

Official Development Assistance and Economic Growth in East African Countries*

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Abstract

Tanzania, Uganda and Kenya have been receiving larger amount of official development assistance (ODA) compared to the rest of the East African Community countries. Therefore this study aims at assessing the impact of ODA on economic growth for to those three East African Community countries for the last 35 years from 1980-2014. The study employed the autoregressive distribution lag (ARDL) approach geared by Eviews9 application software for all estimations with the inclusion of other important independent variables like terms of trade, foreign direct investment, education and health. All countries' ODA estimated results confirmed to have positive and significant effect on their economic growth. Just in the short run, ODA flowing to Kenya and Uganda proved to have a negative significant effect on the economic growth. However in the long run both countries' ODA effects were positive. Tanzania had a significant positive effect for short and long run. In line with ODA, education and health found to have positive significant short and long run effects on the economic growth of East African countries. However in the previous years the human development factors were negatively affecting the growth, therefore the reverse suggested signs of improvements in the human development.

Keywords: Economic growth, ODA, Terms of trade, FDI, Education, Health

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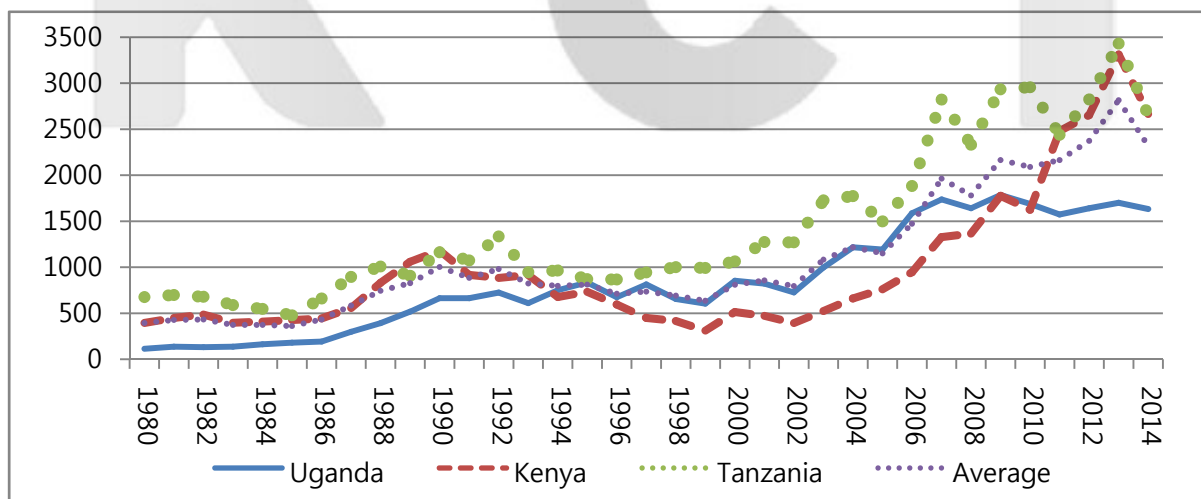
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I. Introduction to ODA flowing to East Africa

According to the World Bank, Official Development Assistance (ODA) consists of “disbursements of loans made on concessional terms and grants by official agencies of the members of the Development Assistance Committee (DAC), by multilateral institutions, and by non-DAC countries to promote economic development and welfare in countries and territories in the DAC list of ODA recipients”. “But as important as official assistance is to improving people’s lives, the reality is that it is trade and private capital flows that will make the real difference that are more, more, much more significant”.¹ Overall in East Africa the average aid to government budget percentage was 20.5% though there was significant variation. For example, the governments of Burundi and Rwanda received 50.2% and 45.3% respectively, of support from foreign aid whereas Kenya received 12.8% of government budgetary support.² Official Development Assistance (ODA) to the resource flows provided through central governments or local governments or public authorities or international organizations and the purpose is to alleviate poverty, help the developing countries escape from the poverty by promoting economic developments, and to form the foundation on the basis of which their people can live on their own.³ Generally trend of ODA flowing to East African region has been increasing slowly as shown in figure 1 below. Recently Tanzania and Kenya have received almost equal amount of ODA.

<Figure 1> ODA Flowing to EAC Countries (US\$ Million) 1980-2014



Source: Author using IEAS ODA data compilation

¹ Colin Powell, “Making Sustainable Development Work: Governance, Finance, and Public-Private Cooperation” (State Department Conference, Meridian International Center, Washington, DC., 2002a).

² TMEA, “Impact of Donor Funding on EAC Economies,” 2016, <https://www.trademarka.com>.

³ Chang Hwan Choi, “The Impact of ODA·FDI·Trade on the Africa Economic Growth: Evidence from Senegal,” *International Area Studies Review* 20(1) (2016), 127–46.

The effectiveness of aid as efficient mechanism in driving growth is the condition upon the geographical location of the country, where their results suggest that aid affects growth positively outside the tropics.⁴ African countries still receive larger portion of aid assistance than any region in the World and three EAC countries, Kenya, Tanzania and Uganda were listed as the top ten recipients of foreign aid in Africa for years 2013 and 2014 consecutive. Tanzania and Kenya have received close amount of ODA while Ugandan portion started to increase slowly. Ethiopia and Egypt are the main recipients of ODA compared any other African country. Table 1 below shows the detail. Therefore this study aims at assessing the impact of ODA on economic growth for to those three East Africa countries which ranked higher compared to others. The three countries have chosen because are all belong to the East African Community.

<Table 1>Recent Top Ten Recipients of ODA (US\$ Mill) in Africa

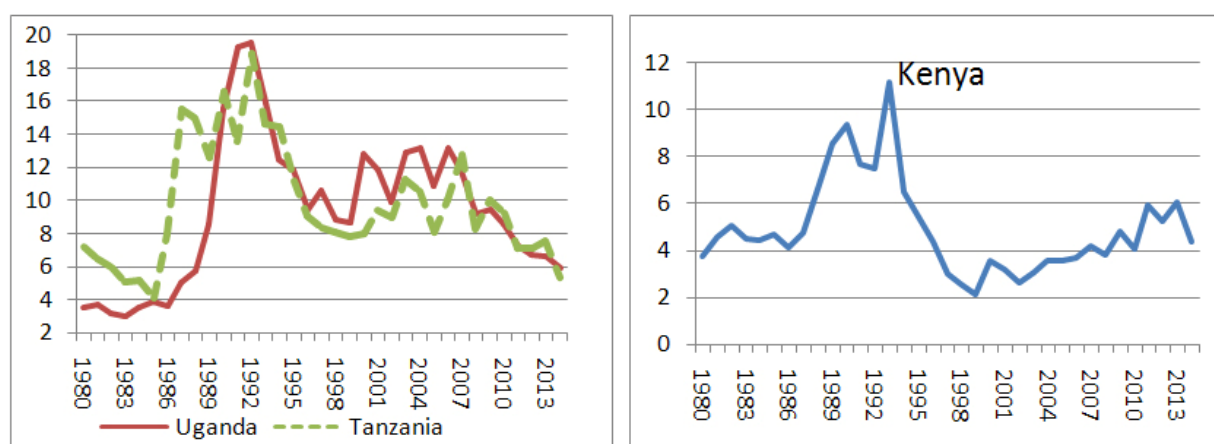
Rank	Country	Year	ODA	Rank	Country	Year	ODA
1	Ethiopia	2014	3585.11	1	Egypt	2013	5508.16
2	Egypt	2014	3532.17	2	Ethiopia	2013	3884.86
3	Kenya	2014	2665.12	3	Tanzania	2013	3431.00
4	Tanzania	2014	2647.98	4	Kenya	2013	3311.62
5	Nigeria	2014	2476.18	5	DRC	2013	2583.50
6	DRC	2014	2398.2	6	Nigeria	2013	2515.10
7	Morocco	2014	2247.03	7	Mozambique	2013	2314.68
8	Mozambique	2014	2103.44	8	Morocco	2013	2004.04
9	South Sudan	2014	1964.19	9	Uganda	2013	1700.74
10	Uganda	2014	1632.93	10	Sudan	2013	1502.95

Source: Author using IEAS ODA data compilation

ODA for Tanzania and Uganda contributed to around 20% of GDP in 1992 and that was the highest recorded contribution from 1980s to 2010s. From then the contributions kept on dropping until 2000s where unstable patterns formed and continuous dropping trends realized. Kenya once recorded highest contribution of 11.16% in year 1993 and also the continuous decreasing trend followed until year 1999 where by the lowest contribution of 2.11% was recorded. The highest decline was due to suspension of ODA to Kenya by multilateral and bilateral donors in 1991 and 1997. Figure 2 and table 2 below show in detail. Recently ODA flowing to the whole East African region does not exceed 6% of GDP which is the lower contribution compared to early 1990s.

⁴ Carl Johan Dalgaard, Henrik Hansen, and Finn Tarp, "On the Empirics of Foreign Aid and Growth," *The Economic Journal* 114(496) (2004), 191–216.

<Figure 2> ODA Flowing to EAC Countries (% of GDP) 1980-2014



Source: Author using IEAS ODA data compilation

<Table 2> Recent ODA Flowing to EAC Countries (% of GDP) 1980-2014

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Kenya	3.53	3.666	4.151	3.805	4.798	4.062	5.913	5.263	6.029	4.374
Uganda	10.853	13.169	11.721	9.161	9.432	8.574	7.253	6.725	6.671	5.946
Tanzania	8.099	10.005	12.772	8.297	10.016	9.282	7.09	7.095	7.542	5.369

Source: Author using IEAS ODA data compilation

II. Economic Growth of East African Countries

Kenya has been the biggest economy in East African region closely equal to the total of Tanzanian and Ugandan economies. Burundi's economy is the smallest in the region and it is approximately one third the size of the Rwandese economy. Its percentage change is also the lowest while Rwanda and Tanzania grow very fast at almost 7 percent. Details are shown in tables 3 below. Overall the GDP per capital for Kenya is the highest and above the average in the EAC region. Tanzania follows with recent GDP per capita of around US\$1000. Burundi records the lowest value not exceeding US\$400 over all times. Figure 3 shows the details. Dominant sectors in all the Partner States reported to be agriculture, followed by wholesale and retail trade and manufacturing.⁵

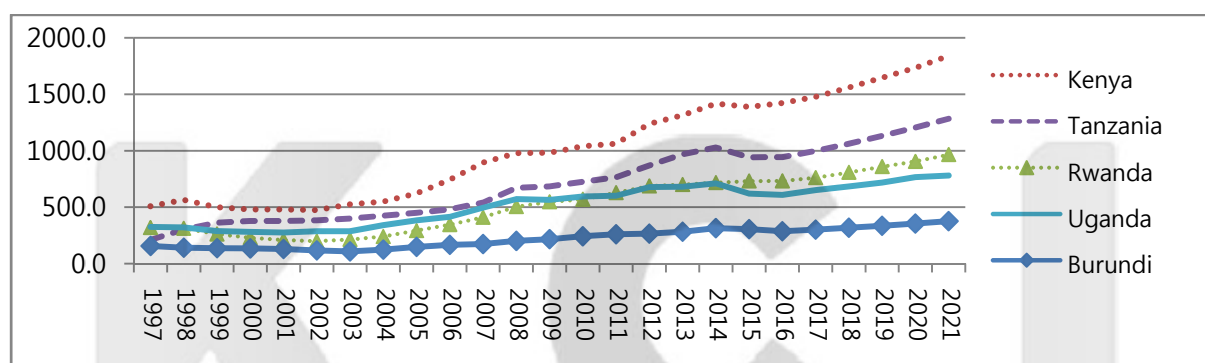
⁵ "East Africa Trade Report," Annual Report (East Africa Community, 2013).

<Table 3> Gross Domestic Products in East African Countries

Gross Domestic Product, constant prices (% change)											
Country	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Burundi	4.37	5.41	3.45	4.86	3.81	5.12	4.03	4.45	4.55	4.66	-4.11
Kenya	5.67	5.85	6.85	0.23	3.31	8.40	6.11	4.56	5.69	5.33	5.59
Rwanda	9.38	9.23	7.65	11.13	6.30	7.34	7.82	8.79	4.71	6.96	6.94
Tanzania	6.46	4.66	8.46	5.57	5.38	6.36	7.91	5.14	7.26	6.97	6.97
Uganda	10.01	7.05	8.06	10.43	8.07	7.67	6.82	2.63	4.04	4.93	5.04

Source: Author using IMF WEO database (Dec 2016)

<Figure 3> GDP per Capita in East African Countries (1997-2021)



Source: Author using IMF WEO database (Dec 2016)

III. Human Development and Growth

Zilibotti summarized famous work called Schumpeterian approach to growth theory where growth is driven by a process of intentional investment (Research and Development) aimed at creating product improvements, more productive technologies, and so on.⁶ In the benchmark model, the growth rate of the economy is determined by the share of productive resources (labour, capital) that the economy allocates to innovative activity, and, thus, policies inducing a shift of resources towards R&D activity increase growth (though not necessarily welfare). Innovation consists of the invention of a new intermediate good, whose use as input allows more efficient methods to be used in producing goods.⁷ Innovation output is a multi-faceted construct, consisting of at least three aspects: knowledge creation, knowledge impact, and knowledge diffusion.⁸ Therefore education stands to be a vital factor for enhancing knowledge even of managing the ODA to many countries for the human development. It was also suggested that the impact of education on economic growth in Sub-Saharan Africa was lower than in other countries, likely due to lower school quality.⁹ Significant and positive impact of education on growth was also evident.¹⁰

Health development is also considered as the important factor in the economic growth agenda for a nation. Substantial amount of ODA has been directed in health facilitation and monitoring of diseases especially in vulnerable areas. The Human Development Index (HDI) assesses health dimension by life expectancy at birth and has been used in various studies where a negative relation is found between economic growth – measured by the rate of growth of gross domestic product (GDP) – and health progress – as indexed by the annual increase in life expectancy at birth (LEB).¹¹ It was also concluded that economic growth was positively associated with health progress in Sweden throughout the 19th century.¹² However,

⁶ “Review of the Endogenous Growth Theory by P. Aghion, P. Howitt and Cecilia Garcia-Penalosa,” *The Canadian Journal of Economics* 32(5) (1999), 1338–41.

⁷ Philippe Aghion and Peter Howitt, “A Model of Growth Through Creative Destruction,” *Econometrica* 60(2) (1992), 323–51.

⁸ Letty Yan Yee Kwan and Chi Yue Chiu, “Country Variations in Different Innovation Outputs: The Interactive Effect of Institutional Support and Human Capital,” *Journal of Organizational Behavior* 36(7) (2015): 1050–70.

⁹ Paul Glewwe, Eugénie Maïga, and Haochi Zheng, “The Contribution of Education to Economic Growth: A Review of the Evidence, with Special Attention and an Application to Sub-Saharan Africa,” *World Development* 59 (2014), 379–93.

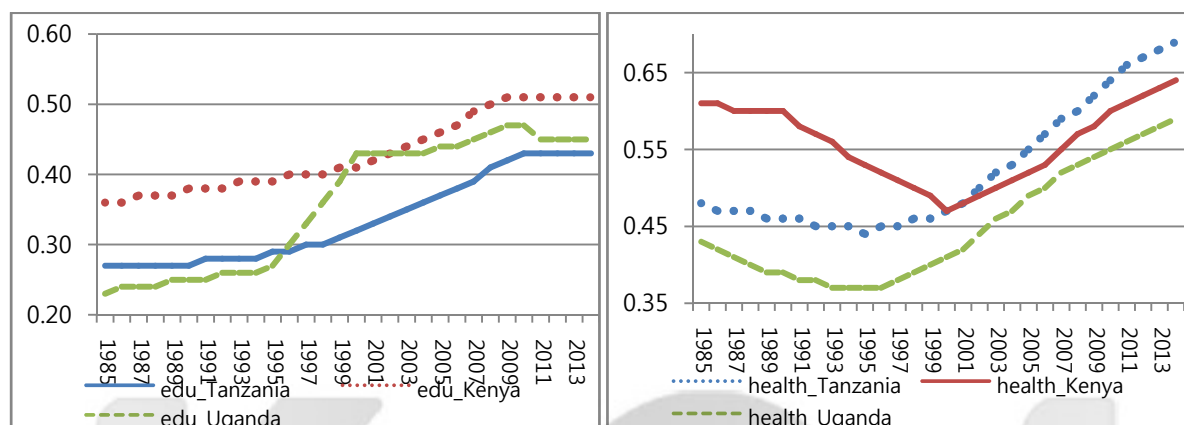
¹⁰ Daniel Cohen and Marcelo Soto, “Growth and Human Capital: Good Data, Good Results,” *Journal of Economic Growth* 12(1) (2007), 51–76.

¹¹ José A. Tapia Granados, “Economic Growth and Health Progress in England and Wales: 160 Years of a Changing Relation,” *Social Science & Medicine* 74(5) (2012): 688–95.

¹² José A. Tapia Granados and Edward L. Ionides, “The Reversal of the Relation between Economic Growth and Health Progress: Sweden in the 19th and 20th Centuries,” *Journal of Health Economics* 27(3) (2008), 544–63.

the relation reversed in the second half of the 20th century, when economic growth negatively affected health progress. For the last decade, Tanzania has recorded highest health development index whereas Kenya has recorded highest education development index in the region. Uganda has recorded all time lowest health rates with huge improvements in education developments in late 1990s and early 2000s. Figure 4 below shows the detail.

<Figure 4> Education and Health Development Indices (1985-2014)



Source: Author using Human Development Index database from UNDP (2016)

IV. Theoretical Reviews

Theories behind foreign aids are mostly originated from the famous two-gap model extended from Harrod-Domar growth model. The second gap in addition to the savings gap is foreign exchange. Savings gap takes into consideration that domestic savings are inadequate to support the level of growth which could be permitted given the import purchasing power of the economy and the level of other resources. Foreign exchange gap takes into consideration that import purchasing power conferred by the value of exports plus capital transfers may be inadequate to support the level of growth permitted by the level of domestic saving. In order to fill the two gaps, it was urged that the availability of foreign assistance makes possible for a less balanced form of accelerated growth to make fuller use of domestic resources.¹³ It was further urged that some of the potential bottlenecks of skills, savings or foreign exchange can be temporarily relaxed by adding external resources for which current payment is not required. Therefore full utilization of other resources can be made and the overall growth of output may be substantially higher than would be permitted by the rate of increase of the most restrictive domestic factor.

¹³ "Foreign Assistance and Economic Development," Discussion Paper No. 7 (Washington D.C.: Department of State, 1965).

The foreign aid required to fill the gap is determined by the dominant gap at a given point in time. If the savings gap is larger than the foreign exchange gap, the economy is said to be in a savings constraint whereas if the foreign exchange gap is larger than the savings gap, the economy is in a foreign exchange constraint.¹⁴ Aids were also discussed under the idea of “big push”. In 1961, when the United Nations embarked on its first development decade, it was understood, by rich and poor countries alike, that there would have to be an intensified effort to mobilize internal and external resources if the designated growth targets were to be met.¹⁵ The big push theory assumes that poverty traps- which arises from various factors such as weak savings, low production capacity and high population- hampers growth and development and therefore; a big push (involving a temporary injection of capital in form of ODA) increases investment in many different sectors leading to a take off into self-sustaining growth.¹⁶ However, other scholar concluded that the influx of massive amounts of foreign aid can have deleterious effects on the governments of the receiving countries, and can end up doing more harm than good in several circumstances.¹⁷

“.....aid may not always be successful in promoting economic growth - however good institutional and policy frameworks enhance aid effectiveness and this remains a paramount requisite for improving the prospects that aid is transformed into economic growth. In fact, there is a growing awareness that aid itself can be instrumental in promoting good economic governance, which in turn leads to improved aid effectiveness”.¹⁸

V. Empirical Reviews

Gounder conducted an empirical analysis of the relationship between foreign aid and economic growth for Fiji using time series for the period 1968-1996 and applied the Autoregressive Distributed Lag (ARDL) approach to estimate the model. Results proved that total aid flows and its various forms (bilateral aid, grant aid and technical cooperation grant

¹⁴ “Foreign Assistance and Economic Growth in Nigeria: The Two-Gap Model Framework,” *American International Journal of Contemporary Research* 3(10) (2013), 153–60.

¹⁵ “Economic Development in Africa: Doubling Aid (Making the ‘Big Push’ Work)” (United Nations, 2006).

¹⁶ “Impact of Official Development Assistance on Economic Growth in Kenya” (Thesis for Degree of Master of Arts in Economics, University of Nairobi, 2013).

¹⁷ “Foreign Aid and the ‘Big Push’ Theory: Lessons from Sub-Saharan Africa,” *Stanford Journal of International Relations* 11(1) (2009), 16–23.

¹⁸ “Aid and Economic Growth in Developing Countries: A Literature Review,” *Bank of Valletta Review*, 14 (Spring 2010).

aid) had positive and significant impact on economic growth in Fiji.¹⁹ The Granger-causality between ODA·FDI·Trade, and economic growth in Senegal over 50 years was investigated and found that ODA, FDI, Trade had impact on the Senegal's economic growth using the Vector Error Correction Model. The empirical results further confirmed a directional causality between the variables considered. It also showed that an increase of ODA in the Senegal had positive effect on GDP growth and FDI.²⁰

Another study was conducted to check whether international remittances outperform foreign aid and FDI as a determinant of a country's economic growth using panel data from 1990-2006 and applied System-Generalized Method of Moments (GMM) approach. Results showed that international remittances, FDI, and ODA are positively and significantly associated with the economic growth rate for low income countries and specifically, the impact was greater with international remittances.²¹ Kim analyzed the relationship between the ODA and economic growth: the Regression analysis using the least squares, the panel data analysis, and the Granger-causality analysis. OLS results of the ordinary least squares showed that the ODA and GDP had a positive relationship between them in case of Bulgaria, Latvia, Lithuania, Malta, and Slovakia. Granger-causality showed that economic growth was tangled among the eastern European countries and existed high degree of interconnectedness.²²

The ARDL model approach was used to assess the heterogeneous impacts of aid on growth in a low income country like Kenya with different aid unpredictability episodes and found that increased aid unpredictability weakened economic growth in Kenya.²³ The impact of FDI, trade and remittances on Tanzania's economic development using Ordinary Least Square (OLS) approach with data covers the period from 1970-2007 was also tested.²⁴ Results showed proved that all variables were contributing positively to the economic growth except for the remittance which was dropped due to data availability. ODA was found to be the most influential factor compared to others. The role of export; overseas development aid (ODA) and remittance inflows in relation to economic growth in Sudan was examined for the periods of year 1977-2010 using the Johansen cointegration technique.²⁵ Results revealed

¹⁹ Rukmani Gounder, "Aid-Growth Nexus: Empirical Evidence from Fiji," *Applied Economics* 33 (2001), 1009–19.

²⁰ Choi, "The Impact of ODA·FDI·Trade on the Africa Economic Growth: Evidence from Senegal."

²¹ Mamoun Benmamoun and Kevin Lehnert, "Financing Growth: Comparing the Effects of FDI, ODA, and International Remittances," *Journal of Economic Development* 38(2) (2013), 43–65.

²² Yeon Joon Kim, "A Research on the ODA and Economic Growth: With European Countries' Data," *East European & Balkan Studies* 37 (2013), 51–87.

²³ Elphas Ojiambo et al., "Aid Unpredictability and Economic Growth in Kenya" (Africa Development Bank Group, 2015).

²⁴ Elena Rotarou and Kazuhiro Ueta, "Foreign Aid and Economic Development: Tanzania's Experience with ODA," *The Kyoto Economic Review* 78(2) (2009), 157–89.

that there was a long run positive relationship between growth, export and remittance, supporting the export-led growth and remittance-led growth hypotheses while aid-growth was rejected.

<Table 4>Summary of Literature Contributions on Economic Growth and ODA

Studies	Data and Methodology	Variables	Results
Choi (2016)	Senegal Annual data (1960-2013) using Johansen Cointegration Approach and ECM	GDP Growth (DV), FDI, Trade, ODA	FDI (+) Trade (+) ODA (+)
Benmamoun and Lehnert (2013)	GMM approach using panel data from 1990-2006	GDP Growth (DV), international remittances, FDI, and ODA	Remittances (+) FDI (+) FDI (+) ODA (+)
Kim (2013)	European countries' panel data using OLS and Granger Causality approach	GDP Growth (DV), ODA	ODA (+)
Marwan et al. (2013)	Sudan yearly data (1977-201) using Johansen Cointegration technique within the augmented Solow-model approach	GDP Growth (DV), Labor, Capital, Remittances, ODA, Exports and Inflation	All variables are (+) except ODA (-) related to economic growth of Sudan
Rotarou and Ueta (2009)	Tanzania year data (1970-2007) using OLS approach supported by ANOVA	GDP Growth (DV), FDI, Trade Balance (TB) and ODA	FDI (+) TB (+) ODA (+)
Gounder (2001)	Fiji yearly data (1968-1996) and applied the Autoregressive Distributed Lag (ARDL) approach	Economic Growth (DV), ODA components	ODA components (+)
Grandos (2012)	England and Wales yearly data covering 160 years (1840-1999) using cointegration regression and correlations	GDP per capita and Life expectancy at birth (LEB)	Negative relationship between the two variables was evident
Grandos and Lonides (2008)	Sweden yearly data for 19 th and 20 th centuries using linear regression, spectral analysis, cross-correlation, and lag regression models	Economic Growth and health progress	Positive in 19 th century and reversed in the second half of 20 th century.
Cohen and Soto (2007)	Yearly data for 95 countries for a period (1960-2000) with projection to 2010 using OLS/FE for panel data	GDP growth rate per worker (IV) and DV were GDP per worker in 1960, change in years of schooling, physical capital stock, change in labor supply	Education variable had significant and positive impact

Source: Author using various studies (2016)

²⁵ Nur Fakhzan Marwan et al., "Export, Aid, Remittance and Growth: Evidence from Sudan," *Procedia Economics and Finance* 7(2013), 3–10.

V. Theoretical Framework for Economic Growth and Empirical Methodology

Economic growth that is increasing per-capita GDP is of course a vital part of economic development but economic growth itself is merely a measure of capacity; the extra money on its own does nothing to guarantee that a population has developed.²⁶ A poor country with a growing economy may still develop little if the growth merely enriches few, leaving the majority of the population without additional income.

The framework for the determination of growth follows the extended version of the neoclassical model and can be represented as:²⁷

$$Dy = f(y, y^*) \quad (1)$$

Where Dy is the growth rate of per capita output, y is the current level of per capita output, and y^* is the long-run or steady-state level of per capita output. The growth rate, Dy , is diminishing in y for given y^* and rising in y^* for given y . The target value y^* depends on different choices and environmental variables. The private sector's choices include saving rates, labor supply, and fertility rates, each of which depends on preferences and costs. The government's choices involve spending in various categories, tax rates, the extent of distortions of markets and business decisions, maintenance of the rule of law and property rights, and the degree of political freedom. For an open economy, terms of trade is also important.

As far as the original neoclassical model and its extensions are concerned, this study too focuses on the economic growth that is increasing per capita GDP (PGDP) for the development of large population. From vast of literatures, variables affecting the economic growth of many countries are including but not excluding foreign direct investment (FDI), terms of trade (TOT) and official development assistance (ODA) which in this study has been considered as the main factor for driving per capita GDP growth especially in developing countries. Among human development indicators, education (EDU) and health (LIFE) have also been taken into consideration. Therefore the proposed growth model is:

$$PGDP_t = \alpha_0 + \alpha_1 ODA_t + \alpha_2 FDI_t + \alpha_3 TOT_t + \alpha_4 EDU_t + \alpha_5 LIFE_t + \varepsilon_t \quad (2)$$

²⁶ Stephen Kosack and Jennifer Tobin, "Funding Self-Sustaining Development: The Role of Aid, FDI and Government in Economic Success," *International Organization* 60 (2006), 205–43.

²⁷ Robert Joseph Barro, *Determinants of Economic Growth: A Cross-Country Empirical Study* (Cambridge Massachusetts Avenue: MIT Press, 1998).

VI. Co-integration analysis (ARDL) Model and Data

This paper has chosen autoregressive distributed lag (ARDL) cointegration approach²⁸ because ARDL does not require for all variables to be stationary at certain levels. It is also efficient in the case of small sample sizes. The ARDL model used in this thesis is expressed as follows:

$$\begin{aligned} \Delta PGDP_t = & \alpha_0 + \alpha_1 PGDP_{t-1} + \alpha_2 ODA_{t-1} + \alpha_3 FDI_{t-1} + \alpha_4 TOT_{t-1} + \\ & \alpha_5 EDU_{t-1} + \alpha_6 LIFE_{t-1} + \sum_{j=1}^p \alpha_{7j} \Delta PGDP_{t-j} + \sum_{j=1}^p \alpha_{8j} \Delta ODA_{t-j} + \\ & \sum_{j=1}^p \alpha_{9j} \Delta FDI_{t-j} + \sum_{j=1}^p \alpha_{10j} \Delta TOT_{t-j} + \sum_{j=1}^p \alpha_{11j} \Delta EDU_{t-j} + \sum_{j=1}^p \alpha_{12j} \Delta LIFE_{t-j} + \varepsilon_t \end{aligned} \quad (3)$$

PGDP stands for Real per capital GDP growth rate measured in percentage. ODA which stands for official development assistance expressed in percentage of GDP is expected to have a positive effect on growth. Terms of trade (TOT) is defined as the ratio of export to import expressed in percentage. Barro (1998) urged that changes in the terms of trade have often been stressed as important influences on developing countries, which typically specialize their exports in a few primary products. Therefore a positive effect on economic growth is expected for TOT. Foreign direct investment (FDI) expressed in percentage of GDP has also been a long term determinant of growth and in this study a positive effect is also expected. EDU stands for gross enrollment as the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown.

Life expectancy (LIFE) represents the health factor which indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout. Therefore coefficients for EDU and LIFE are all expected to have positive impact on the economic growth. Statistical summary for individual country's variables can be seen in table 5 below. All the data from three countries (Tanzania, Kenya and Uganda) cover the period from 1980 to 2014 (35 years). Data for ODA were taken from Institute for Euro-Africa Studies (IEAS) database whereas EDU and LIFE were extracted from World Bank database. All other remaining data were extracted from UNCTAD statistic database.

²⁸ Yongcheol Shin, M Hasheem Pesaran, and Richard J Smith, "Bound Testing Approaches to the Analysis of Level Relationships," *Journal of Applied Econometrics* 16 (2001), 289–326; Yongcheol Shin and M Hasheem Pesaran, "An Autoregressive Distributed Lag Modelling Approach to Cointegration Analysis," in *Econometrics and Economic Theory in the 20th Century*, ed. Steinar Strøm, The Ragnar Frisch Centennial Symposium 31 (Cambridge University Press, 1999).

<Table 5>Summary of Variables

	Variable	Obs	Mean	Std. Dev.	Min	Max
Kenya	ODA	35	4.915569	1.998209	2.113745	11.16068
	PGDP	35	0.720396	2.29054	-3.94685	5.555227
	FDI	35	0.392094	0.47229	0.003084	2.281187
	TOT	35	57.04253	12.09443	33.24011	77.4732
	EDU	35	104.7751	8.233122	90.54491	119.8757
	LIFE	35	56.49151	3.36625	50.78517	61.57637
Tanzania	ODA	35	9.762531	3.597935	4.094492	18.89904
	PGDP	35	1.600865	2.328451	-5.39038	5.123841
	FDI	35	1.848787	1.831983	-0.09098	5.692903
	TOT	35	42.22993	9.603547	22.13856	59.00174
	EDU	35	82.89694	14.48164	65.67504	108.7502
	LIFE	35	53.38113	5.134335	48.69151	64.9439
Uganda	ODA	35	9.32068	4.455826	2.974642	19.55695
	PGDP	35	2.508939	3.285153	-7.55421	7.368189
	FDI	35	1.950774	1.808448	-0.13904	5.348154
	TOT	35	55.8235	32.24387	26.22552	142.0195
	EDU	35	95.28878	29.17715	52.24194	138.3829
	LIFE	35	49.05752	4.550609	43.78332	58.46642

1. Vector Error Correction Model (VECM)

According to Granger representation theorem, when the variables are co-integrated, there must be an error correction model (ECM) that describes the short run dynamics or adjustments of the co-integrated variables towards their long run equilibrium values. Therefore error correction models for four variables which are economic growth (PGDP), inward FDI (IFDI), official development assistance (ODA), terms of trade (TOT), education (EDU) and health (LIFE) can be represented as follows:

$$\Delta PGDP_t = \alpha_0 + \delta ECT_{t-1} + \sum_{j=1}^p \alpha_{1j} \Delta PGDP_{t-j} + \sum_{j=1}^p \alpha_{2j} \Delta ODA_{t-j} + \sum_{j=1}^p \alpha_{3j} \Delta FDI_{t-j} + \sum_{j=1}^p \alpha_{4j} \Delta TOT_{t-j} + \sum_{j=1}^p \alpha_{5j} \Delta EDU_{t-j} + \sum_{j=1}^p \alpha_{6j} \Delta LIFE_{t-j} + \varepsilon_t \quad (4)$$

Where, ECT_{t-1} is lagged error correction term and is the residual from the co-integrating regression equation that measures the speed of adjustment to long run equilibrium. In order to restore equilibrium, the sign of the coefficient of the error correction term (δ) should be negative ($\delta < 0$) and coefficients of first differenced lagged variables measure the short run effect of the variables.

2. Univariate Unit Root Test

Like many other studies the current study will also employed unit root for stationary testing of all variables to check if they are not violating the requirement of ARDL model approach. Therefore to perform a unit root test on an AR (p) model the following regression equations should be estimated:

$$\Delta Y_t = \mu + \gamma Y_{t-1} + \sum_{j=1}^p \beta_j \Delta Y_{t-j} + \varepsilon_t \quad (5)$$

$$\Delta Y_t = \mu + \gamma Y_{t-1} + \lambda t + \sum_{j=1}^p \beta_j \Delta Y_{t-j} + \varepsilon_t \quad (6)$$

Thus the standard Dickey-Fuller model has been 'augmented' by ΔY_{t-j} . Equation 5 tests unit root of the random walk with intercept and equation 6 tests for random walk with intercept and time trend. Results of unit root in table 6 below show mixed results at levels but all variables were stationary at first difference but not at second difference. Therefore all variables were qualified for ARDL model approach and the optimal lag automatic selection was conducted based on Akaike's information criterion (AIC) with maximum of 3 lags for dependent variable and dynamic regressors. Data analysis was carried out using Eviews9 software.

<Table 6>Results for Unit Root Test

Country/Variable		At Levels		At First Difference	
		Test Statistic	Oder	Test Statistic	Order
Tanzania	ODA	-2.084	I(1)	-6.889	I(0)***
	PGDP	-2.652	I(0)*	-9.738	I(0)***
	FDI	-1.981	I(1)	-11.574	I(0)***
	TOT	-2.532	I(1)	-6.621	I(0)***
	EDU	-1.208	I(1)	-3.803	I(0)***
	LIFE	-0.540	I(1)	-4.230	I(0)***
Kenya	ODA	-3.586	I(0)**	-8.446	I(0)***
	PGDP	-3.49	I(0)**	-6.813	I(0)***
	FDI	-4.359	I(0)***	-8.828	I(0)***
	TOT	-1.073	I(1)	-5.652	I(0)***
	EDU	-2.601	I(1)	-7.015	I(0)***
	LIFE	-0.162	I(1)	-6.251	I(0)***
Uganda	ODA	-1.663	I(1)	-4.114	I(0)***
	PGDP	-4.246	I(0)***	-6.305	I(0)***
	FDI	-1.026	I(1)	-6.676	I(0)***
	TOT	-3.457	I(0)**	-9.173	I(0)***
	EDU	-1.813	I(1)	-5.223	I(0)***
	LIFE	-1.923	I(1)	-6.441	I(0)***

Critical values for ADT are ***1% = -3.750; **5% = -3.000 and *10% = -2.630

3. ARDL Estimation Results

Uganda results in table 7 below confirmed the presence of positive and significant effect of lagged ODA on economic growth. Education (EDU) and health (LIFE) showed a positive and significant effect on economic growth. However, positive and negative effects were also confirmed in previous years. The rest of the variables were not impacting any significant effect on economic growth. The vector error correction model results for Uganda are presented in table 8 below. The coefficient of speed of adjustment (ECT) is negative and statistically significant at <0.01 percent and therefore the disequilibrium created in previous time period will be corrected in successive time period. Differenced ODA happened to have significant negative short run effect but positive long run effect. Both education and health had significant positive short run and long run effects on the economic growth of Uganda.

<Table 7>Uganda ARDL Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Variable	Coefficient	Std. Error	t-Statistic
PGDP(-1)	0.5316*	0.1963	2.7088	EDU(-1)	0.0958*	0.0435	2.2038
PGDP(-2)	-0.5787*	0.1566	-3.6949	EDU(-2)	-0.1078*	0.0393	-2.7437
ODA	0.0396	0.0249	1.5917	LIFE	0.5791*	0.1041	2.8691
ODA(-1)	0.0212	0.0283	0.7492	LIFE(-1)	-0.1535*	0.5762	-3.8024
ODA(-2)	0.0810*	0.0252	3.211	LIFE(-2)	0.3559*	0.8861	3.6834
TOT	0.0033	0.0108	0.3023	LIFE(-3)	-0.8136*	0.9804	-2.474
FDI	-0.0047	0.006	-0.7849	C	-6.5462	0.4217	-4.6046
EDU	0.1489*	0.0423	3.5237				

Note: Max lag selection (3), ARDL (2, 2, 0, 0, 2, 3) R-Squared = 0.998701 Adj. R-Squared = 0.997631

<Table 8>Uganda Short and Long Run Effects

	Short Run Coefficients			Long Run Coefficients			
	Coefficient	Std. Error	t-Statistic		Coefficient	Std. Error	t-Statistic
D(PGDP(-1))	0.5787*	0.1566	3.6949	ECT	-0.0471*	0.2031	-5.1566
D(ODA)	0.0396	0.0249	1.5917	ODA	0.1354*	0.0118	2.4345
D(ODA(-1))	-0.0810*	0.0252	-3.2110	TOT	0.0031	0.0101	0.3099
D(TOT)	0.0033	0.0108	0.3023	FDI	-0.0045	0.0057	-0.7856
D(FDI)	-0.0047	0.0060	-0.7849	EDU	0.1307*	0.0419	3.1183
D(EDU)	0.1489*	0.0423	3.5237	LIFE	0.8345*	0.0998	2.3905
D(EDU(-1))	0.1078*	0.0393	2.7437	C	-0.2518	0.4353	-4.3608
D(LIFE)	0.5791*	0.1041	4.8691				
D(LIFE(-1))	0.3559*	0.8861	-4.6834				
D(LIFE(-2))	0.8136*	0.9803	4.4740				

Kenya ARDL estimation results in table 9 below confirmed the presence of positive and significant effect of lagged ODA on economic growth. Initial terms of trade (TOT) happened

to have a negative and significant effect on the Kenyan economic growth which is contrary to the expectation. Kenya is running trade deficit, this might be the reason as to why TOT negatively impacts the growth initially. Education (EDU) and health (LIFE) showed a positive and significant effect on economic growth though the effect was negative in some previous times. The vector error correction model results for Kenya are presented in table 10 below. The coefficient of speed of adjustment (ECT) is negative and statistically significant at <0.01 percent and therefore the disequilibrium created in previous time period will be corrected in successive time period. Previous ODAs showed significant negative short run effect but insignificant positive long run effect. TOT happened to have both negative significant effects in the short and long run period. Like in Uganda, both education and health had significant positive short run and long run effects on the economic growth of Kenya.

<Table 9>Kenya ARDL Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Variable	Coefficient	Std. Error	t-Statistic
PGDP(-1)	0.6265*	0.1694	3.6972	EDU(-1)	-0.0272	0.0592	-0.4587
PGDP(-2)	-0.2870	0.1946	-1.4749	EDU(-2)	-0.0379	0.0631	-0.6013
ODA	-0.0167	0.0169	-0.9903	EDU(-3)	-0.1592*	0.0644	-2.4713
ODA(-1)	0.0156	0.0144	1.0825	LIFE	0.4734*	0.2873	2.1846
ODA(-2)	-0.0157	0.0153	-1.0310	LIFE(-1)	-0.0096*	0.8801	-2.2325
ODA(-3)	0.0628*	0.0221	2.8408	LIFE(-2)	0.5310*	0.0361	2.3935
FDI	0.0033	0.0061	0.5328	LIFE(-3)	-0.5682*	0.5204	-2.6020
FDI(-1)	-0.0198*	0.0070	-2.8198	TOT	-0.0812*	0.0252	-3.2175
FDI(-2)	-0.0085	0.0080	-1.0555	TOT(-1)	-0.0918*	0.0271	-3.3888
EDU	0.2039*	0.0561	3.6356	TOT(-2)	0.0305	0.0329	0.9261
				C	5.0202	0.4079	3.5658

Note: Max lag selection (3), ARDL (2, 3, 2, 3, 3, 2) R-Squared = 0.994239 Adj. R-Squared = 0.983766

<Table 10: Kenya Short and Long Run Effects>

Variable	Coefficient	Std. Error	t-Statistic	Variable	Coefficient	Std. Error	t-Statistic
D(PGDP(-1))	0.2870	0.1946	1.4749	D(LIFE(-2))	0.5682*	0.5204	2.6020
D(ODA)	-0.0167	0.0169	-0.9903	D(TOT)	-0.0812*	0.0252	-3.2175
D(ODA(-1))	0.0157	0.0153	1.0310	D(TOT(-1))	-0.0305	0.0329	-0.9261
D(ODA(-2))	-0.0628*	0.0221	-2.8408	Long Run Coefficients			
D(FDI)	0.0033	0.0061	0.5328	ECT	-0.6605*	0.2131	-3.0991
D(FDI(-1))	0.0085	0.0080	1.0555	ODA	0.0695	0.0613	1.1341
D(EDU)	0.2039*	0.0561	3.6356	FDI	-0.0379	0.0334	-1.1346
D(EDU(-1))	0.0379	0.0631	0.6013	EDU	0.6484*	0.3036	2.1356
D(EDU(-2))	0.1592*	0.0644	2.4713	LIFE	0.6460*	0.2492	2.5926
D(LIFE)	0.4734*	0.2873	2.1846	TOT	-0.2158*	0.0354	-6.1025
D(LIFE(-1))	-0.5310*	0.0361	-2.3935	C	7.6004	0.9489	8.0095

Tanzania ARDL estimation results in table 11 below show that ODA and FDI happened to have positive significant effect on Tanzania economic growth which is in line with the null hypothesis. Like in Kenya, TOT had a significant negative impact on the growth. Education (EDU) and health (LIFE) showed a positive and significant effect on economic growth though the health effect was negative in some previous times. The vector error correction model results for Tanzania are presented in table 12 below. The coefficient of speed of adjustment (ECT) is negative and statistically significant at <0.01 percent and therefore the disequilibrium created in previous time period will be corrected in successive time period. ODA, education and health happened to have positive significant effects in the short and long run. In the long run, TOT has positive effect though not significant. However the differenced TOT has negative significant effect in the short run. FDI had a positive significant effect in the short run but insignificant positive effect in the long run. TOT had negative significant effect in the short run though but long run effect was not evident.

<Table 11>Tanzania ARDL Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Variable	Coefficient	Std. Error	t-Statistic
PGDP(-1)	0.8966*	0.1702	5.2675	TOT(-1)	0.0316*	0.0150	2.1027
PGDP(-2)	-0.3531	0.1800	-1.9615	EDU	0.0191*	0.0387	3.4930
ODA	0.0218*	0.0109	2.0015	LIFE	0.6100*	0.4333	2.9182
ODA(-1)	0.0248*	0.0118	2.1069	LIFE(-1)	-0.7115*	0.8760	-2.7679
FDI	0.0214*	0.0030	3.4456	LIFE(-2)	0.4505*	0.8784	2.6413
TOT	-0.0356*	0.0145	-2.4500	C	-2.6230	0.9428	-2.7820

Note: Max lag selection (3), ARDL (2, 1, 0, 1, 0, 2) R-Squared = 0.997904 Adj. R-Squared = 0.996806

<Table 12>Tanzania Short and Long Run Effects

Short Run Coefficients				Long Run Coefficients			
Variable	Coefficient	Std. Error	t-Statistic	Variable	Coefficient	Std. Error	t-Statistic
D(PGDP(-1))	0.3531	0.1800	1.9615	ECT	-0.4565*	0.1502	-3.0392
D(ODA)	0.0218*	0.0109	2.0015	ODA	0.1021*	0.0272	3.7489
D(FDI)	0.2014*	0.0030	3.4456	FDI	0.0030	0.0067	0.4420
D(TOT)	-0.0356*	0.0145	-2.4500	TOT	-0.0088	0.0403	-0.2181
D(EDU)	0.0191*	0.0387	3.4930	EDU	0.0418*	0.0931	3.4487
D(LIFE)	0.6100*	0.4333	2.9182	LIFE	0.3548*	0.1920	2.3887
D(LIFE(-1))	-0.4505	0.8784	-2.6413	C	-5.7453	0.8315	-6.9095

4. Bound Test

There are bounds on the critical values for the asymptotic distribution of the F-statistic. For various situations (e.g., different numbers of variables, $(k + 1)$), they give lower and upper bounds on the critical values. In each case, the lower bound is based on the assumption that all of the variables are $I(0)$, and the upper bound is based on the assumption that all of the variables are $I(1)$. If the F-statistic exceeds the upper bound, it is concluded that there is cointegration.²⁹ Results in table 13 below shows Tanzania F-statistic (4.32) exceeds the upper bound at the 2.5% significance level, and therefore there is evidence of a long-run relationship among the 3 non-deterministic regressors in long-run relationship. Both Uganda F-statistic (8.22) and Kenya (7.58) exceeds the upper bound at the 1% significance level and therefore confirms the presence of long-run relationships.

<Table 13> Bound Test Results

k = 5	0.1		0.05		0.025		0.01	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
F-value	2.26	3.35	2.62	3.79	2.96	4.18	3.41	4.68
H0: no levels relationship								
k: # of non-deterministic regressors in long-run relationship								
Tanzania	F = 4.320844							
Uganda	F = 8.212428							
Kenya	F = 7.579443							

Source: Pesaran/Shin/Smith (2001)

5. Post Estimation Analysis of the Model

The stability of the model was checked by using CUSUM test. Three figures in appendix I show that the estimated line is well within the critical limits and therefore the estimated models are all reliable and stable. To check for multicollinearity, variance inflation factor (VIF) test was conducted and as a rule of thumb, a variable whose VIF values are greater than 10 may merit further investigation. Results in table 14 below confirmed absence of multicollinearity in the tested models. There were no serious sign of auto-correlation in the residuals because all DW statistic values are close to the conventional mark of 2 which shows no serious autocorrelation in the sample. Breusch-Godfrey LM test also supported DW and strongly accepts the null hypothesis of no first-order serial correlation since all probabilities are above 0.05.

²⁹ David Giles, "ARDL-Bounds Test," 2013, <http://davegiles.blogspot.kr/2013/06/ardl-models-part-ii-bounds-tests.html>.

<Table 14> Post Estimation Tests

	Breusch-Godfrey LM test for Autocorrelation		Other Tests	
	lags (p)	Prob>chi2	DW Statistic	Mean VIF
Tanzania	3	0.1394	1.9368623	3.789
Kenya	3	0.3142	2.0450076	4.912
Uganda	3	0.6231	1.9256456	4.231

H0: No serial correlation

VII. Summary of Findings and Conclusion

In years 2013 and 2014 Tanzania, Uganda and Kenya received larger amount of official development assistance (ODA) compared to the rest of East African countries other than Ethiopia and Egypt which were the main recipients of ODA in the whole continent. Therefore this study aimed at assessing the impact of ODA on economic growth for to those three East Africa countries which ranked higher compared to others. The study used the autoregressive distribution lag (ARDL) approach geared by Eviews9 software for all estimations with the inclusion of other important independent variables like terms of trade (TOT), foreign direct investment (FDI), education (EDU) and health (LIFE).

Only FDI for Tanzania had a positive significant effect on the economic growth. Similar observation was found when studied the relationship between FDI and Economic Growth in Kazakhstan.³⁰ And it was also concluded that FDI had a positive effect on the per capita GDP growth rate and the effect was intensified by the human capital endowment of the city.³¹ There was no evidence of impact of FDI to the GDP per capita of Uganda and Kenya as all coefficients were statistically insignificant. Tanzania is currently the largest recipient of FDI inflow across the region and in year 2014 it received 4.27% of GDP while Kenya (1.65%), Uganda (0.04%), Burundi (1.10%) and Rwanda (3.34%).³²

³⁰ Byeong Yun Chang and Assel Kassymbekova, "The Relationship between FDI and Economic Growth: Kazakhstan Case," *Journal of the Korea Society for Simulation* 21(1) (2012), 19–26.

³¹ Yaqin Su and Zhiqiang Liu, "The Impact of Foreign Direct Investment and Human Capital on Economic Growth: Evidence from Chinese Cities," *China Economic Review* 37 (2016), 97–109.

³² Robert Suphian, "Sustainability of Trade Imbalances in East African Countries," *Africa Focus Review* 12 (2016), 1–25.

TOT for Tanzania and Kenya have shown positive significant effect on the economic growth which is contrary to the null hypothesis. TOTs for Kenya happened to have a negative significant effect in the short and long run. Tanzania TOT had a negative significant effect in the short run only. It was also urged that GDP per capita and terms of trade are jointly determined and an increase in terms of trade volatility will lead to a decrease in real GDP per capita³³. It was also revealed that improved terms of trade in Poland led to increased growth of GDP per capita and therefore had a positive effect on economic growth.³⁴

The great concern here is for the long term negative and significant impact of TOT on per capita GDP growth. For a long time the three countries have been net importers and the merchandise trade imbalance has been growing hugely as for year 2014 alone Uganda had -12.67% of GDP, Tanzania (-15.45%) and Kenya (-20.52). The persisting trade imbalances and volatility should be reduced for the positive long run effect of growth to be realized. East African countries should also focus to reduce importation of goods and services which may be entirely or partially accessed, processed and utilized inside their countries to capture well the substitution effect in the economy.

All countries' ODA estimated results confirmed to have positive and significant effect on their economic growth which is in line with the null hypothesis. Similar results were obtained in previous similar studies.³⁵ Just in the short run, ODA flowing to Kenya and Uganda proved to have a negative significant effect on the economic growth. However in the long run both countries' ODA effects were positive. Tanzania had a significant positive effect for short and long run. Therefore ODA flowing to East African countries has proved to be vital for economic development in East Africa region; policies should be directed to enhance better utilizations of ODA especially for creating conducive environment for human development. In line with ODA, education (EDU) and health (LIFE) found to have positive significant short run and long run effects on the economic growth of East African countries. However in the previous years the human development factors were negatively affecting the growth, therefore the reverse suggested signs of improvements in the said factors. GHAP³⁶ urged that, to end extreme poverty by 2030 and leave no-one behind, ODA should explicitly target poverty reduction, making and mobilising investment across the economic, social and environmental dimensions of sustainable development, to benefit the poorest people in

³³ Hock Tsen Wong, "Terms of Trade and Economic Growth in Japan and Korea: An Empirical Analysis," *Empirical Economics* 38(1) (2010): 139–58.

³⁴ Piotr Misztal, "Terms of Trade and Economic Growth in Poland 1980-2009," *The Romanian Economic Journal* 15(46) (2012), 51–68.

³⁵ Rotarou and Ueta, "Foreign Aid and Economic Development: Tanzania's Experience with ODA"; Benmamoun and Lehnert, "Financing Growth: Comparing the Effects of FDI, ODA, and International Remittances"; Choi, "The Impact of ODA·FDI·Trade on the Africa Economic Growth: Evidence from Senegal."

³⁶ Global Humanitarian Assistance Programme.

developing countries.³⁷ Because education (EDU) and health issues (LIFE) are directly linked to poverty eradication goals, proper ODA allocations to those areas will ultimately increase growth and decrease poverty.

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³⁷ GHAPD, “Improving ODA Allocation for a Post-2015 World,” 2015, <http://www.globalhumanitarianassistance.org/>.

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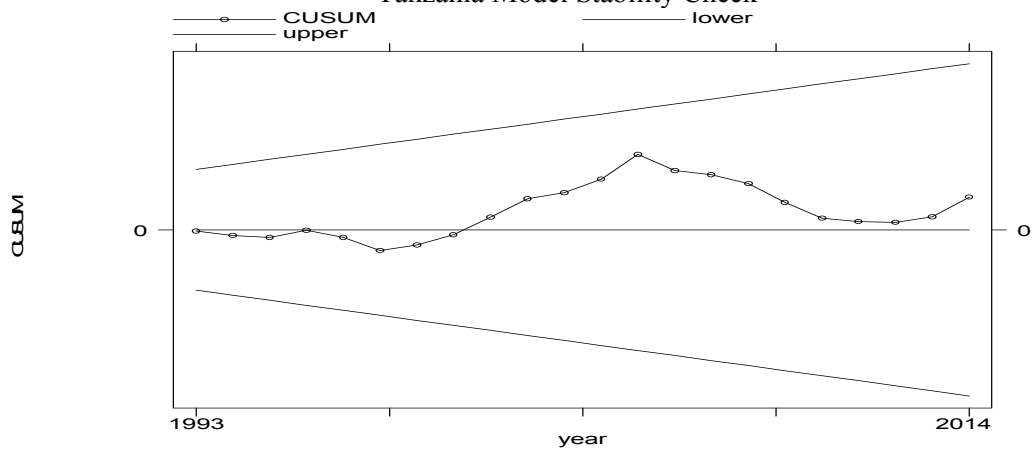
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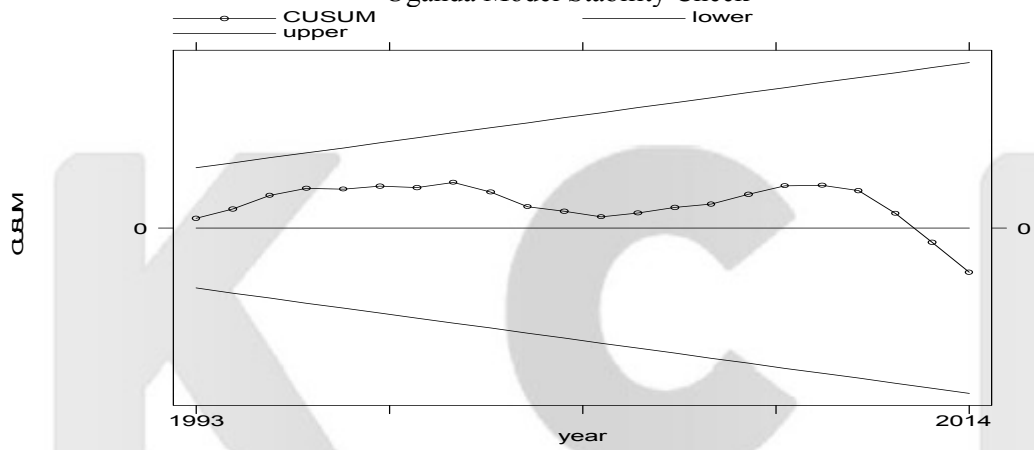
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Appendix: Model Stability
Tanzania Model Stability Check



Uganda Model Stability Check



Kenya Model Stability Check

