presumed to cause growth in the manufacturing sector. On the contrary, lack of transport and communication facilities in rural areas have made agriculture dependent on manufacturing for only a few consumer goods. Furthermore, it is hypothesized that causation between agriculture and services is minimal. According to Pickett (1991), growth in services GDP until the recent past has been the outcome of growth in public administration and defense, but not expansion in education, health, trade, transportation and communication services. Expansion in education and health services improves the stock of capital, while expansion in trade, transport and communication services represents the continued widening of markets.

2. THE EFFECT OF AGRICULTURE ON OTHER SECTORS: A REVIEW OF POLICIES

A number of articles dominated the course of development thinking for many years. Hirschman's article, 'The strategy of Economic Development (1958)', is one of them. His article focused on backward and forward linkages between agriculture and the rest of the economy. He found that investment in manufacturing as opposed to agriculture has the potential to stimulate more backward and forward linkages. Thus, he recommended that a focus on manufacturing rather than agriculture would generally lead to more rapid economic growth. This had consequences for the selection of development strategies in the third world for many years (Townsend, 1997).

Johnston & Mellor (1961) and Kuznets (1964) challenged Hirschman's recommendations. They found that agriculture stimulates forward, as well as backward linkages with the rest of the economy. Thus they recommended that equal attention should be given to develop agriculture. The following were some of the possible threads of contributions that these studies identified to come from agriculture: product, foreign exchange, labour factor, capital creation, and markets.

Different methods were pursued by former socialist countries, including Ethiopia, to forge linkages between agriculture and the rest of the economy under a command-based economic framework (Lin, 1998; Brooks, 1990; Eshetu, 1990). One method was to forcefully manipulate the direction of

linkages between agriculture and the rest of the economy. Russia had some success in this regard. This can be exemplified by dividing the economic history of Russia between 1930 and 1989 into two periods, namely, the period between 1930 and 1953, known as an "extraction period", and the period between 1966 and 1989, known as the agricultural modernization era (Brooks, 1990).

During the extraction period, the objective of resource transfer from agriculture was to achieve industrialization (Lin, 1998; Brooks, 1990). Hence, the direction of causality was deliberately controlled to run from agriculture to manufacturing. On the contrary, between 1966 and 1989, the focus of policy makers was changed away from industrialization to agricultural modernization (Brooks, 1990). This was achieved by channeling resources to develop agriculture, which means that the direction of causality was deliberately controlled to run from non-agriculture to agriculture.

Industrialization was the primary development strategy of socialist Ethiopia (Alemayehu, 1994). The methods pursued to achieve this objective exhibited similarities with China, the former Russia, as well as Central and Eastern European Countries (CEECs). First, land became the property of the state in March 1975. Second, involuntary changes in farming structures were made. This created small-scale private farms, producer cooperatives and state farms. State farms were formed in 1977 by nationalizing privately owned commercial farms. Agricultural producer cooperatives were established by Proclamation No 138 of 1978 (PMAC, 1978).

Different methods were employed to introduce collectivized agriculture in Ethiopia during the socialist era. These included the six annual development campaigns between 1978 and 1982, the "ten-year perspective plan" which was aimed at raising the number of producer cooperatives from 1 147 to 15 344 by 1993/1994, and by massive resettlement and villagization programmes. Despite these initiatives, however, the number of producer cooperatives and state farms in the country was small compared to the total peasant population. In other words, collectivized agriculture could not become a major source of capital for growth in other sectors of the economy.

Therefore, much of the resources needed for industrialization had to come from private peasants. However, there was little surplus available for extraction from peasant farms because outputs from these farms were barely sufficient for their maintenance. The command-driven economy was replaced by a mixed economy in March 1990. This sealed the fate of collectivized agriculture. Therefore, it can be said that collectivized

agriculture died prematurely in 1990 before it could dominate farming systems and become a source of capital for growth in non-agriculture.

The time spent to move from individual peasant farming to collective farming differed from one country to the next. In countries such as Russia, China and most CEECs, the transition was swift. Thus, collective and state farms were major sources of surplus for industrial growth. On the contrary, in Ethiopia, the transition to collectivized agriculture took a long time. This meant that peasant farms remained the dominant production structures and hence major sources of surplus for growth in the non-agricultural sectors. Therefore, peasant farms were taxed through both marketing and non-marketing mechanisms to finance growth in the non-agricultural sectors.

Peasant farms were taxed through a marketing mechanism in the form of institutionalizing a centralized marketing system. The Central Planning Authority was the highest government body, which made production and marketing decisions. It imposed production targets on the lowest production and accounting units through a vertically administered hierarchy. Different government marketing parastatals such as the Agricultural Marketing Corporation (AMC) were setup in 1976 to link peasant farms to an urban rationing system (PMGE, 1976).

To restrict free-market exchanges of agricultural produce, compulsory procurement programmmes were instituted. To aid this, grain checkpoints were introduced in 1976. Three years later, fixed quota procurement programmes replaced flat quota programmes (Befekadu & Tesfaye, 1990). The shift to the fixed quota system was an indirect way of limiting farm autonomy as applied to Chinese and Russian collective farms (Brooks, 1990; Tang, 1990). This furthered production stagnation. Most farmers responded negatively to declining incentives. They changed production from grain to oil crops to evade grain quotas (Befekadu & Tesfaye, 1990). Attempts were made in 1987 to boost production incentives by introducing a 6-10% price hike in farm purchase prices of selected grains (Befekadu & Tesfaye, 1990). This remained in place until the centralized marketing system was dismantled in March 1990.

Non-marketing mechanisms such as direct levies were also applied to extract resources from peasant farms (Eshetu, 1990). These included land use fees and taxes on agricultural incomes. In addition, levies of different forms such as transaction tax, export duties, and surtaxes were applied to exporters of agricultural products. For example, coffee exporters used to pay 44% of their revenue to the government in the form of taxes and duties (Eshetu, 1990).

The socialist structure of production was changed after markets were once again allowed to govern resource allocation in 1992. In addition, the development strategy of the country was changed to an agriculture-led development strategy and a reform in the farming structures was introduced. The latter was necessitated by production inefficiencies exhibited by state farms, which were attributed largely to poor incentive structures and sub-optimal allocation of resources. In former socialist countries, reform in the farming structures was part and parcel of the land reform process in order to guarantee a secure and unrestricted property right. In Ethiopia, however, reform in the farming structure was carried out without changing the existing land holding system. The existing land policy is blamed for causing production stagnation in agriculture by causing land fragmentation, deforestation, lower land productivity and diminution in holding size.

In the area of marketing, as part of the price and trade liberalization processes, agricultural prices were decontrolled. In addition, parastatal monopoly on marketing and distribution of agricultural produce was abolished. These together increased the number of traders, licensed and unlicensed and increased spatial integration of markets (Wolday, 1999; Asfaw & Jayne, 1998). However, according to studies conducted by different researchers, markets for agricultural produce in Ethiopia are still constrained by a host of setbacks. These include, lack of effective competition, access to working capital, poor road conditions, limited storage facilities, presence of too many unlicensed grain traders and high and unsystematic tax assessment (Wolday, 2001; Gebremeskel *et al.,* 1998; Alemayehu, 1995).

3. METHODS

3.1 The data

Time series data at 1995 prices on agriculture, manufacturing and service GDPs were obtained from the Ministry of Economic Development and Cooperation (MEDaC). The series begins in 1963 and ends in 1998. Data on manufacturing represent large and medium scale operations, while data on services are composed of trade, hotels, transport, communications, banking, insurance, real estate, public administration, defence, education and health. All the series were converted to natural logarithms.

3.2 Tests on the statistical properties of variables

Tests on the statistical properties of the variables were performed in two stages. In a country like Ethiopia where disruption in the long-term trend of macro variables is expected to occur due to man made and natural factors, a study on the significance of these factors, hereafter breaks, on the long-term trend of such variables must always precede conventional tests for unit roots. This is important because Perron (1989) showed that the application of conventional Augmented Dickey-Fuller testing procedures (equation 2) on series characterized by breaks has the tendency of incorrectly accepting the unit root null while the true data-generating process is in fact a trend stationary process. Therefore, in stage one, an attempt was made to detect dates of structural breaks in each series by applying a recursive analysis using the Dickey-Fuller regression procedure[4]. In step two, based on results obtained from step one, we decided on the type of unit root-testing method that should be implemented. Therefore, tests for unit root on variables identified to have break(s) in their series were conducted with the help of Perron (1989) adjusted Augmented Dickey-Fuller test procedure (equation 1) and on the remaining (i.e. for variables without breaks in their series), a conventional Augmented Dickey-Fuller test procedure (equation 2) was applied.

$$Y_t = \mu + \theta DU_t + \beta t + \gamma DT_t + dD(T_B)_t + \alpha y_{t-1} + \sum_{i=1}^{\kappa} c_t \Delta y_{t-i} + e_t \qquad (1)$$

Where μ = intercept term; T_B =time of break; D (T_B) = 1 if t=T_B+1, 0 otherwise; DU_t = 1 if t>T_B, 0 otherwise; DT_t = t if t > T_B 0 otherwise. The test for the hypothesis that α=1 was computed using test statistics developed by Perron (1989). The values of k (see equation 1) were set at 1.

$$\Delta Y_t = \varphi_1 + \varphi_2 t + \alpha Y_{t-1} + \gamma_i \sum_{i=1}^{m} \Delta Y_{t-i} + \varepsilon_t \qquad (2)$$

Where, α = (1-p), p is a parameter estimate of a first-order or AR (1) process.

3.3 The model

Direction of causality between agriculture and other sectors of the economy is measured using the Granger causality test (1969). It is assumed that the information relevant to the prediction of the respective variables X and Y is contained solely in the time series data of these variables. The test is performed using the following vector auto regression (VAR) model.

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[4] ***This system was applied by Balke & Fomby (obtained from Balke (1991)).***

$$\left.\begin{aligned} X &= \sum_{i=1}^{m} \lambda_i X_{t-1} + \sum_{j=1}^{m} \delta Y_{t-j} + u_t \\ Y_t &= \sum_{i=1}^{n} \alpha_i X_{t-i} + \sum_{j=1}^{n} \beta_j Y_{t-j} + v_t \end{aligned}\right\} \quad (3)$$

Where X is agriculture, Y is other sectors (manufacturing or service), u and v are uncorrelated error terms.

Causality was tested between agriculture (i.e. X) and manufacturing (i.e. Y) first and then between agriculture (i.e. X) and service (i.e. Y). To take into account the effects of exogenous factors, a time varying approach was used. This was achieved with the assistance of a rolling regression.

Unidirectional causality from agriculture to the other sector requires that $\sum\alpha$ be different from zero and $\sum\delta$ be equal to zero. Conversely, unidirectional causality from another sector to agriculture requires that $\sum\delta$ be different from zero and $\sum\alpha$ be equal to zero. Bi-directional causality is suggested when λ, δ, α and β are different from zero. No causality is suggested when λ, δ, α and β are equal to zero. This test was developed within an implicit framework of stationarity.

Depending on test results from the statistical properties of the variables in section 3.2, variables, which were identified as satisfying the properties of difference stationary processes were differenced until they were made stationary. On the other hand, variables satisfying the properties of trend stationary processes were detrended. These helped satisfy the basic assumptions of classical regression techniques. Cointegration tests are not applied here since agricultural GDP was a trend stationary process (section 4.2). This is in line with the literature that working with stationary/breaking trend data precludes our carrying out tests for cointegration (Banerjee *et al.*, 1992).

4. RESULTS

In this section, results from the statistical properties of the variables (section 4.1) and results from the Granger causality procedure (section 4.2) are reported.

4.1 Results on structural breaks

In section 3.2, a testing procedure was introduced in cases where breaks were not known a priori. Results, based on this testing procedure, are reported in Figure 1 below. Figure 1 depicts test results for the null hypothesis that there is no break against the alternate hypothesis that there is break in the series. Furthermore, the procedure identifies date of structural break in the series.

According to the results obtained, the no-break null for agricultural GDP was rejected at the 5% level of significance in 1985. This corresponds to drought and famine, which, in terms of damage caused, was the largest. It was severe and extensive, and its effect in terms of loss of life was great compared with all other drought years that the country has witnessed in its recent history. According to Pickett (1991), the drought and the famine were similar to the great famine, which occurred at the turn of the century.

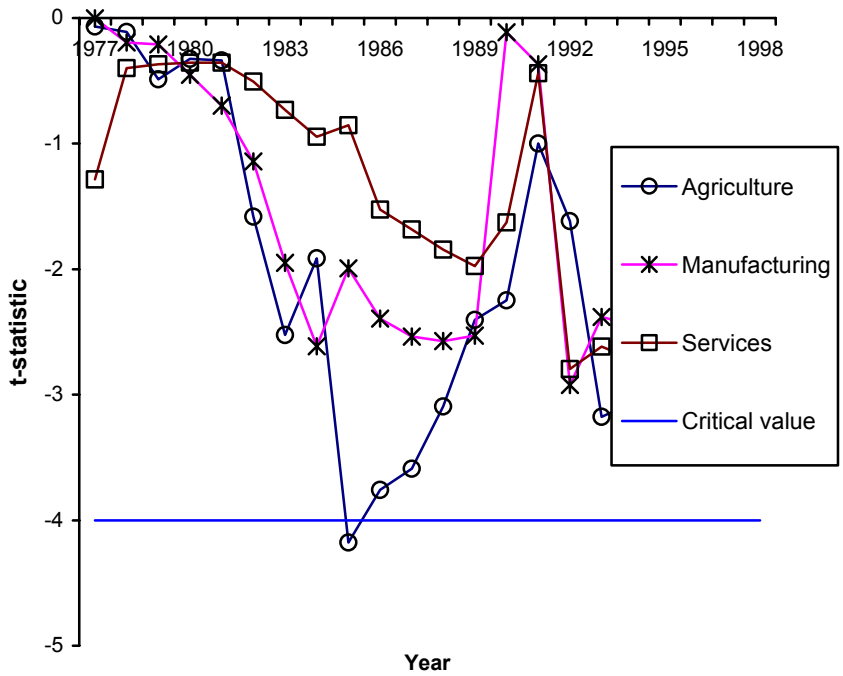


Figure 1: Recursive analysis using the Dickey-Fuller regression to test the presence of a structural break

Figure 1 also shows that the highest t-statistic for the manufacturing GDP is below the critical line. This means that there is no break in this series. This highest t-statistic occurred in 1992. This may be attributed to various factors. The following aspects are prominent: the sector started to enjoy management autonomy as a result of the country's adopting a market economic system; limits on the size of the private enterprises were removed by the Investment Code Reform No 15/1992; and a public enterprise proclamation was enacted. The public enterprise proclamation attempted to

strengthen the efficiency of the state-owned enterprises in recognition of the fact that privatization would be a lengthy process and that some state-owned enterprises would continue to function under government control.

No break could be detected in the services GDP. The highest t-statistic in this variable occurred in 1996. The following were some of the major effects of shifts in policies which could have precipitated these events: an attempt was made to liberalize the financial sector; sector policy reform for the transport sector was introduced; and a review of public expenditure and privatization of state-owned retail stores and hotels was made. Banking and insurance were opened to domestic private investors in 1995. Currently, there are about eight commercial banks and nine insurance companies. The Ethiopian privatization agency, which was created by Proclamation No 2/1994, started its first phase of privatization in June 1996 (TGE, 1994). In this year, 101 retail shops and 13 hotels and restaurants were privatized from the services sector alone. A transport sector memorandum, which articulated reform in the transport sector, was introduced by Proclamation No 12/1996 (FDRE, 1996). This served as a platform for the launching of a Five-year Road Sector Development Programme in September 1997.

4.2 Results on the data-generating process

As said in section 3.2, testing the presence of a break(s) in a variable is crucial before a choice of the type of unit root testing procedure (conventional ADF or Perron ADF) is made. It is believed that this minimizes the risk of incorrectly characterizing a time series variable as a difference stationary process while the true data-generating process is a trend stationary process and vice versa.

As shown in section 4.1, agricultural GDP exhibits a break in its series. Hence, a test for unit root was conducted using Perron's (1989) adjusted Augmented Dickey-Fuller procedure (equation 1). On the contrary, no breaks could be detected in the manufacturing GDP and services GDP; thus, a test for unit roots in these series were conducted using conventional Augmented Dickey-Fuller procedures (equation 2). Results on unit root tests are reported in Table 1 below.

According to results obtained, the unit root null for agricultural GDP was rejected at the 1% level of significance using test statistic developed by Perron (1989). This means that agricultural GDP is a trend stationary process; thus, agricultural GDP was represented in equation 3 as a trend stationary process.

Table 1: Test for unit-root

Coefficients	Sectors		
	Agriculture*	Manufacturing	Service
μ	8.796 (1.706)	1.1900 (0.381)	0.987 (0.373)
β	0.007 (0.010)	0.10 (0.004)	0.11 (0.005)
θ	-1.166 (0.377)	---	---
γ	0.048 (0.015)	---	---
dD	-0.013 (0.096)	---	---
α	-1.094 (0.395)	0.671 (0.110)	0.702 (0.117)
c	0.795 (0.216)	0.298 (0.162)	0.279 (0.161)
-Bar Sq	0.827	0.93	0.98
F-statistic	F(8.23) 19533	F(3.30) 152	F(3.30) 912
DW-statistic	1.96	1.95	1.86

* After second order serial correlation in residuals is corrected using Cochrane-Orcutt Method. Numbers in brackets are standard errors.

Unit root test results, based on conventional ADF test procedure, revealed that manufacturing GDP and services GDP are difference stationary processes (columns 2 and 3). Furthermore, a test on the order of integration of these variables indicated that they were integrated or order 1 or I (1). This suggests that they appear in equation 3 in their first differences.

4.3 Results on granger causality

In this section, results obtained by applying the vector autoregressive (VAR) model are presented (see Figure 2 and 3). Two VAR models were run. Firstly, to investigate causality between the agricultural sector and the manufacturing sector. Secondly, to investigate causality between the agricultural sector and the services sector. Lag lengths of the two VAR equations were determined by applying the Akaike information and the Schwartz Bayesian criteria. A rolling regression with a window size of 9 years was applied in the two VAR models to capture variability in causality over time. Causality was determined between the variables for the time period 1963-1971, then from 1964-1972, and to the end of the period.

4.3.1 Granger causality: agriculture to manufacturing and vice versa

The contribution of agriculture to growth in the manufacturing sector was insignificant throughout. On the contrary, the contribution of growth in the manufacturing sector to growth in agriculture was significant before 1975 (Figure 2). Reasons for these findings are given in the paragraphs that follow. Rather than consider the coefficients of these variables as zero and thus unimportant, attempts are made in the paragraphs below to interpret the slopes of the t-statistics of agriculture and manufacturing (Figure 2). As can be seen from Figure 2 below, the slopes of the t-statistics of agriculture

and manufacturing changed signs corresponding to changes in the economic systems and agricultural policies of the country.

According to Figure 2, the time-varying t-statistic of growth in agricultural GDP in the equation, where manufacturing GDP is a dependent variable, were positively sloped before 1975. The same was true with t-statistic of growth in manufacturing GDP in the equation where agricultural GDP is a dependent variable. These could be attributed to the following. The period prior to 1975 is known in the economic history of the country as a period during which markets were major actors in resource allocation. Some positive interventions in the form of comprehensive package projects were introduced in the late 1960s in a few promising highland areas of the country with the assistance obtained from a few donors to introduce modern production techniques in agriculture. The project was discontinued in the mid 1970s as a result of donors' dissatisfaction with the overall political system of the country.

Growth in the manufacturing sector and also its positive contribution to growth in the agricultural sector, prior to the 1974 revolution, could be attributed to the development strategy of the country, which focused on import substitution. Various proclamations were introduced to achieve this objective. These included Legal Notice No 10 of 1950 to encourage foreign capital investment in the country, Decree No 51 of 1953 to provide for the encouragement of capital investment in the country and Proclamation No 242 of 1966 to assist in expanding agricultural and industrial activities (Befekadu & Berehanu, 2000).

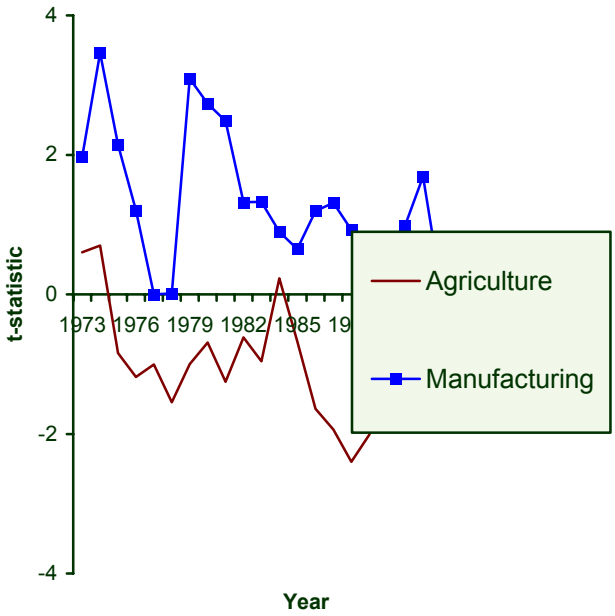
The slopes of the time varying t-statistics of agricultural GDP and manufacturing GDP became negative after 1975 (Figure 2). This occurred following the announcement of socialism as the political and economic system of the country in 1974. In the agricultural sector, turning land ownership exclusively into the hands of the government assisted in unifying the age-old north-south disparity in land holding rights. The reform made land the property of the government and disallowed all types of transactions on land. Grain production increased in the aftermath of the reform but this could not be sustained for "*the government was preoccupied with the political and military struggle which followed the 1974 revolution*" (Dejene, 1990). In the manufacturing sector, all medium and large-scale manufacturing enterprises were nationalized in 1975.

The slope of the time varying t-statistic of agricultural GDP was close to zero between 1978 and 1985, became negative between 1985 and 1989 and has been positive since 1989 (Figure 2). The zero-slope between 1978 and

1985 implies that agriculture had little impact on the growth of the manufacturing sector. This maybe attributed to various events: the establishment of producer cooperatives; the introduction of fixed output and input pricing systems; and the imposition of physical barriers on the free trade of agricultural outputs. Details of these are found in section 2.

The slope of the t-statistic of agricultural GDP was negative between 1985 and 1989. This could be the result of the 1984/85 drought and famine. The drought had direct consequences for the asset base of farmers in the drought-hit areas. Many farmers residing in these areas were reported to have attempted to absorb the risk by selling or slaughtering their oxen, a major productive asset (Webb *et al.*, 1992).

The slope of the t-statistic of agricultural GDP has been positive since 1989.



This could be the outcome of a number of factors. Firstly, the prices of some of the agricultural products were revised in 1987 due to pressure from the World Bank and the African Development Bank. Secondly, the command-based economic system of the country was replaced by market-based economic system.

The following changes were introduced in input and product pricing and marketing: output price liberalization, AMC was restructured, control on grain movement was removed and political favouritism in terms of easy access to input for government-owned production units was removed. The following changes were introduced in the structure of production in the agricultural sector: forceful membership requirements to join producer cooperatives were banned and some state farms were sold. The other

important change that was introduced during this time was the change in the overall development strategy of the country from an industry-led to an agriculture-led development strategy in 1994.

Figure 2 further shows that the slope of the t-statistic for manufacturing GDP was negative between 1980 and 1994 and the slope has maintained a positive sign since 1995. The time between 1980 and 1994 can be divided into two periods. Firstly, there is the period between 1980 and 1992, when all medium and large scale manufacturing enterprises were owned and managed by the government, with little management autonomy whatsoever exercised by individual enterprises in the production and marketing of their output. Secondly, there is the period between 1992 and 1994 when these enterprises were granted management autonomy, following the change in the economic system of the country from a command-based to a market-based economic system in 1992.

Attempts were made by the government in 1992/1993 to improve the efficiency of manufacturing enterprises to allow them to prove their viability before decisions to privatize them were made in 1995. Inefficiencies in these enterprises used to be attributed to their operating below full capacity for lack of inputs. This also assisted the government in buying time to make decisions with regard to the list of manufacturing enterprises that would continue to remain under its control. The positive slope of the t-statistic for manufacturing GDP after 1995, on the other hand, implies that the contribution of the manufacturing sector to growth in the agricultural sector has started to gain momentum. This may be attributed to the cumulative effect of positive changes in policies, which allowed the greater participation of the private sector in the manufacturing business.

4.3.2 Granger causality: agriculture to services and vice versa

The contribution of agriculture to growth in the services sector was significant before 1976. But the contribution of the services sector to growth in agriculture was insignificant throughout. Reasons for this situation are given in the paragraphs below. As shown in section 4.3.1, the slopes of the t-statistics of agriculture and services are investigated to see the extent to which they responded to major policy changes that were introduced at various stages.

According to Figure 3, the time-varying t-statistic of growth in agricultural GDP in the equation where services GDP is a dependent variable is positively sloped before 1975. The same was true with the slope of the t-statistic of services GDP in the equation where agricultural GDP is a

dependent variable. As stated earlier, the period before 1975 is known as a time when markets were major actors in resource allocation. The types of positive interventions made to develop agriculture during this time were discussed in section 4.3.3. Like growth in the manufacturing sector, growth in the services sector may be attributed to the government drive to attract foreign direct investment into the country. The proclamations and declarations, which came out during this time, were discussed in section 4.31.

As can be further seen in Figure 3, the slope of the t-statistic for agricultural GDP was negative between 1975 and 1978. This implies that the contribution of agriculture to growth in the services sector was decreasing between 1975 and 1978. This may be attributed to the nationalization of major services rendering organizations after socialism was declared the political and economic system of the country in 1974.

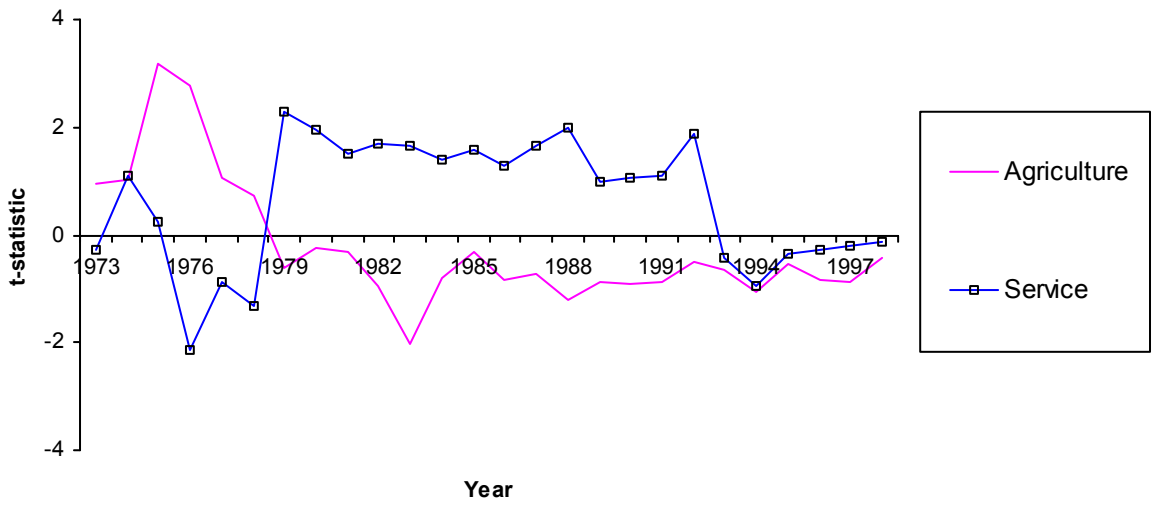


Figure 3: Time-varying t-statistics of agriculture and services

Figure 3 also shows that the slopes of the t-statistics of agricultural GDP and services GDP have been near zero between 1978 and 1993. This indicates that the contribution of agriculture to growth in the services sector, and vice versa, was negligible. A look at the components of services GDP reveals that growth in the services GDP between 1978 and 1992 was the outcome of expansion in the public sector. This was, in turn, attributed to government control over economic activity following the nationalization of major economic sectors. In short, expansion in the services sector had little to do with expansion in economic activity because much of the growth in the services sector was not the result of expansion of education, health,

trade, and transportation and communication services. It was rather caused by the expansion in administration and defense expenditures. Expansion in education and health services is believed to improve the stock of capital, while expansion in trade, transport and communication services represents the continued widening of markets.

5 CONCLUSIONS AND RECOMMENDATIONS

This study investigates causal relationships between agriculture and non-agricultural sectors in an attempt to gauge the contribution of growth in agriculture to growth in other sectors of the Ethiopian economy over time. According to results obtained, the coefficients for agricultural GDP were found to be insignificant for all years between 1975 and 1998. This means that agriculture was a passive sector during these years, a finding that was confirmed at the 5% level of significance. The contribution of agriculture to growth in the services sector was significant before 1975, while its contribution to growth in manufacturing was positive and increasing, albeit insignificant. In addition, the contributions of growth in the manufacturing and service sectors to growth in agriculture were positive and increasing before 1975, reflecting the beginning of integration of agriculture into the economy.

In addition, attempts were made to study the slopes of the t-statistics in order to see to what extent they changed signs following changes in economic systems and policies, which were introduced between 1963 and 1998. The t-statistics of agriculture had a positive slope prior to the introduction of a socialist economic system in 1974 in both the manufacturing and service equations. In both the manufacturing and service equations, the slope changed sign to negative between 1975 and 1978. It became close to zero between 1979 and 1995 in the manufacturing equation and between 1979 and 1998 in the equation for services. It is also found from the manufacturing equation that it has taken until 1989 for agriculture to recover from the drought in 1985. The non-significance of the t-statistics of agricultural GDP between 1990 and 1998, given positive policy changes in 1990 and 1992, could be attributed to structural constraints. Structural constraints, which influenced agriculture before 1992, continued to have negative effects on agriculture in the 1990s even after some of the major policy constraints were removed.

These findings imply that the contribution of agriculture to growth in the other sectors of the economy has been dependent on the type of economic systems followed and non-policy constraints faced at various levels of economic reform. Therefore, with the consideration that agriculture

responded adversely to growth in other sectors when faced with policy and structural constraints during the socialist era; and that its contribution to growth in the manufacturing sector showed a sign of revival, following the creation of healthier policy environments between 1989 and 1990, the following can be concluded: The freer agriculture is from policy constraints, the higher its contribution becomes to growth in the manufacturing and services sectors.

For agriculture to make an even larger contribution to growth in the other sectors of the economy, the following policy measures need to be addressed. The existing land tenure system must be reformed to allow land to be legally exchanged at scarcity value and to ensure its utilization in its best uses. In addition, infrastructural developments are needed to ensure farmers' access to markets, credit and government support systems. Land has been in state hands since 1975 meaning that farmers are granted only usufruct right. According to different researchers, this has become a reason for a decrease in holding size, tenure insecurity, and population pressure in rural areas. Continuous land redistribution has presently caused over 63% of the farm households to rely for their livelihood on less than one hectare of land (CSA). Studies show that decrease in holding size and increase in the demand for land for cultivation by newly formed households has limited the application of modern agricultural technologies in production and resulted in the extension of cultivation to areas previously designated as permanent pasture and forests (Zerihun, 2002). Tenure insecurity is attributed to the fear that another round of official land redistribution would make farmers end up with smaller plots of land. This is believed to have resulted in poor land management practices, deforestation and weaker investment in long-term soil conservation practices (Sutcliffe, 1995; Teferi, 1995). Over 80% of the country's labor force is currently tied up in the agricultural sector. This is attributed partly to the existing land policy which has limited free movement of labor from rural to urban areas by denying access to land to households which are sustainably absent from rural areas (Dessalegne, 1999).

Presently, government focus is much more on introducing new production technology in agriculture through a new agricultural extension program. Considering that production is predominantly at subsistent level, efforts underway are too little to make production market oriented, which is the only way that the rest of the economy can benefit from agricultural growth. This needs to be tackled by making market improvement an integral part of the development planning process.

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