International Journal of Latest Research in Humanities and Social Science (IJLRHSS)
Volume 09 - Issue 03, 2026
www.ijlrhss.com || PP. 247-260

Effect of Monetary Policy on Economic Growth in Tanzania for the Period of 1966–2020

Wilbert Michael Matunda
Department of Economics, Faculty of Business & Economics, St. Augustine University of Tanzania

Abstract: The aim of this study was to investigate the effect of monetary policy on economic growth in Tanzania from 1966 to 2020. The Secondary time series data for the variables were collected from the World Bank and the Bank of Tanzania. The Augmented Dickey-Fuller and Johansen co-integration test were used to analyse the data. The findings suggested that the variables were stationary after differencing and co-integrated. This necessitated the use of the ECM to investigation the short-run and long-run effect of monetary policy on economic growth in the country. The extended money supply, inflation rate, lending interest rate, and exchange rate were measured as monetary policy variables, while GDP was measured as economic growth. The findings also showed that the extended money supply and exchange rates were positive and significant to economic growth for the long run, while the lending interest rate was negative but with significant effect on economic growth. At the same time the inflation rate was negative with insignificant effects on economic growth. The study concluded that in the long-run, monetary policy impacts positively on economic growth rather than in the short run. Therefore, it is recommended that the government should maintain a level of money supply that does not exceed the money velocity in the economy so as to enhance investment. Moreover, the government should intervene in the foreign exchange market and use capital control to calm the exchange rate and ensure the exchange rate system that magnetises both domestic and overseas investment.

Keywords: Monetary policy, Economic Growth, Extended money supply, Inflation rate, Lending Interest rate, Exchange rate, Tanzania.

1. Introduction

According to the United Nation report (2015), the nation is growing and developing only when there are economic changes such that the nation can fulfil its people's needs, provide social services, and improve the well-being of the people as stated by the Sustainable Development Goals (SDGs) of 2030. Each nation in the world is actually aiming at growing economy, an improved standard of living and economic development, whereby the GDP acts as the general measure of growing economy and development. In line with this SDGs objectives, Tanzania has been the leading and fastest growing economy in Sub-Saharan Africa from the report published by World Economic Forum and became among the ten largest sub-Saharan African economies in 2017 and 2018 (Wainyaragania, 2019).

These economic achievements are the outcome of the economic activities, advancement in technology and macroeconomic policy performance in general. The macroeconomic policies act as the fundamental and sufficient economic growth mechanism for many developing countries, and the policies' stabilisation is an engine of steady state economic growth in the particular economy. Monetary policy is a macroeconomic policy which acts as major key driver of economic growth in the nations (Joshi, 2021). Among the monetary policies that contribute to Tanzania's economic growth are lending interest rates, price stability, monetary aggregates, domestic credit, and the favourable exchange rate between home and foreign currencies. Mkupete and Ndanshau (2017) argued that, there is importance of using fiscal and monetary policy tool in influencing the economic growth of Tanzania.

The role played by monetary policy on economic growth has been confirmed by several empirical studies. There is close effect of monetary policy towards economic growth improvements in which economic variables are matched so as to attain the general national objectives. For instance, Abille and Mpuure (2020) investigated the effect of monetary policy on the Ghanania economy by estimating money supply, inflation and lending interest rate on GDP. The study confirmed that, there is positive and negative effect of monetary policy on the economy of Ghana. Lombardi *et al.* (2018) established that the lending interest rate as a monetary policy variable is significant and plays an important role in different countries' economies, such as China, the USA, and the Euro zone.

In Africa, the economic growth among countries does not grow in the same directions. The overall continental economic growth in 2019 was 5.0% for Middle regions, 4.1% for Northern regions, 3.7% for Western regions and 0.7% for Southern regions in Africa (World Bank, 2020). According to Twinoburyo and Odhiambo (2016), the African economy's growth has been attributed to monetary policy aggregates, channels, and changes in inflation rate. The contribution of monetary policy to economic growth in Africa revealed from

various empirical studies of Musa & Amuta (2021), Tadesse (2020), Beyene & Kotosz (2020), Makame (2015), Olamide & Maredza (2020) and others. The African economies challenges which brings threats to economic progress are controlled by economic policy, in which monetary policy used in clearing up those challenges hence is accepted and prioritized by scholars and policymakers (Evans *et al*., 2018).

Monetary policy technology can be traced back to the Post-World War II emergency, and prior to modernised economics, no one knew if there were mutual interactions between monetary policy technology and economic growth behaviour acceleration (Hetzel, 2017). The e-money technology is the new monetary technology that is characterised by cash less money, which has impacted all monetary policy operations. E-money substitutes cash money, which cause changes in circulation of money, hence ineffective monetary policy performance in the economy. E-money has brought economic growth effects since digital money policy replaces central bank currency policy and hence affects the money supply by limiting the demand for reserves by the central bank. According to Soseco (2016), e-money plays a big part in enhancing economic growth in small economies but makes little contribution in big economies.

The some analysts and experts in economic theories suggest that it is important and better to follow the best financial policies that help to reduce inflation in the relevant economy in order to achieve high economic goals for any cost (Abille & Mpuure, 2020). The Quantity theory of money and Keynesian Liquidity of preference theory shares the common inspiration of price stability. The quantity theory of money postulates that the money velocity is equal to price of output. Keynesian believes that, people demand money so as to invest in bonds with the intention of future gains in interest (Ibrahim, 2018). Therefore, the common idea between the theories postulates that, when you keep price flexible, monetary policy is not necessary applied but when price is fixed, the monetary policy used to make the economy stable (Tadesse, 2020).

Tanzania's economic position traced through the national economic policies development since independence. These economic policies includes; the Market Economy (1961-1966), the *Ujamaa na Kujitegemea* Economy (1967-1985), Restructuring Economic Programmes (1986-2005), Poverty Reduction, and the Millennium Development Goals. These policies influenced by the neo-liberal school of thought, dependency behaviours, and transformation due to technology (Mandalu *et al*., 2018). The policies faced challenges but the liberalization and policy restructuring from 1980s influenced the persistent economic growth in Tanzania, hence the economy grew at an average of 6.7% in the 10 years starting in 2007 to 2017 (BOT, 2020). Nevertheless, the reformation and monetary policy implementations led to Tanzania's economic transition from low-income to lower-middle-income country status by 2020 (World Bank, 2020). This milestone resulted from the accommodative monetary policy stance, which supported by stable macroeconomic policies.

The Bank of Tanzania (BOT) since its establishment 1966 acts as the national organ in facilitating all key activities of monetary policy, like issuing money, mediate in the foreign exchange market and controlling prices in the economy (BOT, 2019). BOT practices the traditional role of using monetary policy targets to manage the money stock in the economy, manipulate the level of interest rates in the financial banking system so as to achieve macroeconomic goals. However, both expansionary and contractionary monetary policy measures are taken to track the emergency of difficulty and higher levels of uncertainty in the economy (Olofinlade *et al*., 2020). For this backdrop, monetary policy as an agent of economic growth needs to be researched enough. It should be researched not only to recognise its behaviour and how it promotes economic growth but also to discover the new technological changes in the monetary system and its implementation.

The effect of monetary policy on global economic growth has generated a lot of discussions. Traditionally variety of factors, primary ones like capital accumulation, rising labour force participation, knowledge advancement, and technical innovation, drive economic growth. However, they are affected by the favourable monetary policy environment for the short run and long run Based on Tanzanian economy, Makame, (2015) and Bashagi *et al.*, (2019) argued that monetary policy affects positively the economic growth. Twinoburyo & Odhiambo, (2016) found that the monetary policy on economic growth matters despite of prevailing ambiguous effect.

Whereas Twinoburyo & Odhiambo, (2016) found that monetary policy has a negative effect on economic expansion when money supply measured as a monetary policy variable. Mwamkonko (2019) and Maganya and Ndanshau (2020) agree that fiscal policy was more effective than monetary policy in influencing the economy in Tanzania while Mkupete & Ndanshau (2017) agued that monetary policy is more effective in stabilizing the economy in Tanzania. Therefore, the effect of monetary policy on economic growth in Tanzania is contradictory. These contradictions justify the need to find out the effect that monetary policy plays on economic growth in Tanzania.

1.1 Objective of the study

This study seeks to achieve its general objective of investigating the effect of monetary policy on economic growth in Tanzania between 1966 and 2020 by focusing on the following specific objectives.

i. To determine the effect of extended money supply on Tanzania's economic growth
ii. To identify the effect of inflation rate on Tanzania's economic growth
iii. To ascertain the effect of lending interest rate on economic escalation in Tanzania
iv. To establish the effect of the exchange rate on Tanzania's economic growth

1.2 Study Hypotheses (Ho)

i. Extended money supply has a negative effect on economic growth in Tanzania.
ii. Inflation rate has a positive effect on the economic growth in Tanzania.
iii. Lending interest rate has a positive effect on economic growth in Tanzania.
iv. Exchange rate has a negative effect on economic growth in Tanzania.

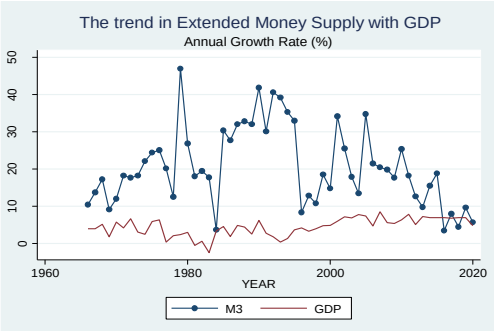
1.3 Stylized Facts on Monetary Policy and Economic Growth in Tanzania from 1966 to 2020

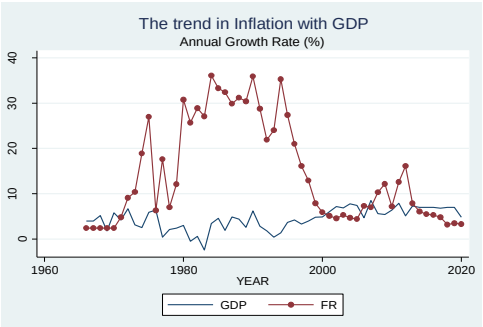
The economic reformations such as the emergency of *Ujamaa* policy, the transformation of the rural economy, and industrialization made economic changes. But strongly, the implementation and reforms of prudential monetary policies led the economy to instant growth. Between 1966 and 1970 and after the introduction of BOT, extended broad money growth averaged 16.7%. The economic liberalization, especially between 1985 and 1995, increased the money supply by an average of 45.31%. The injection of money led to a fall in economic growth during the period, which was caused by an increase in global fuel prices and growing budget deficits.

The public enterprises' privatisation and the implementation of the Banking & Financial Institutions Act (BFIA) led the money supply to decrease slightly in 1996 (Maganya & Ndanshau, 2020). Since 2000, the extended money supply and economic growth have been moving up and down consecutively which means has been increased and decreased according to the economic growth situationas indicated in figure (a).

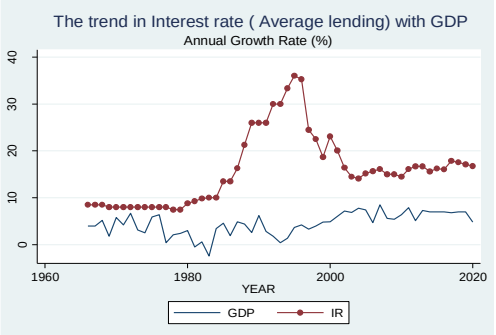
Panel (b), between 1980 and 1995, the country experienced inflationary problems whereby prices picked up to an average of 31.94%. The situation led the economy to grow at a lower and negative rate in 1981, 1982, 1983, and 1993. The situation was caused by the increase in global fuel prices and growing budget imbalances. As a result, the government immediately reformed the economy by adopting National Economic Survival Program, Structural Adjustment Program, Economic Recovery Program and others (Saungweme & Odhiambo, 2021). The inflation cut down from an average of 31.94% in 1995 to 5% in 2000 as a result of the reforms and from there, the inflation has been in the low single digits, while economic growth was positive to 2020.

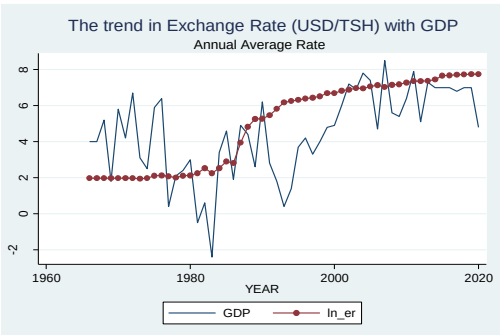
(a) (b)





(c) **(d)**





The growth of lending interest rates from 1966 to 1979 averaged at 8%, which is considered as a moderate rate by BOT due to the 8.9% level of inflation as indicated in panel (c). Interest rates rose to 35.3% in 1996 as a result of the liberalization of exchange rates, lending interest rates, and the transition to indirect monetary policy. This indicator led the government to adopt prudential monetary policies in the way of privatising the public corporations and insured the development of financial institutions. As a result, from 2005 up to 2020, the moderate growth in lending interest rates enhanced the favourable economic growth rate, except in 2020 due to COVID-19 (Mashindano & Kazi 2021).

Tanzania's currency experienced a higher and gradual decline in value compared to other major leading currencies, whereby 1 USD traded at an average of 7.14 Tsh. from 1966 to 1972. This attributed to the shortage of foreign currency reserves and the adoption of the Foreign Exchange Plan of 1971, political governance that agreed on the importation of food due to severe draughts, the oil crisis and the collapse of EAC in 1977 (Hartmann, 2016). Since 1985, the value of the currency has been fairly depreciated due to the moderate level of inflation and favorable balance of payments in the country, except in 2019. As indicated in the figure above the exchange rate was moving in the direction of economic growth, which confirms the positive change (currency depreciation) as shown in panel (d).

2. Theoretical and Literature Review

The effect of monetary policy on economic growth in Tanzania is theorized by the Keynesian Liquidity Preference and Classical Quantity Theory of Money (QTM). The Keynes theory believes that the production level and interest rate determine the total money demanded by society (Abille & Mpuure, 2020). The money demand depends on the purpose of fulfilling the normal transactions, investing in bonds for future gain in inerest and expectations of solving both risks and unknown events (Ibrahim, 2018). The interaction between money supply and demand for money (liquidity preference) creates a certain interest rate level in the economy. The total expenditure by interest rate channel are affected by changes in money supply (Olofinlade *et al.,* 2020). Therefore, economic growth is attributed to lower charged interest rates, which increases credits that encourage economic activities or investments, hence economic growth.

The Classical Quantity Theory of Money (QTM) developed by Fisher (1926) postulates the classical relationships between money, prices, and output (Ismail, 2021). The theory believes that the increase or decrease in the money supply results in the increase or decrease in the price level in the economy. In the field of money theory, both the quantity theory of money and the credit creation theory adopted Fisher's basic idea, but the Rational Expectation School of thought and the monetarist theory do not. The average amount of money held by the public is the result of a total amount of money supplied in the economy at a time, hence equilibrium. The control of money for the short run is attributed to the development of interest rates, and for the long run, money demand is attributed to the real cash balance. "The theory also confirms the inverse relationship between the quantity of money and the value of money in the economy" (Joshi, 2021).

However, the effect of monetary on economic growth has reviewed from different studies and different contrasting results revealed. For instance, Geiger (2008) conducted a study on the instruments of monetary policy and their effectiveness from 1994 to 2006 in China. The general findings indicated that the usage of price-based monetary policy instruments is more effective and supportive mechanism in the working of interest rates only when there are no quantitative-based instruments to influence the economic growth of China. Choi *et al*. (2021) conducted a study on the monetary policy transmission on industrial output production for the 88 countries in the world. The general result is that contractionary monetary policy doesn't contribute to economic growth because the levels of industrial outputs are being reduced.

Ismail (2021) analysed the monetary policy impacts on the economic growth of Kuwait for the period of 1980 to 2020. The Vector Error Correction Model (VECM) results confirmed the long-run relationship between monetary policy and economic growth. Jordà *et al.* (2020) investigated the effects of monetary policy in 17 advanced economies. The study employed the Base Line Model and Cluster Robust Standard Error which found that global economic growth is achieved through long-run monetary policies. Obeid & Award (2017) examine the effectiveness of Monetary Policy instrument on the Economic Growth in Jordan. With VECM analysis, there is inversely relationship between rediscount rate and economic growth in Jordan for both short run and long run real GDP.

Tahajuddin, *et al.* (2021) conducted the study on the choice between the fiscal and monetary policy in combating the problem of Pandemic and their relation to the economy of Malaysia in 2020 to 2021. It was theoretical study which reviewed theories and related literatures hence, the results suggested that both fiscal and monetary policies are used to control or combating with the pandemic which helped to overcome the economic downturn of Malaysia. Ahmad *et al.* (2016) assessed the importance of monetary policy measures on the economic growth of Pakistan. The Autoregressive Distributed Lag Model (ARDL) results indicated that inflation rate, exchange rate and money supply have positive impacts on the economic growth. Lut & Moolio

(2015) in Cambodia conducted the study of the impact of monetary policy on economic growth from 2000 to 2012. The multiple regression model results show that money supply has a positive significant impact on the economy while the interest rate has no significant impact in the economy.

Musa and Amuta (2021) investigated the effect of monetary policy in curbing the rise in prices in Nigeria. The secondary data from 1986 to 2019 used and the study employed the Autoregressive Distributed Lags (ARDL) model. The results reveals that, the exchange rate and interest rate controls inflation while the monetary policy rate is ineffective in controlling inflation in Nigeria. Olofinlade *et al.* (2020) investigated the time series effects of monetary policy on banking and economic growth in Nigeria between 1968 and 2018. The two model regression analyses employed and the results suggested that the monetary policy positively and significantly affects Nigeria's economic performance. Ibrahim (2018) conducted a study of the relationship between the monetary policy measures and economic growth in Kenya from 2008 to 2017. Through multiple regression model, the economic growth of Kenya is influenced by the open market operations, cash reserve ratio, and exchange rate.

Abille and Mpuure (2020) conducted a study on the effects of monetary policies on Ghana's economy. By using time series data, the ARDL bound test technique confirmed that the money supply for the long run has significant positive effects on Ghana's economic growth. In the long run, the lending rate confirmed an insignificantly negative effect on the economy of Ghana. Islam *et al*. (2021) investigated the short run and the long run effect of monetary policy on the Bangladesh and United Kingdom economic growth covered the years between 1980 and 2019. The study adopted the ARDL Model and the results shows that, there is positive long run relationship between monetary policy and economic growth of both countries. Mukoka (2018) assessed the impact of inflation on the economic growth of Zimbabwe between 1990 and 2017. The results of OLS indicated that inflation doesn't have an impact on the economic growth of Zimbabwe.

Famoroti and Tipoy (2019) assessed the effects of external monetary policy shocks on economic growth of 17 ECOWAS member states. The quaterly data from 1980 to 2017 analysed by Panel Structural Vector Autoregressive (SVAR) model. The analysis indicated that economic shocks have direct effects on the economic growth of the countries, thus monetary policy instruments have a significant impact on the economic growth of ECOWAS member countries. Evans *et al.* (2018) investigated the relative effects of monetary and fiscal policy on economic development in 12 selected African countries from 1995 to 2016. The General Method of Moments (GMM) and the St. Louis equation approaches indicated that, the utilisation of monetary policies is more effective than fiscal policies. Beyene and Kotosz (2020) used Johansen Cointegration approach to analyse effective policy on economic growth of Ethiopias. The secondary data collected from 1981 to 2008 and the results indicated that, both fiscal and monetary policy are effective on Ethiopia's economy.

Makame (2015) assessed the relationship between monetary policies and economic growth in Zanzibar from 2000 to 2013. Both time-series and cross-sectional survey data collected and analysed by the Multiple Regression Model. The findings showed that the monetary policy instrument has a significant relationship with the economic growth of Zanzibar. Bashagi *et al*. (2019) researched the contribution of monetary policy transmission channels towards the output growth in Tanzania. The quaterly data from 2002 to 2018 collected and analysed by SVAR Model which then, indicated that for monetary policy (supply of credits to the private sector) fosters the growth of the economy. Twinoburyo & Odhiambo (2016) aimed to find out the impacts of monetary policy on Tanzania's economic growth. The 37 observations from 1975 to 2013 analysed by ARDL and the results found that monetary policy has a negative effect on economic expansion when money supply measured as a monetary policy variable.

Epaphra and Dunia (2021) examined the impact of fiscal and monetary policies as well as the exchange rate on real GDP in Tanzania. The autoregressive distributed lag-vector error correction model (ARDL-VECM) used in this study and it found that an expansionary monetary policy causes an increase in real GDP. Aikaeli (2022) investigated the empirical study of monetary policy impact on macroeconomic performance in Tanzania from 1966 to 2019. By using structural vector error correction (SVEC) model, concluded that nation's monetary policy is successful in achieving its only goal of price stability. Based on these empirical literatures, the studies on the effects of monetary policy on the economic growth in Tanzania are fewer compared to the other countries like Nigeria and South Africa. Fewer studies conducted after the establishment of BOT in 1966, most studies begun in 1970. This gap has to be filled in this study by gathered time series data from 1966 to 2020 for analysis. Therefore this study intends to address these gaps by building upon the insights that have been undertaken by the various researchers in the monetary policy study fields in Tanzania.

3. Research Methodology

The study is organised by the quasi-experimental quantitative research design because it aims to investigate the cause–and-effect relationship between monetary and economic growth in Tanzania. To examine the effect between monetary policy and economic growth, the secondary data were collected and compiled for

the period of 1966 to 2020. The data collected comprises the Gross Domestic Product, extended money supply, inflation rate, lending interest rate, and exchange rate. The extended money supply data obtained from World Bank, whereby other variables were collected from annual reports of Bank of Tanzania.

Based on the theoretical and empirical literatures, the model adopted and specified from the empirical monetary model of Tadesse (2020). The researcher investigated the dynamic effect of monetary policy on economic growth in Ethiopia. The model modified by replacing the following variables: GDP (economic growth) as dependent variable and independent variables includes; Extended Money Supply (M3), Inflation rate (FR), Lending Interest rate (IR), Log Exchange rate (ER). To express the effects of monetary policy on economic growth, the researcher developed the function form model, and it is expressed as;

GDP = F (M3, FR, IR, ER) .....(i)

The secondary data collected were in rate form except the real value of the exchange rate was transformed to linear logarithmic form. The data transformation helps to reduce the time series errors, eliminate heteroscedasticity, reduces dataset variance, and achieves variable elasticity, which result in systematic data analysis and ensures econometric meaning. The specified model for this study is linear-log model which is an appropriate to fulfil the requirements of Ordinary Least Squares (OLS) estimation technique. Therefore, the empirical model formulation is restated in linearity function as;

$$GDP_t = \beta_O + \beta_1 M3_t + \beta_2 FR_t + \beta_3 IR_t + \beta_4 lnER_t + \mu_t \quad \text{.....(ii)}$$

The dependent variable is estimated to be GDP, while the explanatory variables are Extended money supply (M3), Natural log of exchange rate (*ln*ER), Lending interest rate (IR), and Inflation rate (FR). The econometrical meaning of *βo* is the intercept coefficient and β1- β4 are regressed variable coefficients and μ indicates the outside variable errors. During analysis, both extended money supply and Log exchange rate are expected to contribute positively on economic growth while Inflation and lending rate are expected to contribute negatively to the economic growth of Tanzania.

4. Empirical Findings and Discussions

4.1 Unit root Test

The study estimated the effect of monetary policy on economic growth by Error Correction Model (ECM). Before estimation, the study undergone the unit root test so as to detect the non stationary behaviour of time series data collected. The time series data faces non-stationary problems and, if not treated, may lead to spurious results. The classical linear regression model assumption is violated when non-stationary time series data are used to provide empirical economic results. To avoid the superior regression, the study conducted the Augmented Dickey–Fuller (ADF) test and it is algebraically expressed as;

$$\Delta X_t = \alpha_0 + \delta X_{t-1} + \alpha_2 t + \sum_{i=1}^{n} B_1 \Delta X_{t-1} + \varepsilon_t \quad \text{.....(iii)}$$

α_0 Indicate the constant components where α_2 indicates the trend components, B_1 Indicates a measure of Lag Length and δ measures of the unit root and ε_t is the white noise error term.

Table 1: The Unit Root Test Results

Variables	Augmented Dickey-Fuller (ADF)						Order of integration
	At level			At 1st Difference			
	Test Statistics	5% CV	Z(t)	Test Statistics	5% C.V	Z(t)	
GDP	-2.397	-2.928	0.1427	-6.042	-2.928	0.0000***	*I*(1)
M3	-2.713	-2.928	0.0718	-7.378	-2.928	0.0000***	*I*(1)
FR	-1.588	-2.928	0.4896	-6.199	-2.928	0.0000***	*I*(1)
IR	-1.623	-2.928	0.4714	-3.983	-2.928	0.0015***	*I*(1)
lnER	-0.749	-2.928	0.8336	-3.831	-2.928	0.0026***	*I*(1)

Note: p-values are significance at 1% (***)
Source: STATA Estimation (2022)

According to ADF test results in table 1, the monetary policy variables became stationary at first difference and the null hypothesis which states that there is a unit root problem is rejected. The variables were integrated at order one, *I(1)*, which means the variables do not have constant trends, hence indicates the long run effects between variables. However, the study determines the optimal lag length that should be applied for the

analysis. Under the condition of common criteria such as Akaike information criteria (AIC), the Hannan-Quinn criterion (HQC), and the Schwarz Bayesian Criterion (SBC), the study found one lag length is employed.

4.2 Cointegration Test

Because the variables were discovered to be stationary at first difference, the study employed co-integration procedures between variables to determine whether or not the estimated variables are co-integrated. Two or more variables are said to be co-integrated if they face a long-term relationship. The Johansen Cointegration test is used to find out the number of equations cointegrated in the study. The Trace and maximum eigenvalues Statistics method provides the results in table 2.

Table 2: The Cointegration Test results

Trend: constant				**Number of Obs**	= **53**		
Sample 1968 - 2020				**Lags**	= **2**		
Maximum rank	parms	LL	eigenvalues	Trace Statistics	5% critical value	Maximum Statistics	5% critical value
0	30	-548.37749	.	70.5405	68.52	33.6193	30.46
1	39	-535.3326	0.38876	39.9212*	47.21	18.7233	27.07
2	46	-526.49099	0.28369	21.1979	29.68	10.3645	20.97
3	51	-519.97107	0.21811	10.8334	15.41	8.6178	14.07
4	54	-515.0632	0.16906				

Note: Asterisk * indicates rejection of the null hypothesis at the 5% Significance level.
Source: STATA Estimation (2022)

The table indicated the long run relationship between variables since there is one cointegration equation at *. The equation indicated by the higher value of zero traces statistic and maximum statistic than critical value at 5% level of significance. The null hypothesis of no cointegration between variables is rejected, and suggests that, there is one cointegration equation. Therefore, the termination can be drawn that extended money supply, inflation rate, lending interest rate, and exchange rates share a familiar trend and long run equilibrium with economic growth in Tanzania. One co-integration equation necessitates the study to use an Error correction model in investigating the short run and long run effect of monetary policy on economic growth in Tanzania. These results are in line with the results of Ismail, (2021) in the study of the impact of monetary policy on the economic growth of Kuwait.

4.3 Error Correction Model (ECM) Estimation

The ECM used to determine the short-run dynamics and long-run effect of monetary policy on economic growth in Tanzania. The ECM estimation appliance provided both short-run and long-run effect results. The long run equilibrium results are provided by Johansen normalisation restriction coefficients, where short run equilibrium results are provided by ECM short run equilibrium coefficients.

Table 3: ECM short run and speed of Adjustment Results

	Variables	**Coef.**	**Std. Err.**	**Z**	**P>|z|**	**[95% Conf. Interval]**	
D_gdp	_ce L1	-.3704489	.165429	-2.24	0.025	-.6946838	-.0462141
	m3 | LD.	-.0366641	.0244118	-1.50	0.133	-.0845104	.0111822
	fr |LD.	-.0349769	.0356187	-0.98	0.326	-.1047882	.0348345
	ir |LD.	-.0064286	.0930724	-0.07	0.945	-.1888473	.17599
	log_er |LD.	-.7168951	1.014224	-0.71	0.480	-2.704738	1.270947
	_cons	-.0023268	.2311201	-0.01	0.992	-.4553138	.4506602

Source: STATA Estimation (2022)

From the findings, the ECM (-cel L1) indicated a negative coefficient of (-.3704489) and was statistically significant (0.025) at the 0.05 level of significance. The negative sign shows the speed of adjustment, and it specifies that the rapidity of alteration portrays the path to restoring the long-term effects. It denotes that, the disequilibrium shaped on the earlier occasion is corrected on succeeding time, therefore, there is a long-run effect of monetary policy on economic growth. The equation implies that it takes one year to adjust 37% of the

discrepancies in equilibrium. This result is similar to the empirical result of Gisaor, (2021) who conducted the study of the monetary policy and long run economic growth in Nigeria.

However, the results also confirmed that all variables possessed the negative relationship with economic growth but it probabilities are insignificant meaning that, there is no effect of monetary policy on economic growth in Tanzania in the short run. Therefore, the study fails to reject the null hypothesis, which states that there is no effect of monetary policy on economic growth in Tanzania in the short run *ceteris paribus.*

Table 4: ECM Long Run Effect Between Variables

Johansen normalization restriction imposed							
beta		Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_ce1	gdp	1	.	.	.	.	.
	M3	-.1484271	.035326	-4.20	0.000***	-.2176647	-.0791894
	fr	.0328657	.0335623	0.98	0.327	-.0329151	.0986466
	ir	.2977172	.0556839	5.35	0.000***	.1885787	.4068557
	log_er	-.8757451	.1664568	-5.26	0.000***	-1.201994	-.5494957
	_cons	-2.983469	.	.	.	.	.

Note: *** denotes 1% level of significance
Source: STATA Estimation (2022)

The ECM long run regression equation is constructed according to the numerical outputs from table 4. The interpretations of long-run equation coefficient signs are reversed given the error correction output.

4.3.1 Economic Interpretation and confirmation of Hypothesis

Hypothesis One

Ho: The extended money supply has a negative effect on economic growth in Tanzania.
H1: The extended money supply has a positive effect on economic growth in Tanzania.

From the ECM regression equation in table 4, the extended money supply ***(m3)*** was statistically significant at one percent significance level for the long run. The null hypothesis indicates that extended money supply affect negatively the economic growth in Tanzania. Therefore, the study rejected the null hypothesis, which means the extended money supply is positively affects economic growth. This result is similar to the study's prior expectations. In other words, a one percent increases in the extended money supply causes 0.14 percent increase in economic growth. The same results were confirmed from the studies of Ismail (2021), Tadesse (2020), Ahmad *et al.* (2016), Lut & Moolio (2015) and Evans *et al.* (2018). Twinoburyo and Odhiambo (2016), and Mkupete and Ndanshau (2017) confirm the same findings based on Tanzanian monetary policy development.

Hypothesis Two

Ho: The inflation rate has a positive effect on the economic growth in Tanzania.
H1: The inflation rate has a negative effect on the economic growth in Tanzania.

The inflation rate (***fr***) coefficient is negative and statistically insignificant at all levels in the long run. The null hypothesis states that the inflation rate is positive affecting the economy. Based on sign coefficient results, the study rejected the null hypothesis and suggests that the inflation rate has negative effect on economic growth. It implies that, the increase in inflation rate by one percent drops the economy by 0.03 percent in the long run, which is consistent with the results of Olofinlade *et al*. (2020) and Mukoka (2018). Based on the significance power, the inflation rate does not have statistical power to affect the economic growth because its power is statistically insignificant. Though it could be dropped, but is an important monetary policy variable if removed can affect other variables hence, it plays important role in the estimated model and therefore has to be maintained.

Hypothesis Three

Ho: The lending interest rate has a positive effect on economic growth in Tanzania.
H1: The lending interest rate has a negative effect on economic growth in Tanzania.

The lending interest rate ***(ir***) findings established a negative and statistically significant effect to long run economic growth in Tanzania. Therefore, the null hypothesis, which states that the increase in lending interest rate contributes positively to economic growth, is rejected. Due to this rejection, the result confirmed that a one percent increase in lending interest rates facilitates a 0.2 percent decline in economic growth when other things are kept constant. This result is similar to Mwamkonko (2019) in Tanzania, while Ahmad *et al.* (2016) portrays

the same results from outside Tanzania. For this reason, an average increase in lending interest rates reduces economic growth because the loanable fund becomes expensive, and lowering lending rates encourages economic growth because the loanable fund becomes cheaper hence attract investors (Ibrahim, 2016).

Hypothesis Four

Ho: The exchange rate has a negative effect on economic growth in Tanzania.
H1: The exchange rate has a positive effect on economic growth in Tanzania.

The study rejected the null hypothesis, which states that the exchange rate has negative effect on economic growth in Tanzania. This rejection confirms a priori expectations and it is induced by the positive coefficient and significant p-value, which means the exchange rate boost Tanzania's economic growth. It was confirmed that if the value of the Tanzania shillings (***lner***) depreciates by one US dollar, the economic growth goes up by 0.009 percent, holding other factors constant. The results look similar to the studies conducted outside Tanzania by Ibrahim (2018), Ahmad *et al.,* (2016). But, the result is the opposite of other studies conducted in Tanzania like Rwejuna (2020), who confirmed that the percentage depreciation in TZS currency against US dollar discourages the economy.

4.4 Post-Model Estimation Test Procedures

The post estimations that required after ECM estimates and the OLS post estimation tests followed.

4.4.1 Residual Autocorrelation

The serial correlation happens when current error term is influenced by previous forces which cause the statistical inferences to be unreliable. It was tested by using the Lagrange-multiplier test for the Auto correlation based on the following hypotheses.

Ho: Residuals are not correlated
H1: Residuals are correlated

Table 5: Results Lagrange-multiplier test for residual autocorrelation

Lagrange-multiplier test for residual autocorrelation			
lag	chi2	df	Prob > chi2
1	19.9489	25	0.74950
2	24.0251	25	0.51792

H0: no autocorrelation at lag order

Source: STATA Estimation (2022)

Based on the findings in table 5, the p-values of both two lags are greater than the 5 percent level of significance. Therefore, the study failed to reject the null hypothesis and suggests that there is no residual autocorrelation problem in the study.

4.4.2 Test for Normally Distributed Disturbances

Ho = Residuals are normally distributed (p-value > 5% level of significance)
H1= Residuals are not normally distributed (p-value < 5% level of significance)

Table 6: Test for Normally distributed disturbances results

Jarque-Bera test			
Equation	chi2	Df	Prob > chi2
Gdp	1.327	2	0.51506
M3	4.648	2	0.09789
Fr	0.813	2	0.66597
Ir	11.380	2	0.05333
Lner	153.741	2	0.59987

dfk estimator used in computations

Source: STATA Estimation (2022)

The Jarque-Bera test was performed to determine if the residuals were normally distributed, and the findings showed that the chi (2) values are greater than 5 percent significance level. As a result, the study fails to reject the null hypothesis because the prob > z are greater than 5 percent level of significance, therefore the

residuals from regression model estimated are normally distributed hence confirms the classical linear model requirement.

4.4.3 ECM Estimation Model Stability

The stability condition applied so as to investigate if the model formulated does not face misspecification consequences. The study's intent is to test whether the model is stable enough to provide long-run stability which can provide better economic meaning. The stability condition based on the following hypothesis;

Ho: No long run model stability

H1: There is log run model stability

Eigenvalue stability condition

Eigenvalue	Modulus
.9664517	.966452
.8997173 + .1297478*i*	.909025
.8997173 - .1297478*i*	.909025
.495292	.495292
.1827657 + .3083139*i*	.358414
.1827657 - .3083139*i*	.358414
-.345807 + .09055342*i*	.357467
-.345807 - .09055342*i*	.357467
.08638042 + .3087789*i*	.320634
.08638042 - .3087789*i*	.320634

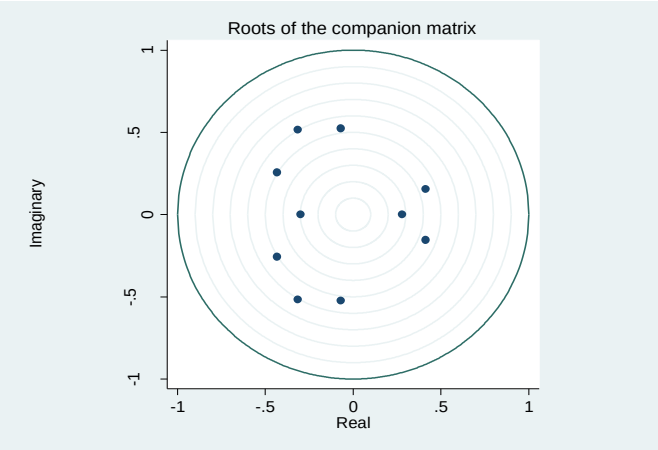


Figure 2: Unit circle of recursive residuals

Source: STATA Computation, (2022)

Figure 2 shows that the Eigenvalues are less than one, hence the model is correctly specified. In additional, the root of the companion matrix figure indicates that the recursive residuals appeared within the unit circle or within the 5% boundary of the critical region. The study rejected the null hypothesis of no model stability and proves that the model satisfies the stability condition, therefore no structural break in the model and the estimated model is reliable and meaningful.

In this study the error was obtained from OLS and the variables were different to get the short run influence and the speed of adjustment. This means the study has to test the OLS post estimations.

4.4.4 Multicollinearity Test

The test is more useful in determining whether two or more independent variables have a linear (perfect) relationship. This happens when two or more variables with the same relationship and meaning are treated differently during analysis. The test is carried under the following hypothesis:

Ho: The variables are perfectly collinear (VIF > 10: 1/IVF < 0.10)

H1: The variables are not perfectly collinear (VIF 10: 1/VIF > 0.1).

Table 7: The Results of Multi co-linearity

Variable	VIF	1/VIF
ir	2.80	0.357540
Log_er	2.59	0.386106
Fr	1.91	0.523367
M3	1.38	0.722585
Mean VIF	2.17	

Source: STATA Estimation (2022)

The findings indicated that the mean value of vector inflammatory factor (VIF) was 2.17 and the tolerance (1/VIF) of each variable was greater than 0.10. Therefore, the null hypothesis was rejected, and suggest that no perfect collinear between variables because the mean value of VIF is less than 10 and the values of 1/VIF are greater than 0.10.

4.4.5 Omitted Variables Test

Table 8: The Ramsey RESET Test results

Ramsey RESET test using powers of fitted values of gdp			
Ho:	model has no omitted variables		
	F (3, 47)	=	1.57
	Prob > F	=	0.2092

Source: STATA Estimations (2022)

From the Ramsey RESET test results, the study failed to reject the null hypothesis which states that no omitted variable because the p-value is greater than 5% level of significance and then predicts that there is no omitted variable, hence the model is correctly specified.

4.4.6 Overall Significance of the Model

The Analysis of variance (ANOVA) used to measure the overall significance of the model and coefficient of determination. It indicates how the regression analysis is important and fits the model (Ibrahim, 2018). The ANOVA results in the table indicate that the overall model is statistically significant since its p-value (0.000) is less than 5% significance level. However, the variation between variables is presented by the coefficient of determination(R^2) and adjusted coefficient of determination (R^{-2}).

Table 9: The Results of ANOVA Test

Source	SS	df	MS	Number of Obs	=	55
Model	111.810236	4	27.9525589	F (4, 50)	=	33.10
				Prob > F	=	0.0000***
Residual	88.8952208	50	1.77790442	R-squared	=	0.5571
Total	200.705456	54	3.71676771	Adj R-squared	=	0.5217
				Root MSE	=	1.3334

Note: *** indicates 1% level of significance
Source: STATA Estimation, (2022)

The study used the adjusted (R^{-2}) to explain the variations between variables because it is adjusted for the degree of freedom connected with the sum of squares. Therefore, the study shows that about 52% of the variation in GDP is explained by the model after taking into account the degree of freedom, and the other 48% of variation is explained by other factors that cause GDP growth.

5. Conclusion

The main objective of the study is to investigate the effect of monetary policy on economic growth in Tanzania. With application of Error correction model mechanism, the study found that all estimated monetary policy variables have no effect on economic growth in Tanzania for the short run because its probabilities are insignificant. However the result indicates that monetary policy variables have long run effect on economic growth in Tanzania except inflation. This means that increased money supply causes inflation in the short run,

weakening the economy, but acts as an asset economic booster in the long run through investment. In the short run, domestic currency appreciation raises the price of domestic goods and discouraging exports. The depreciation of the domestic currency in the long run causes the domestic goods to be cheaper, which encourages exports, hence economic growth.

Short-term changes in inflation do not harm the economy, but long-term sharp increases in general prices do. The insignificant power of inflation on economic growth in Tanzania in the long run implies that, to control highest rise in price is important but not a basic condition for country's economic growth promotion. Some inflation levels occasionally motivate the economy through investment, but a severe and continuous rise in general price level indicates investor doubts, harms the cost of living at a family level, and thus disrupts economic growth. The case of lending interest rates, the response cannot be exposed for the short run because the private and public sectors take a long time to respond to the changes done in the financial market.

In the long run, an average increase in lending interest rates reduces economic growth because the loanable fund becomes expensive, and lowering lending rates encourages economic growth because the loanable fund becomes cheaper hence attract investors. The long-run effect of monetary policy on economic growth holds up the theoretical predictions of the Quantity theory of money and the Keynesian liquidity preference theory. This means the increase in money supply and exchange rates are associated with the increase in GDP, whereby increases in inflation and lending interest rates are associated with the decrease in GDP.

5.1 Policy Implications and Recommendations

The excessive of money supply in the economy can lead to inflation, the government should ensure a moderate growth in the money supply, and however, a precaution must be observed. The contraction monetary policy can harm the economy by reducing business and employment opportunities, which in turn lowers productivity, hence economic failure. The central bank should adopt suitable monetary measures such as bank rate and OMO so as to control and maintain the extended money supply level which do not hinder the loans' accessing opportunities but enables economic strength to persist in Tanzania.

The government should continue to support private inventors to increase productivity so as to discourage the rise in prices. The government should intervene in the foreign exchange market and use capital control to calm the exchange rate by reducing shakiness and volatility hence economic growth. Moreover, the government must insure the exchange rate system that magnetizes both domestic and overseas investment.

The government should generate a constructive investment environment by easing the emergence of market-based interest rates. In line with this environment, the BOT should maintain the appropriate bank rate for commercial banks that lowers the lending rates, which boosts investments, hence economic growth, and the lending money should be directed to agricultural sectors, which appear to contribute nearly one-third of the country's GDP. However, the study suggested the further related research should be done on the effects of saving and deposits interest rates on economic growth in Tanzania, the digital monetary policy potentials on developing countries' economies in 21th century. In additional, the further study should be done on the effects of monetary policy on productive entrepreneurship performance in Tanzania with the use of monthly data.

Author's Purpose

The author expects this study to contribute in the living body of empirical literatures, knowledge acquisition, and guide future scholars' academic needs, hence influences the policy setting precision in developing countries, specifically in Tanzania.

References

[1]. Abille, A. B., & Mpuure, D. M. N. (2020). Effect of monetary policy on economic growth in Ghana. *Applied Economics Journal*, *27*(2), 110-124.
[2]. Ahmad, D., Afzal, M., & Ghani, U. (2016). Impact of monetary policy on economic growth empirical evidence of Pakistan. *International Journal of Applied*, *4*(6), 2345-5721.
[3]. Aikaeli, J. (2022). Monetary Policy Impact on Macroeconomic Performance in Tanzania: Empirical Approach. *Monetary and Financial Systems in Africa* (pp. 63-80). Palgrave Macmillan, Cham.
[4]. Bank of Tanzania, (2019, 2020). Bank of Tanzania Various annual report. Retrieved from http://www.bot.gov.gh.
[5]. Bashagi, A, Kimolo, D & Sanga, M. (2019). Assessment of Monetary Policy transmission mechanism in Tanzania; Journal of Bank of Tanzania, Bank of Tanzania Working Paper Series WP No. 19: 2019.
[6]. Beyene, S. D., & Kotosc, B. (2020). Is Fiscal or Monetary Policy More Effective on Economic Growth? an Empirical Evidence in The Case of Ethiopia. *J.Afr. Res. Bus. Technol, 2020*, 124855.
[7]. Choi, S., Willems, T., & Yoo, S. Y. (2022). Revisiting the Monetary Transmission Mechanism Through an Industry-Level Differential Approach. *International Monetary Fund.*

[8]. Epaphra, M., & Dunia, R. H. (2021). The impact of fiscal policy, monetary policy and exchange rate policy on real GDP in Tanzania: An ARDL-VECM model.
[9]. Evans, O., Adeniji, S., Nwaogwugwu, I., Kelikume, I., Dakare, O., & Oke, O. (2018). The relative effect of monetary and fiscal policy on economic development in Africa: a GMM approach to the St. Louis equation. *Business and Economic Quarterly*, *2*(October), 3-23
[10]. Famoroti, J. O., & Tipoy, C. K. (2019). Macroeconomic Effects of External Monetary Policy Shocks to Economic Growth in West Africa. *Stellenbosch University: Cape Town, Western Cape, South Africa*.
[11]. Geiger, M. (2008). Instruments of Monetary Policy in China And Their Effectiveness: 1994–2006 (No. 187). United Nations Conference on Trade and Development.
[12]. Hetzel, R. L. (2017). The Evolution of US Monetary Policy, Working Paper 18-01.
[13]. Ibrahim, O. I. (2018). The relationship between the monetary policy and economic growth in Kenya. *The Journal of Academic Studies in Kenya.*
[14]. Islam, MR & Lee, KK (2020). Monetary policy and financial Development: An Empirical Examination. *The Journal of The Ritsumeikan Economic Review Vol. 69 No. 3* sep 2020.
[15]. Ismail, N. A (2021). The Impact of Monetary policy on The Economic growth of Kuwait for the period of 1980-2020.
[16]. Jordà, Ò., Singh, S. R., & Taylor, A. M. (2020). The long-run effects of monetary policy (No. w26666). *National Bureau of Economic Research.*
[17]. Joshi, U. L. (2021). Effect of Money Supply on Inflation in Nepal: Empirical Evidence from ARDL Bounds Test. *International Research Journal of MMC, 2*(1), 84-98.
[18]. Lombardi, D., Siklos, P. L., & Xie, X. (2018). Monetary policy transmission in systemically important economies and China's impact. *Journal of Asian Economics*, (*59)*, 61-79.
[19]. Lut, M., & Moolio, P. (2015). The impact of monetary policy on economic growth in Cambodia. *Journal of Management for Global Sustainable Development*, *1*(1), 40-63.
[20]. Maganya, M. H., & Ndanshau, M. O. (2020). Money and Output in Tanzania: A Test for Causality. *African Journal of Economic Review*, *8*(2), 39-58.
[21]. Makame, J. S. (2015). Monetary policy and economic growth: The case study of Zanzibar (Doctoral dissertation, Mzumbe University).
[22]. Mandalu, M., Thakhathi, D. R., & Costa, H. (2018). Investigation on Tanzania's Economic History since Independence: The Search for a Development Model. *World Journal of Social Sciences*, *4*(1), 61.
[23]. Mashindano, O. J.& Kazi, V. (2021). Macroeconomic policy Development in Tanzania" COVID-19 Macroeconomic policy responses in Africa. *The Journal of International Development Research Centre (IDRC/CRDI) and the Centre for the study of the Economies of Africa.*
[24]. Mkupete & Ndanshau (2017). Money and Output in Tanzania: A Test for Causality**.** *African Journal of Economic Review, Volume VIII, Issue II*, July 2020.
[25]. Mukoka, S. (2018). An econometric assessment of the impact of inflation on economic growth: A case study of Zimbabwe economy. *Economics*, *7*(1), 17-22.
[26]. Musa, N., & Amuta, O. D. (2021). Effects of Monetary Policy on Inflation In Nigeria. Interdisciplinary Journal of African & Asian Studies (Ijaas), 7(2).
[27]. Mwamkonko, A. M. (2019). The Impact of fiscal and monetary policies on economic growth and stability in Tanzania (Doctoral dissertation); *University of Dodoma Institutional Repository.*
[28]. Obeid, R., & Awad, B. (2017). Effectiveness of monetary policy instruments on economic growth in Jordan using vector error correction model. *International Journal of Economics and Finance*, *9*(11), 194-206.
[29]. Olofinlade, S. O. et al, (2020). The Effects of Monetary Policy on Bank Lending and Economic Performance in Nigeria. *ACTA UNIVERSITATIS DANUBIUS 16(2), 2020.*
[30]. Saungweme,T. & Odhiambo, *N. M. (2022). Does Public Debt Granger-Cause Inflation in Tanzania? A Multivariate Analysis. Economia Internazionale/International Economics, 75(1), 75-100.*
[31]. Soseco, T. (2016). Effect of E-Money to economic Performance (Comparative Study of Selected countries). In *The International Conference of Management Sciences, UMY, Indonesia* (pp. 9-12).
[32]. Tadesse, G. (2020). The Dynamic Effect of Monetary Policy on Ethiopian Economy *(Doctoral dissertation, St. Mary's University).*
[33]. Tahajuddin, S., & Sulaiman, N. N. (2021). Malaysian government choice of fiscal and monetary policies during covid-19 pandemic: Preliminary insight. *International Journal of Advances in Engineering and Management*, *3*(1), 248-253.
[34]. Twinoburyo, EN & Odhiambo, N. M. (2016). "Can monetary policy drive economic growth?"; Empirical evidence from Tanzania (Working Papers 21122), University of South Africa, Department of Economics.

[35]. United Nations. (2015). Transforming Our World. *The 2030 Agenda for Sustainable Development*. https:// doi.org/10.1891/9780826190123.ap02.

[36]. Wainyaragania, K.A (2019). Macroeconometric analysis of economic growth in Tanzania: Ramsey-Cass-Koopmans Approach. *The Noble International Journal of Economics and Financial Research ISSN(e): 2519-9730 ISSN(p): 2523-0565 Vol. 04, No. 11, pp: 99-110, 2019.*

[37]. World Bank. (2020b). Trading for Development in the Age of Global Value Chains. World Bank Group.