The Relationship between Economic Growth and Service Sector in Tanzania: An Empirical Investigation

Edwin Magoti[†] and John M. Mtui[‡]

Abstract

The study uses Autoregressive Distributed Lag Model (ARDL) to examine the relationship between economic growth and service sector in Tanzania for the period 1970 to 2015. Further, bounds test of cointegration is used to test for existence of long-run relationship among the variables. Results show that the real economic growth is positively related to the growth rate of the services sector, and the latter's effect is statistically significant in the long-run as postulated in theory. The error correction term has the envisaged negative sign and is statistically significant, implying convergence towards the long-run equilibrium. The results also show there is a bi-directional causality between GDP growth and growth of services sector. However, the growth in services sector has no effect on the economic growth in the short-run. This calls for friendly cum enabling business environment for investment and business operations in trade, tourism, financial sector, etc. in order to enhance value addition in the services industry. Promotion of technological innovations in the services sector is very crucial so as to improve efficiency, quality and productivity in delivery of services and thus enhance competition. The services sector should be considered as equally important as industrial sector due to cross-fertilization between the two.

Key words: Services sector; Economic growth; Economic reforms; Long-run equilibrium
JEL Classification: B22, E23, L80, L90, O11

[†] Department of Statistics, The Eastern Africa Statistical Training Centre, Dar Es Salaam – Tanzania
[‡] Department of Economics, University of Dar Es Salaam,Tanzania

1.0 Introduction

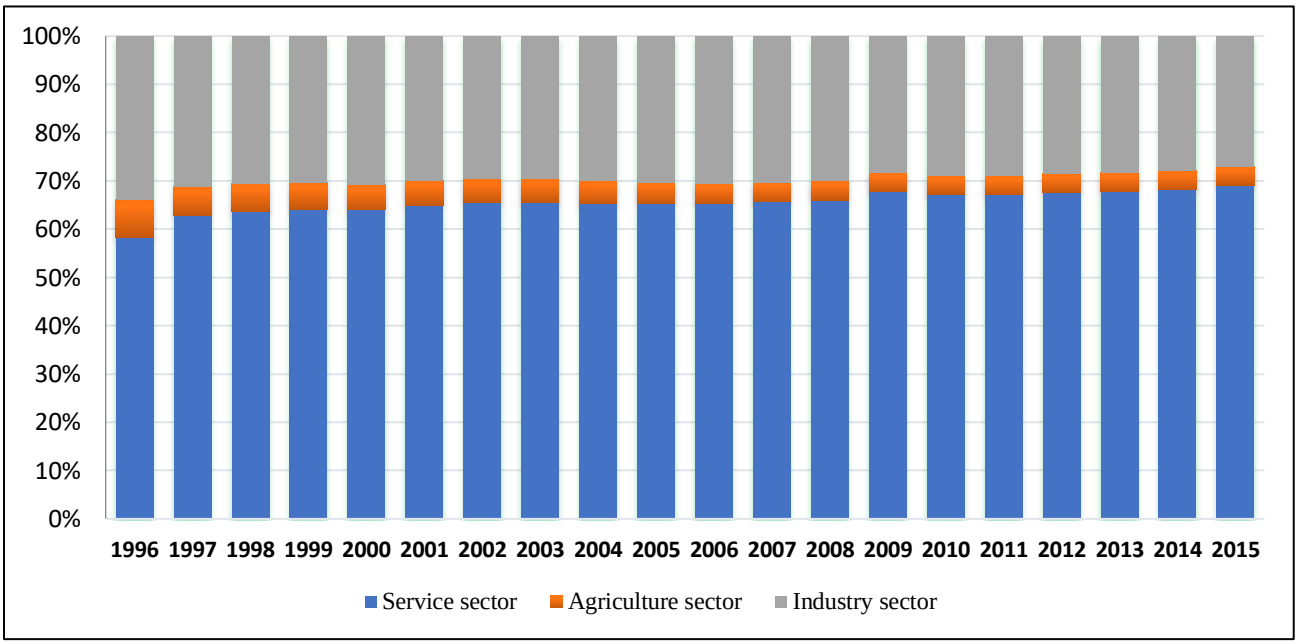
Gross Domestic Product (GDP) is the most commonly cited indicator of economic performance. GDP is compiled from three broad sectors, namely, agriculture, forestry and fishing, that constitute the primary sector; manufacturing sector; also dubbed secondary sector and, construction and services sector of the economy, also known as the "tertiary sector" or the "service industry", (ISIC, Revision 4; Alhowaish, 2014). The process of economic structural change dictates that as per capita income rises, the primary sector loses importance and while the manufacturing industry may initially gain momentum, it is eventually overtaken by the growth of the service sector. The important distinguishing features of services from other economic activities is that services are performances (intangible); inseparable from the person or individual produces them; production and consumption occurs concurrently; are heterogeneous since performances of human beings would definitely not be the same and are perishable such that they cannot be inventoried, saved, resold or returned, (Kim, 2006; Liping & Evenett, 2010; Loving, 2011). Economists acknowledge that increase in income goes together with increase of the share of services in economic activity, (Khanna, *et al.*, 2016). As noted elsewhere, economic growth and development in general is associated with structural transformations, the most notable manifestations being the rising share of services in national economies, (Liping and Evenett, 2010).

Literature evidences that the service sector has being recording a remarkable contribution in social and economic spheres of influence, ranging from employment creation, facilitation of trading activities and growing markets for services, reduction of poverty and improvement in economic growth, (Oyejide *et al.*, 2001; Avsar, 2005; Vangrasstek, 2006; Cali *et al.*, 2008; Francois and Hoekman, 2009; Maroto-Sanchez and Cuadrado-Roura, 2011; Ahmed and Ahsan, 2011; Ghani, 2011). At the beginning of the 21st century, most of the highly industrialized countries transformed into service economies, which increased substantially the share of the individuals employed in the sector, (Schettkat and Yocarini, 2003). The transition made the service sector to keep getting bigger in terms of size and growth. As a result, in most developed nations the service sector modified employment structure and the composition of the sectors' value addition, (World Bank, 2017).

Figure 1, shows that global share of services sector has been dominant. Implying that percentage contribution of services sector to GDP in each year has consistently been higher and increasing compared to that of agricultural and industrial sectors. Figure 1 also shows the global share of services sector in GDP increased. Globally the share of the service sector to GDP averaged 62.5% over the period 1996 to 2000, and exceeded that share in the period 2001 and 2005, respectively, increased to an average of 66.5% and 67.9% during the period 2006 and 2010 and the period 2011 and 2015.

The services industries are commonly viewed as more stable compared to agriculture and industry. In this regard increased contribution of services sector potentially strengthens resilience of the economy to exogenous weather shocks in agriculture and industry, (Singh, 2010). However, while the service sector employs less people and creates more money, the agricultural sector employs more people with less output due to low productivity.

Figure 1: Global GDP Components (Agriculture, industry and Services) 1996 - 2015



Source: Compiled from the World Bank: World Development Indicators, 2017.

The service sector also accounts for a significant proportion of GDP in most countries, including low income countries, where it frequently generates over 50% of GDP. The process of development usually coincides with a growing role of services in the economy (alongside a reduced role for agriculture). Thus, services constitute an increasing percentage of GDP in nearly all developing countries.

Many services are key inputs to all or most other businesses. For example, infrastructure services such as energy, telecommunications and transportation; financial services which facilitate transactions and provide access to finance for investment; health and education services which contribute to a healthy, well-trained workforce; and legal and accountancy services which are part of the institutional framework required to underpin a healthy market economy. The service sector is thus a key part of the investment climate, and can have a much wider impact on overall business performance and the level of investment, and hence growth and productivity in the economy.

The services sector has long been the main source of growth in rich countries. The sector has increasingly accounted for a larger share of GDP in poor countries; and productivity growth in the sector exceeds that in industry for most poor countries. This is largely explained by the rapid development of modern, commercial services-business processing, finance, insurance, and communications. Modern service productivity growth, in turn, is driven by the tradability, technology and transportability, (Ghani, 2011).

In Africa, the services sector is believed to embraces remarkable economic potentials, (United Nations, 2015). Evidence from most African countries shows that the sector in recent years accounted almost half of the continent's output, (UNCTAD, 2015). The services sector is a primary source of employment and income to the people, it accounts to almost two-third of the continents'

workforce and it also represents an important share in exports. As of 2012 for instance, the import and export of services in Africa amounted to US$271 billion, (United Nations, 2015).

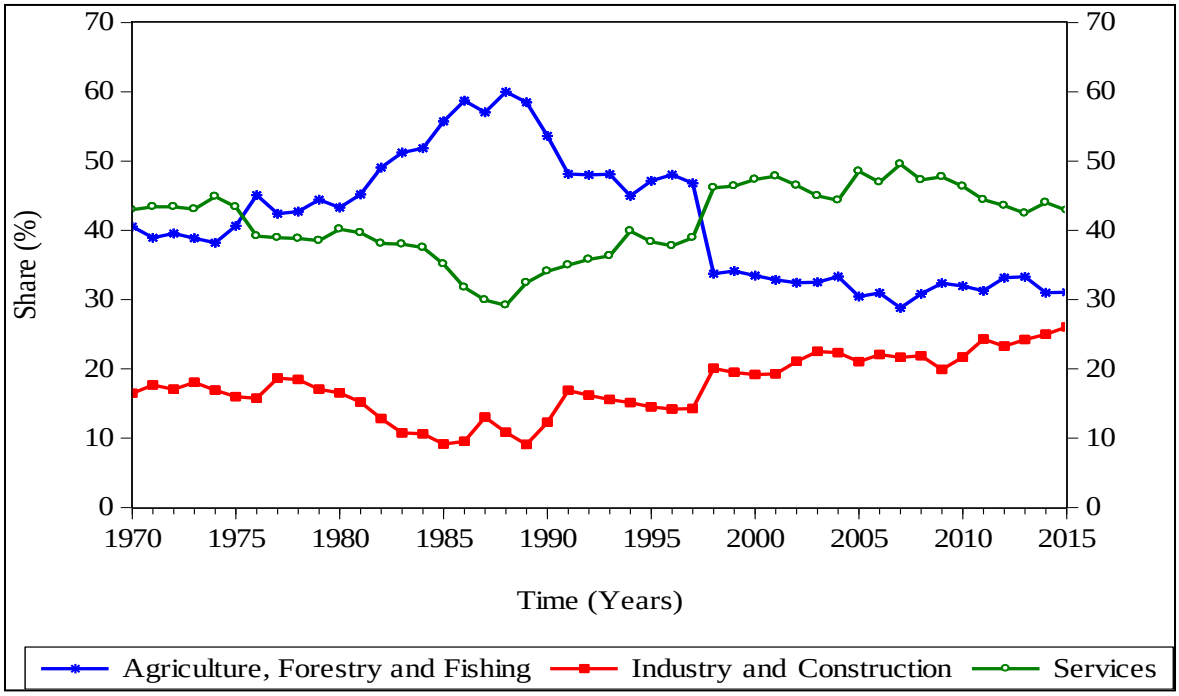
Economic growth and quality life are well addressed in the 2030 Agenda for Sustainable Development, while in Tanzania, it is reflected in the 2025 Development Vision and the National Five-Year Development Plan (2011/12-2015/16). In Tanzania however, contribution of the services sector to GDP declined from the mid-1970s and picked up in late 1980s owing to economic crisis which slowed down the GDP growth, which necessitated Economic Recovery Programme (ERP), 1986 – 1989. Since the reform period especially from the mid-1990s Tanzania has experienced an economic transformation of its three main sectors, namely, agriculture, industry and construction as well as services. The transformation has given rise to increase in non-agricultural activities. The share of agricultural sector to the GDP dominated between 1975 to late 1990s, where the trend reversed in favor of services sector following the reforms (Table 1; Figure 2). The share of agriculture to GDP declined from an average of 48.6% between 1990 – 1994 period to about 32% in 2010 – 2015. The share of the services sector to the GDP recorded an increasing trend between 1996 and 2010 before declining slightly during the period 2013 – 2015. The services sector recorded an average of 43.3% and 46.4% and 47.6% during 1996 – 2000, 2001 – 2005 and 2006 to 2010, respectively (URT, 2012). Contribution of the sector fell to an average of 43.9% during the period 2010 – 2015, (URT, 2016b).

Table: 1: Shares of Agriculture, Industry and Service Sectors to the GDP, 1970-2015

Economic Sector	Period Average								
	1970-1974	1975-1979	1980-1984	1985-1989	1990-1994	1995-1999	2000-2004	2005-2009	2010-2015
Agriculture, Forestry and Fishing	39.3	43.1	48.1	58.0	48.6	42.0	32.9	30.7	32.0
Industry and Construction	17.2	17.2	13.2	10.3	15.2	16.5	20.9	21.3	24.1
Services	43.5	39.7	38.7	31.7	36.2	41.5	46.2	48.0	43.9
Real GDP Growth (%)	04.5	03.4	00.8	03.5	04.2	04.3	06.3	06.4	06.8

Source: Bank of Tanzania (2015).

Figure 2: Share of Agriculture, Industry and Service Sectors to the GDP, 1970 – 2015
Source: Tanzania National Bureau of Statistics (various issues).



The trend indicates that employment growth has gradually shifted from agricultural and manufacturing sectors to the services sector during the same period. Thus, the services sector is a key resource for sustainable development in Tanzania since it has strong potential to increase in future due to, among others, rapid changes in information technology which makes knowledge-based services such as finance easily accessible for an increasing number of global consumers.
Despite the increasing importance of the services sector in the economy, there lacks an investigation of the contribution of the sector on economic growth in Tanzania. Thus, the purpose of this study is to assess how expansion in the services and its effects on per capita income and economic growth in Tanzania during the period 1970 – 2015.

In arriving at reasonable conclusion, we define the Gross Domestic Product (GDP) as a function of as function of its three major sectors: Agriculture, fishing and forestry sector; services sector and Industry and construction sector. Also, owing the fact that the years 1986 and 1996 had remarkable history in the Tanzanian economy, we introduce the dummies D_{86} and D_{96} to reflect the effect of the 1986 economic reforms such as trade liberalization and the 1996 privatization policy on economy. Also, due to integration of the variables at I(0) and I(1), we make use of the Autoregressive Distributed Lag Model (ARDL) and bounds test of cointegration test for the presence of long run relationship among the variables.

The study findings gave strong evidence to reject the null hypothesis of no cointegration and thus concluding that the variables are cointegrated. Furthermore, the results show that in the long run, the contribution of the services sector to economic growth is significant in line with theoretical prediction. On the other hand, the findings reported a statistically significant error correction (CointEq (-1)) coefficient (-1.022) at 1% level, meaning that the speed of convergence towards the long-run equilibrium is 100%. However, the results reveal that the services as well as agriculture,

forestry and fishery sectors growth rates have no significant impact on economic growth in the short-run. Additionally, the current study finds dummy variables, D_{86}, statistically significant with a positive coefficient while the dummy variable, D_{96} being statistically insignificant with a negative coefficient. This means, economic reforms and policies adopted in 1986 such as trade liberalization and restoration of macroeconomic stability had positive impact in scaling up the economy. Insignificant coefficient for D_{96} means economic reforms and policies of 1996 such as privatization had no significant impact on economic growth.

The rest of the paper is organized as follows: Section 2 reviews both theoretical and empirical literature on services sector and economic growth. Section 3 dwells on the methodology of the study, and empirical results and the discussion of the findings are presented in section 4, Section 5 presents conclusions and policy implications.

2.0 Literature Review

Recent literature demarcates three distinct development phases that most of advanced and developing economies have moved through. The phases are the dominance of traditional agriculture, followed by manufacturing sector and lastly the resurgence of the service producing or tertiary sector as a dominant economic activity.

In 1970s the structural change theorists assert that developing economies must undergo structural transformation from traditional dominant subsistence agriculture to a modern manufacturing – move away from agriculture which has low labour productivity to industrial sector with high productivity, (Lewis 1954; Chenery 1979; Ranis & Fei 1961). Overall, they called for a sequential sectoral transformation-economic, industrial and institutional changes in order to reduce the dominance of tradition agriculture as the engine of economic growth in developing countries.

In the 1980s and 1990s, some countries advocated for a neoclassical (neoliberal) counter-revolution economic theory and policy. Their main argument was that underdevelopment is the result of poor resource allocation due market distortions as well as excessive government intervention in developing countries. That also marked the revival of the free-market argument which is a cornerstone of the traditional neoclassical growth theory. Accordingly, liberalization of national markets by the developing nations could draw additional domestic and foreign investment, which can increase the rate of capital accumulation. They called for supply-side macroeconomic policies, liberalization, privatization and dismantling of the public sector, (Todaro & Smith, 2012). According to Syrquin (1988), structural transformation entails changes in growth patterns, accumulations, sectors proportions and relative prices.

The services-led growth has challenged the traditional notion that the process of industrialization, and hence the development of a manufacturing sector, is a necessary element of structural transformation and economic development, (Haroon, 2016). The low productivity criticism leveled against the services sector since the classical economist was brushed off by among others, (Grilches 1992 and Maclean 1996). Innovation and productivity in the serves sector have been enhanced by investment in ICT and reforms in regulatory systems as well as growing tradability of services, (Pilat, 2000). Bosworth and Maertens, (2009) found that labour productivity, in absolute terms, is higher in the services sector than in the industrial sector for India, Nepal, Pakistan and Sri Lanka. A key question from a developing country's perspective, especially in the case of African countries, is on whether service sector growth can have a positive contribution to economic transformation.

Recent literature has argued that services can bring positive economic transformation, and the South Asian case somewhat attests to this. Nevertheless, the working hypothesis is that a country with a large service sector will tend to grow slower than a country with a smaller service sector. As advanced economies are predominantly service economies, this creates new possibilities for catch up in developing countries where the industrial and the manufacturing sector have a proportionately larger share in output. On the other hand, developing countries are characterized by a very large share of the service sector at early stages of development. They did not follow the traditional linear sequence of a shift from agriculture to manufacturing, followed by a shift from manufacturing to services. As much of the large service sector in developing countries is accounted for by a large, inefficient and unproductive sector of government services, developing countries suffer from a structural change burden at early stages of development. Because the demand for services increases at higher level of incomes, (Attiah 2019).

Fagerberg and Verspagen (2002) examine the impact of shares of manufacturing and services on economic growth in three periods: 1966-1972, 1973-1983 and 1984-1995 for a sample of 76 countries. They find that manufacturing has much more positive contributions before 1973 than after. The interpretation in both papers is that the period 1950-1973 offered special opportunities for catch up through the absorption of mass production techniques in manufacturing from the USA. After 1973, ICT technologies started to become more important as a source of productivity growth, especially in the nineties. These technologies are no longer within the exclusive domain of manufacturing but operate in the service sector.

Studies by Sahoo and Dash (2010) and Kumo (2012) use bivariate Vector Auto-Regression (VAR) to model infrastructure development and economic growth in China and South Africa. The findings from both studies indicate a strong causality between economic infrastructure investments and GDP growth rate running in both directions, implying that infrastructure investments drive the long-term economic growth in China and South Africa. In addition, the study found human capital spending, namely, expenditures on health and education contributes substantially to economic growth.

Ghani (2011) uses a sample of 50 countries to establish the relationship between growth of services and poverty reduction (poverty change) for the period 1990 – 2005. The findings indicate a strong negative correlation between the growth of services sector and poverty (reduction). The service sector impact on poverty reduction surpassed those of agriculture, fishing and forestry as well as industry and construction sectors, highlighting the message that services sector growth is very important for poverty reduction.

Mujahid and Alam, (2014) employs co-integration technique and Vector Error Correction Model (VECM) using annual data for the period 1976 – 2010 to investigate the long run and short run relationship among the determinants of service sector growth. The results found that 1% increase in population reduces the services sector value addition by about 0.76%. While for 1% increase in trade liberalization, labour force and government spending, raises the services sector value addition by about 0.10%, 0.43% and 0.19%, respectively, and so the country's GDP.

Saqib, (2013) uses multiple regression and sensitivity analysis to determine the impact of development and efficiency of financial services on economic growth of selected 50 developing countries. The findings show a significant positive impact of financial sector development on

economic growth in the sample countries. The amount and quality of financial services increases with expansion and sophistication of financial institutions which in turn promote economic growth. The results resemble the findings of Mattoo *et al.*, (2006), which prove that countries with fully open telecommunication and financial services sectors registered economic growth of up to 1.5% points faster than other countries.

Castillo *et al.* (2014) examine the importance of the service sector in the Mexican economy by using a time series analysis. The findings of the study revealed that the elasticity of GDP with respect to the industry and construction sector to be 0.81, and that corresponding to the service sector was 1.00. In addition, the average elasticity for the two largest activities in the industry and construction sector was 0.77 whereas that for commerce and real estate recorded 0.93. These findings suggest that the effects of the service sector are more intensely reflected in the aggregate economy than the industry and construction sectors, hence supporting the idea that services accounted for nearly two-thirds of the New Zealand's GDP.

Ndambiri *et al*. (2012) uses panel data of 19 Sub-Sahara African (SSA) countries to examine the factors that stimulate economic growth in Africa. The findings indicate that human capital development through improved literacy rates have a positive effect on GDP growth. A unit rise in literacy rate is likely to raise GDP performance by 35.9%. But the study found government expenditure impacting negatively on the GDP growth. A unit increase in the size of government spending is likely to reduce GDP growth rate in the sample countries by 0.8%.

According to the study by Uwitonze and Heshmati (2016), the literature review on service sector supports that services contribute more to the economic growth and further asserts that the service sector accelerates the transformation of economic growth, raise employment, boost the economy-wide labor productivity. They noted that key factors that contribute to the growth of service sector include rapid urbanization, the expansion of the public sector; increased demand for intermediate and final consumer services, domestic investment and openness, education skills, cultural adaptability, financial attractiveness, business environment; expansion of quality health services, application of information technology, increase in consumption expenditure, and incentive system and investing more in research and development. In Rwanda, the main components of the service sector are wholesale and retail trade, repair motorcycle and motor vehicle repairs; accommodation and food services activities and human health and social work activities. Finally, the findings show that the service sector growth in Rwanda is driven by access to finance, increased labor force, training personnel, ICT application, embryonic innovation and the tax system.

The study by Kabeta and Sidhu (2016) used a Shapely decomposition method to identify the contributions of service sector to per capita GDP and employment growth during two periods of 1999-2005 and 2005-2013 in Ethiopia. The study further decomposed per capita GDP into employment rate, productivity, and demographic changes. The findings indicate that during 1999-2005 growth periods, per capita GDP growth was mainly contributed by employment rate changes originated from the agriculture sector. Whereas the service sector has the highest contribution in productivity but a negative contribution in employment change. However, during 2005 to 2013, which was the high growth period growth in per capita GDP is due to productivity growth resulting from the service sectors mainly the distributive service sector

Kapunda and Topera (2013) study the influence of government expenditure on health, general public, defense and infrastructure services on economic growth in Tanzania. Though the expenditure on defense was not significant, it however, had a positive effect on economic growth. The findings suggest that for every 1% increase in government spending on defense, economy grows by 0.01%. Likewise, the relationship between expenditure on infrastructure was positive implying the economy grows by 0.01% for every 1% increase in infrastructure expenditure (mainly transport and communication services). The coefficient of expenditure on health services was positive, implying that the economy would grow by 0.02% for every 1% increase in expenditure on health. On the other hand, the coefficient of expenditure on education was negative a finding also noted to more spending on primary, secondary and on tertiary education rather than on the technical education as well as poor loan recovery system.

3.0 Methodology

3.1 Theoretical Framework

Services are crucial and important to peoples' wellbeing and economic growth as well. Development of service industries like education, health, tourism, transport and communication has huge impact on the economy. When the industrial sector is doing well the value added from the service industries increases and the overall GDP rises too. Thus, GDP growth rate is used as a response variable defined by growth of Services, Industry and Construction, Agriculture, Forestry and Fishery sectors.

3.2 Model Specification

The GDP growth depends on agriculture, forestry and fishing; industry and construction; and the services sectors. The function defining the relationship between GDP growth and its major components can be presented as:

$$GGr = f(AGr, SGr, IGr) \qquad (3.1)$$

where, *GGr, AGr, SGr,* are GDP growth, Agriculture, fishing and forestry sector growth, services sector growth respectively; *IGr* stands for growth of industry and construction sector.

The years 1986 and 1996 had remarkable history in the Tanzanian economy. To reflect the effect of the 1986 economic reforms such as trade liberalization and the 1996 privatization policy on economy, the dummies D_{86} and D_{96} were introduced. Equation (3.1) is modified to:

$$GGr = f(AGr, SGr, IGr, D_{86}, D_{96}) \qquad (3.2)$$

The general production function in equation (3.2) is expressed as a multiple form to read as:

$$GGr = \pi + \psi AGr + \eta IGr + \vartheta SGr + \delta D_{86} + \varphi D_{96} + \epsilon_t \qquad (3.3)$$

where; ϵ is an error term.

Some variables were stationary at level and others integrated of order one, this necessitates the use of Autoregressive Distributed Lag (ARDL) model for better estimates, (Brooks, 2008 and Nkoro and Uko, 2016) and thus, estimation of Error Correction Model (ECM) defined in equation (3.4).

$$\Delta Y_t = \eta_0 + \beta_i t + \sum_{i=1}^{k} \vartheta_i \Delta Y_{t-i} + \sum_{i=1}^{k} \varphi_i \Delta X_{t-i} + \lambda_1 Y_{t-1} + \lambda_2 X_{t-i} + \epsilon_{1t} \qquad (3.4)$$

where X and Y are independent and dependent variables, respectively, ϵ_1 is random error with no serial correlation; λ_1 and λ_2 are long-run multipliers; ϑ_i, and φ_i are short-run dynamics, η_0 is a constant (drift term) and k is the maximum lag order of the ARDL model.

Extending equation (3.4) to include lagged variables for the dependent and independent variables used in the study, the estimated ECM took the form:

$$\begin{aligned}\Delta GGr_t = \ & \eta_0 + \sum_{i=1}^{k} \vartheta_i \, \Delta GGr_{t-i} + \sum_{i=1}^{k} \varphi_i \, \Delta AGr_{t-i} + \sum_{i=1}^{k} \psi_i \, \Delta IGr_{t-i} + \sum_{i=1}^{k} \xi_i \, \Delta SGr_{t-i} \\ & + \lambda_1 GGr_{t-1} + \lambda_2 AGr_{t-1} + \lambda_3 IGr_{t-1} + \lambda_4 SGr_{t-1} + \phi_1 D_{86} + \phi_2 D_{96} \\ & + \epsilon_{1t}\end{aligned} \qquad (3.5)$$

Bounds test was used to test for the presence of long run relationship among the variables. The F-statistic was used to test whether the variables are cointegrated or not. We tested the null hypothesis that there is no long run relationship between the variables, implying that the coefficients of lagged variables in equation 3.5 are equal to each other and they are zeros, [Ho: $\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = 0$] against the alternative hypothesis that the variables have long run relationship, to mean that the coefficients of lagged variables are not the same and they are different from zero [Ha: $\lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq 0$]. The guideline was to reject the null hypothesis if the calculated F-Statistic is greater than the upper bound critical value at 5% level of significance.

Building from Ahmed Monir *et al.* (2013) and Türsoy (2017) existence of long run relationship led to estimation of long run ARDL model of the form:

$$GGr_t = \lambda_1 GGr_{t-1} + \lambda_2 AGr_{t-1} + \lambda_3 IGr_{t-1} + \lambda_4 SGr_{t-1} + \phi_1 D_{1986} + \phi_1 D_{1996} + \epsilon_{1t} \qquad (3.6)$$

The short run dynamics estimated by Error Correction Model (ECM) that reads as:

$$\begin{aligned}\Delta GGr_t = \ & \eta_0 + \sum_{i=1}^{k} \vartheta_i \, \Delta GGr_{t-i} + \sum_{i=1}^{k} \varphi_i \, \Delta AGr_{t-i} + \sum_{i=1}^{k} \psi_i \, \Delta IGr_{t-i} + \sum_{i=1}^{k} \xi_i \, \Delta SGr_{t-i} \\ & + \upsilon ECT_t + \epsilon_{1t}\end{aligned} \qquad (3.7)$$

where ECT is an error correction term which, according to Iheonu (2016), must be negative and statistically significant.

From statistical standpoint, if variables exhibit long run relationship, it implies that there exists causality running in at least one direction. In this regard, Granger causality test was employed to establish the direction of the causal relationship between the variables. The Granger Causality scheme reads as:

$$\Delta\begin{bmatrix}GGr_t\\AGr_t\\IGr_t\\SGr_t\end{bmatrix} = \begin{bmatrix}\eta_1\\\eta_2\\\eta_3\\\eta_4\end{bmatrix} + \sum_{i=1}^{p}\Delta\begin{bmatrix}\vartheta_{1i} & \varphi_{1i} & \psi_{1i} & \xi_{1i}\\\vartheta_{2i} & \varphi_{2i} & \psi_{2i} & \xi_{2i}\\\vartheta_{3i} & \varphi_{3i} & \psi_{3i} & \xi_{3i}\\\vartheta_{4i} & \varphi_{4i} & \psi_{4i} & \xi_{4i}\end{bmatrix} \times \begin{bmatrix}GGr_{t-1}\\AGr_{t-1}\\IGr_{t-1}\\SGr_{t-1}\end{bmatrix} + \begin{bmatrix}\eta_1\\\eta_2\\\eta_3\\\eta_4\end{bmatrix}[ECT_{t-1}] + \begin{bmatrix}\epsilon_{1t}\\\epsilon_{2t}\\\epsilon_{3t}\\\epsilon_{4t}\end{bmatrix} \quad (3.8)$$

where Δ is a lag operator, $ECTt_{-1}$ is a one-period lagged error term derived from a long-run cointegration; ϵ_{1t}, ϵ_{2t}, ϵ_{3t}, and ϵ_{4t}, are white noise error terms that are serially uncorrelated and p is the number of lags.

As documented, among others, by Türsoy (2017); Monir *et al.* (2013), and Kumar and Smyth (2004), the Granger causality test was carried out by including an ECM (with lagged error correction term) shown in equation (3.8).

4.0 Empirical Results and Discussion

4.1 Descriptive statistics

Table 2 presents summary statistics of the variables of the ARDL model. The mean and median of each variable, along with their corresponding standard deviations, indicate that there was no greater variability in the data. The values for skewness and Jarque-Bera statistic confirm that our data were almost normal.

Table 2: Descriptive statistics for ARDL model

	GGr	AGr	IGr	SGr
Mean	4.34	3.63	4.93	4.44
Median	4.63	3.52	5.06	5.27
Maximum	8.46	10.90	10.34	19.02
Minimum	-2.36	-4.14	-1.61	-15.80
Std. Dev.	2.47	2.71	3.05	6.32
Skewness	-0.51	-0.03	-0.14	-0.60
Jarque-Bera	2.12	2.03	1.48	0.08
Probability	0.35	0.36	0.48	0.08
Sum	199.38	167.12	226.77	204.03
Observations	46	46	46	46

Source: Authors compilation from E-views 9.5.

4.2 Unit root tests

Augmented Dick-Fuller (ADF) test was used to test data for stationarity, where the null hypothesis, Ho: I(1), was tested against an alternative Ha: I(0) at level; Ho: I(2) against Ha: I(1) at level one. At 5% level of significance, the guideline was to reject the null hypothesis if the calculated probability is less than 0.05. Results in Table 3 suggest the variables GGr, SGr and IGr were integrated at order I(1) whereas AGr was stationary at level I(0).

Table 3: Unit root tests output for ARDL model variables

Variable	Description	I(0)		I(1)	
		t-Stat	Prob.	t-Stat	Prob.
GGr	ADF Test Statistic	-1.484	0.532	-7.643	0.000***
	5% level Critical Value	-2.931		-2.931	
AGr	ADF Test Statistic	-7.309	0.000**		
	5% level Critical Value	-2.930			
IGr	ADF Test Statistic	-0.600	0.856	-3.376	0.020***
	5% level Critical Value	-2.960		-2.968	
SGr	ADF Test Statistic	-2.109	0.242	-6.429	0.000***
	5% level Critical Value	-2.928		-2.931	

Source: Author's estimates

** The probability is significant, the variable is stationary at level, I(0)

*** The probability is significant, the variable is stationary at level 1, I(1)

Figure 3 depict graphical presentation of non-stationary variables. As evident, the four variables GDP growth (GGr), industrial growth (IGr) and services growth (SGr) seem to be variant, meaning that their means, variances and covariances are not constant. This evidence (Figure 3a) suggest that the variables were not stationary at level, I(0). On the other hand, Figure 3b presents stationary variables at I(1). As shown, means and variances of the variables are invariant, which is, the necessary condition for stationarity. Therefore, with the exception of the variable AGr that was stationary at level i.e. I(0), the rest were stationary at I(1).

Figure 3a: A Graph for Non-Stationary ARDL Model variables at I(0)

Source: Eviews 9.5 Output

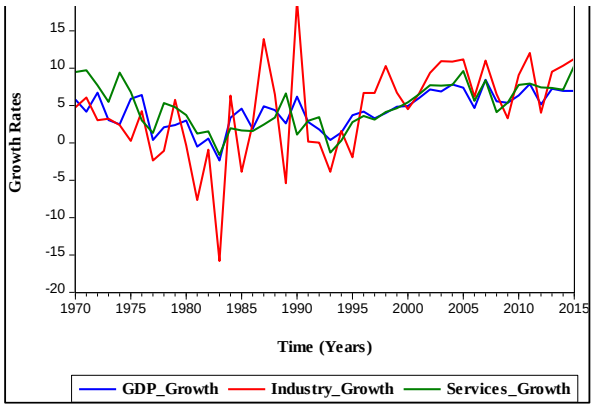
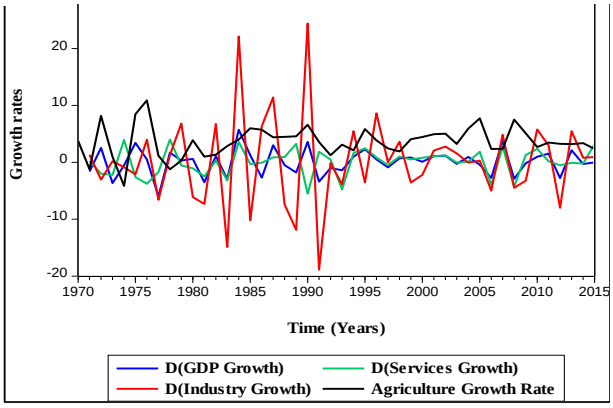


Figure 3b: A Graph for Stationary ARDL Model variables at I(0) and I(1)

Source: Eviews 9.5 Output



4.3 Lag selection

Table 4 present the Lag order selection criterion of Vector Autoregressive (VAR) model. The lag chosen was the one with the lowest Akaike Information Criteria (AIC) value. As Table 4 shows, two lags were used in the ARDL model.

Table 4: VAR Lag Order Selection Criteria for ARDL Model

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-353.84	NA	635.96	17.80	18.63*	18.21
1	-335.67	28.55	586.53	17.70	19.19	18.23
2	-306.30	40.56*	328.42*	17.06*	19.21	18.09*
3	-297.49	10.49	517.64	17.40	20.22	18.61
4	-276.49	21.00	497.36	17.17	20.64	18.82

Source: Author's estimates.

Notes: *indicates lag order selected by the Criterion

4.4 ARDL Long Run form Bounds test for Cointegration

Table 5: ARDL Bound tests

Ho: No long-run relationship exists			Critical Value Bounds		
Test Statistic	Value	K	Significance	I0 Bound	I1 Bound
F-Statistic	43.469	3	5%	2.79	3.67

Source: Author's estimates.

The study used bounds test for cointegration to test for long run relationship among variables. As reported in Table 5, the F-statistic (43.47) was greater than the upper critical value bound (3.67). This is a strong evidence to reject the null hypothesis of no cointegration and thus concluding that the variables are cointegrated. There was, therefore, a long-run relationship running from AGr, SGr and IGr to the dependent variable, GGr.

4.5 Long-run Multipliers

The estimated long run coefficients, standard errors, t-statistics along with their corresponding probabilities are as depicted in Table 6. Equation (4.1) defines the long run relationship among variables that is:

$$GGr = 0.360AGr + 0.150IGr + 0.464SGr \quad (4.1)$$

Table 6: ARDL Long Run Coefficients

Level Equation				
Variable	Coefficient	Std. Error	t-Statistic	Prob
AGr	0.360	0.047	7.738	0.000
IGr	0.150	0.060	2.518	0.017
SGr	0.464	0.074	6.239	0.000
C	−0.049	0.397	−0.123	0.903

Source: Author's estimates

The results show that the contribution of the services sector to economic growth is significant in line with theoretical prediction. The sector recorded a positive (0.46) coefficient and significant at 1% level. Implying that, in the long-run real GDP increases by approximately 0.46 for every unit growth in services sector. This affirms to Mattoo *et al.* (2006) who claims that economies of the countries with fully open services sector grow at the rate of 1.5% points faster than other countries.

Sharipov (2015) argues that economic growth is linked to investment on services, such as investment in human development through availing better services including education, health, transport and public administration. Additionally, the coefficient for agriculture, fishery and forestry is 0.36 and significant at 1% level, meaning that in the long-run, for every unit increase in growth rate of agriculture, fishery and forestry sector, the economic growth increases by 0.36. The findings are in line with studies by Marks (2011); Omonzejie and Omonzejie (2014). While a unit increase in industry and construction increase the real growth of the economy by about 0.14.

4.6 ARDL Error Correction Model (ECM)

The Error Correction Term (ECT) denotes one period lag residuals of the cointegrating vector between explanatory variables and a response variable. ECT explains the speed of convergence of short-run disturbances towards the long-run equilibrium. As a thumb rule, a variable converges to equilibrium if its coefficient is negative and significant. The findings reported have a statistically significant error correction (CointEq (-1)) coefficient (-1.022) at 1% level, meaning that the speed of convergence towards the long-run equilibrium is 100%.

Table 7: ARDL Cointegration and Long Run Form

Original Dependent Variable: GDP_Growth				
ECM Regression				
Variable	Coefficient	Std. Error	t-Statistic	Prob
D(IGr)	0.181	0.016	11.026	0.000
D(IGr(−1))	0.043	0.016	2.663	0.012
D_{1986}	0.343	0.155	2.208	0.034
D_{1996}	−0.345	0.269	−1.283	0.207
CointEq(-1)	−1.023	0.066	−15.562	0.000

Source: Authors compilation from Eviews9.5 Output

Equation (4.2) defines the short run dynamics (approximated to two decimal places):

$$D(GGr) = 0.18D(IGr) + 0.04D(IGr(-1)) + 0.34D_{1986} - 1.02CointEq(-1)\ ) \qquad (4.2)$$

Surprisingly, the results reveal that the services as well as agriculture, forestry and fishery sectors growth rates have no significant impact on economic growth in the short-run. Only the growth of industry and construction sector and its one period lag have significant impact to economic growth in the short-run. The coefficient on one period lag of industry and construction sector is positive (0.04) and significant at 1% level, implying that a unit increase in one period lag of industry and construction sector growth increases economic growth by about 0.04. Also, the coefficient of industry sector growth is positive (0.18) and statistically significant at 1% level, implying that in the short-run, a unit increase in industry and construction growth will increase economic growth by 0.18.

The dummy variables, D_{86}, is statistically significant (p-value = 0.03) with a positive coefficient (0.34) while the dummy variable, D_{1996} is statistically insignificant (p-value = 0.21) with a negative coefficient (-0.34). This means, economic reforms and policies adopted in 1986 such as trade

liberalization and restoration of macroeconomic stability had positive impact in scaling up the economy. The reforms helped the economy to grow by the rate of 0.34 than before. This is in line with Bigsten and Danielsson (1999) and Muganda (2004). Insignificant coefficient for D_{96} means economic reforms and policies of 1996 such as privatization had no significant impact on economic growth.

4.6.1 Granger Causality

Results in Table 8 suggests there is a bi-directional causality between GDP growth and services growth, meaning that services growth is attributed by GDP growth, similarly GDP grows due to growth of services. Additionally, there was a unidirectional Granger causality showing that growth of services is attributed by growth of both industry and agriculture sectors.

Table 8: Pairwise Granger Causality Tests

Null Hypothesis	Observations	F-Statistic	Prob.
S_Gr does not Granger Cause GDP_Gr	44	3.427	0.043
GDP_Gr does not Granger Cause S_Gr		5.302	0.009
S_Gr does not Granger Cause A_Gr	44	3.041	0.059
A_Gr does not Granger Cause S_Gr		4.730	0.015
S_Gr does not Granger Cause I_Gr	44	1.606	0.214
I_Gr does not Granger Cause S_Gr		4.237	0.022

Source: Author's estimates

4.6.2 Stability Diagnostic

4.6.2.1 CUSUM and CUSUM of squares tests

The study used CUSUM and CUSUM of squares to testing for the stability of the model at 5% level of significance. Figure 4a and 4b evidence that the model was stable since the graph for CUSUM and CUSUM of squares tests, which are the plots of recursive residuals and cumulative sum of squared recursive residuals, respectively, are within the boundary of the critical regions. Though figure 6 shows that there was a slight structural break (Shift) for year 2004, the shift, however, is not large enough to affect the validity and reliability of findings since there is no significant departure, our model is therefore stable and can be used for predication.

Figure 4a: CUSUM test for ARDL

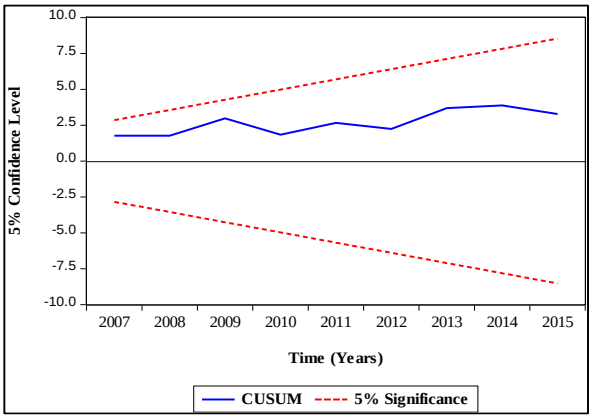
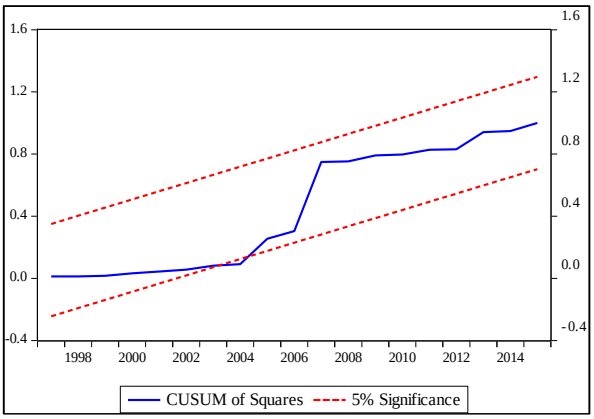


Figure 4b: CUSUM of Squares for ARDL Model



4.6.3 Residual and Stability Diagnostic tests

Diagnostic test	Test statistics	Hypothesis to be tested	Probability	Decision (At 5%)
Serial Correlation	Breusch-Godfrey serial correlation LM	H_0: No serial correlation H_1: Residuals are serially correlated.	0.3767	Residuals are not serially Correlated
Heteroskedasticity	ARCH Test	H_0: Residuals are not heteroskedastic H_1: Residuals are heteroskedastic.	0.2429	Residuals are not heteroskedastic
Normality	Jarque-Bera test	H_0: Residuals are normally distributed H_1: Residuals are not normally distributed	0.2043	Residuals are normally distributed
Ramsey Tests for Model Specification	F-Statistic	H_0: Coefficients of squared fitted value are not different from zero H_1: Coefficient of squared fitted value are different from zero	0.2932	The model is correctly specified

5.0 Conclusions

This study aimed at soliciting the responsiveness of the GDP growth to services industry in Tanzania by using time series data for the period 1970 to 2015. Due to integration of variables in different orders, (I(0) and I(1)) the study adopted Autoregressive Distributed Lag Model (ARDL) and vector error correction model. The findings reveal that contribution of the services sector to GDP growth in Tanzania is positive and significant. This complies with theoretical prediction that growth of services sector has high impact on economic growth compared to growth of agriculture, fishery and forestry as well as industry and construction sectors. In the short-run, the services sector growth rate has no impact in economic growth. There is bidirectional granger causality between services growth and economic growth during the study period.

The scope of the service industries ranges from social, economic as well as political spheres. Since services are needed in every domain of human life as peoples' well-being is primarily determined by the quality of social services, a range of complementary efforts cum policies such as appropriate regulations, creation of market conditions which are competitive, and appropriate training/skills are imperative in order to scale up productivity in the services sector.

The government should establish enabling business environment for investment, trade and tourism in order to enhance value addition in the services industry. Promotion of technological innovations in the services sector is very crucial so as to improve efficiency, quality and productivity in domestic services and thus enhance competition. The services sector should be considered as equally important as industrial sector due to cross-fertilization between the two. Ensure supply of skilled workforce which is able to compete for employment at national and international levels.
Better transport system creates a room for easy service delivery. It allows mobility of people from one place to another and facilitates other activities which add value to the service sector such as trade (whole sale and retail) to be undertaken. The government should therefore allocate funds to improve the means of transport; this will in turn help to increase the service sector's value added. Relevant health policies should also be in place in order to have health human capital.

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