What is the Right Policy-mix for Macroeconomic Stabilization in Tanzania?

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Abstract

The purpose of this paper was to find out the right policy-mix for macroeconomic stabilization in Tanzania. The paper employed the co-integration and error correction modeling approach to analyze the interaction effects of fiscal and monetary policies on macroeconomic stability. The results show that fiscal and monetary expansion characterized by high government expenditure and high broad money supply deteriorates macroeconomic stability, but fiscal and monetary expansion characterized by low tax buoyancy and low interest rate enhances macroeconomic stability. The results further indicate that fiscal and monetary tightening characterized by low government expenditure coupled with low broad money supply strengthens macroeconomic stability, but fiscal and monetary tightening characterized by high tax buoyancy and high interest rate weakens macroeconomic stability. Furthermore, the results reveal that fiscal expansion and monetary contraction characterized by high government expenditure and high interest rate improves macroeconomic stability, but fiscal expansion and monetary contraction characterized by low tax buoyancy accompanied by low broad money supply dampens macroeconomic stability. Moreover, the results show that fiscal contraction and monetary expansion characterized by low government expenditure and low interest rate impairs macroeconomic stability, but fiscal contraction and monetary expansion characterized by high tax buoyancy coupled with high broad money supply drives macroeconomic stability. Lastly and more importantly, the study found that out of all policy-mix options and strategies under investigation, the right policy-mix is fiscal contraction and monetary expansion characterized by high tax buoyancy and high broad money supply. The policy implication of the findings is that in order to stabilize macroeconomic environment in Tanzania, fiscal and monetary authorities have to widen both tax base and monetary base.

Key Words: Fiscal policy; Monetary policy; Policy-mix; Macroeconomic stability; Tanzania
JEL Classification Codes: E52, E62

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1.0 Introduction

Achievement of macroeconomic goals such as economic growth, price stability, employment, and exchange rate stability depend on adoption of appropriate policy - mix. In practice, fiscal and monetary policies are strongly linked in a way that success of one policy can be undermined or strengthened by the side effects resulting from another policy (Adefeso *et al.* 2010). Thus, an economy needs a right policy-mix to achieve several goals at the same time. Pure monetary policy or fiscal policy may have little or no effect on economic activities. But monetary policy that is based on fiscal actions and fiscal policy that has some elements of monetary actions can ensure multiple objectives (Iyeli *et al.* 2012). The right policy-mix may be using fiscal and monetary policies in the opposite or in the same direction.

Tanzania has been pursuing both fiscal policy and monetary policy over several decades. In 1980s, for instance, Tanzania used tight fiscal and monetary policies along with Structural Adjustment Program and Economic Recovery Program in a bid to stabilize the economy after economic crisis (Tsikata, 2001). As a result, between 1987 and 1991, GDP growth rebounded to 4.2% from 0.8% reported between 1977 and 1983; fiscal deficit reduced to 0.9% from 7.6% recorded between 1977 and 1983; but inflation rose to average of 30% per annum. These limited achievements lived shortly as they were eroded in 1993- 95 when a country succumbed into another crisis; GDP declined to 1.8%, public debt rose to 160%, revenues declined to 11% and budget deficit widened to 5.2% (BOT, 2015). Responding to recession, in 2000s Tanzania adopted looser fiscal and monetary policies along with the National Strategy for Growth and Reduction of Poverty (NSGRP). As a result, between 2005 and 2015, economy grew at 7% quite in line with set target of 6% - 8% per annum and inflation dropped to desired single digit and remained within the country medium-term target of at most 5% (URT, 2015).

There is consensus among economists that fiscal and monetary policies affect economic activities, but the degree and the relative potency of these policies has been the subject of debates between the Keynesians and the Monetarists (Iyeli *et al.* 2012). The Monetarists strongly believe that monetary policy has a greater and more predictable impact on economic activities than fiscal policy. They argue that fiscal expansion "crowds out" private investments, thus, outweighing positive impact of public expenditure on economic growth. By contrast, Keynesians, hold that fiscal policy performs better than monetary policy in stimulating economic growth. They point out that at "liquidity trap" monetary expansion causes downward pressures to investments, which in turns offset the positive impact of money supply on economic growth (Adefeso *et al.* 2010). There exist plethora empirical works but findings are inconclusive. Iyeli *et al.* (2012) for Nigeria; Sen *et al.* (2015) for Turkey; Ndanshau *et al.* (2017) for Tanzania; and Afonso et al. (2019) for 28 EU countries found that monetary policy is more effective than fiscal policy. Conversely, Friedman (1977) for USA; Petrevski *et al*. (2016) for Europe; Nguyen (2015) for Asia; and Adegboyo *et al.* (2021) for Nigeria found that fiscal policy dominates monetary policy in promoting growth and stability.

Theoretical debates between Keynesians and Monetarists suggests a need to find out an efficient way of using both fiscal and monetary policies. Discrepancies in findings also suggests that it is not possible to generalize a particular economic philosophy - neither the Monetarists nor the Keynesians. This is because countries differ in many respects, including their economic structures, levels of financial development, political stability, trade regimes, ability to absorb external shocks,

and macroeconomic environment. These distinctive features of the economies tend to have distinctive fiscal - monetary policies implications on economic activities. Thus, to understand the impact of fiscal and monetary policies on the economy, each country must be analyzed separately. Most of the previous studies investigated the comparative effectiveness of fiscal and monetary policies on economic growth and price stability; which is necessary but not sufficient condition for deriving policy-mix. To establish the optimal policy-mix, this research enriches the existing body of knowledge by analyzing the interaction effects of fiscal and monetary policies by using the "interaction terms". Moreover, this study contributes to the existing literature by evaluating efficacy of fiscal and monetary policies on "macroeconomic stability", which is jointly measured by inflation rate, exchange rate, budget deficit, and public debt. This is important because usually fiscal and monetary authorities take into account various dimensions of the economy when formulating and executing policy-mix. Ismihan (2003) emphasized the use of multiple indicators jointly to evaluate macroeconomic stability because each variable has only partial information separately.

The rest of this paper is organized as follows: A review of theoretical and empirical literature is presented in next section. This is followed by methodologies used to find out the best policy-mix for macroeconomic stability. Thereafter, the results of the research are presented and discussed. The last section is a summary of concluding remarks, area for further studies and policy implications.

2.0 Literature Review

2.1 Theoretical Review

The clearest exposition of Fisher's formulation of the quantity theory of money postulates that monetary expansion leads to high output tied with inflation (Mishkin, 2004). Thus, expansionary monetary policy is good when the resultant inflation rate is moderate and its costs are negligible. The classical dichotomy[2], however, holds a different view, that is monetary expansion will typically result in higher prices, and not more output, and accordingly monetary policy is more effective in restraining an overheated economy than in expanding an economy in a deep recession. (Stiglitz *et al*, 2006). So, it is argued that inflation is always and everywhere a monetary phenomenon (Friedman, 1956). Keynesians pointed that at "liquidity trap" expansionary monetary policy is not only ineffective but also counterproductive (Adefeso *et al*, 2010). This is because as interest rate falls, speculative real demand for money tends towards infinity. Moreover, it is argued that it is "credit", and not the "money supply", matters for economic growth and stability. The commercial banks determine who is creditworthy, how much to lend to each borrower, and under what terms. Even if the discount rate falls, banks may be reluctant to lend more when they believe their balance sheets are weak, or when they perceive the risk of lending to be very high (Greensward *et al*. 1988). Since monetary policy has its most direct impact through banking system; then, when banking sector is extremely undeveloped, impact of monetary policy may be limited.

Keynes in his general theory emphasizes that increase in government expenditures or tax cut leads to high GDP through multiplier effects. Even when public investment is totally unproductive, the expenditure itself will lead to an expansion of output because of a multiplier effect throughout the

[2]Classical dichotomy implies that if money supply doubles, price levels must also doubles, because velocity and output are constant in the short-run.

economy. And if the expenditure is on productive investments, the social benefits can be enormous (Stiglitz *et al,* 2006). Keynes further argues that tax cuts for the poor and middle class are likely to stimulate the economy far more than tax cuts for the wealthy, because the poor and middle class spend more of their tax savings on consumption while the wealthy save their disposable incomes (Stiglitz *et al,* 2006). Thus, fiscal expansion helps to revive the economy back to equilibrium during recession, as it stimulates consumption and investment while tight fiscal policy restrains inflation, as it reduces aggregate demand (Bhatia, 2006). The monetarists, however, hold that increase in public expenditure leads to higher fiscal deficit, which results to higher interest rates, which in turns, crowds out private investments, hence retards growth. Likewise, Barro - Ricardo hypothesis contends that tax cut enlarge fiscal deficit, which in turn, widens public debt because households will increase their savings in recognizing that they will have to repay the debt in future (Stiglitz *et al*, 2006).

Mundell - Flaming model shows that fiscal expansion reduces economic growth through exchange rate appreciation. The model holds that in a small open economy with a floating exchange rate regime, increase in public spending widens fiscal deficit, which results to high interest rate above world interest rate, leading to capital inflows from abroad taking advantage of higher returns. This capital inflow has exchange rate appreciation effect because it increases demand for the domestic currency vs foreign currency, as foreign investors need to buy the domestic currency to invest in the domestic economy. The appreciation of domestic currency makes domestic goods more expensive relative to foreign goods, reducing net exports, which in turns, off-sets the growth-effects of fiscal expansion (Mankiw, 2016). But, this effect dominates in the short-run, because investors can quickly shift their funds from one country to another in response to changes in interest rates. By contrast, the model shows that monetary expansion enhances economic growth through exchange rate depreciation. In a small open economy, monetary expansion leads to exchange rate depreciation, which in turns increases net export, and hence increase domestic output.

2.2 Empirical Review

There exists numerous empirical works traced the effectiveness of fiscal and monetary policies. Ndanshau and Mkupete (2017) analyzed the relative importance of fiscal and monetary policy on economic growth in Tanzania by using quarterly time series data for the period 1966: I to 2013: IV. The analysis was based on the original and modified St. Louis equation estimated by using the Restricted VAR and ARDL techniques. The study established that monetary policy tools, measured by money supply, had a relatively stronger, larger and predictable impact on economic growth than fiscal policy, measured by government expenditure. In addition, it was evident that shocks associated with changes in money supply were larger than the shocks due to changes in fiscal policy. However, over the short-run, the shock due to changes in fiscal policy on economic activity was larger; and that of monetary policy was larger over the long-run. The estimation results suggest the modified St. Louis equation was more superior to its original form. Moreover, the results suggest the relative dominance of monetary policy over fiscal policy, implying that macroeconomic stabilization policy can be successfully pursued by the former rather than the latter policy in Tanzania. However, the study concluded that either of the policy should not be used exclusively because even fiscal policy was found to have growth-effect, at least over the short-run period.

Iyeli *et al.* (2013) determined the relative effectiveness of monetary and fiscal policies on output and price in Nigeria using co-integration and error-correction modeling approach. The results revealed that contemporaneous contribution of broad money supply to inflationary cycle is weak, but its one year lagged value is strong, positive and significant. The study confirmed that the role of budget deficits although positive, is negligible and in some instances statistically insignificant in influencing cyclical inflation rate. Furthermore, the results confirmed that while money supply matters budget deficit has a negative insignificant effect on output. The article concluded that the effect of monetary policy has an edge over fiscal policy variable as a measure of output and price stabilization in Nigeria. Kibwe (2016) investigated the efficacy of fiscal and monetary policies in East Africa namely Kenya, Tanzania and Uganda by using the structural vector autoregressive model. The study provided strong evidence that of the two monetary policy transmission channels, interest rate is more effective than money supply in Tanzania, Kenya and Uganda. Also, the study found that fiscal actions have modest effects, and that monetary policy is more effective in the region.

Adegboyo *et al.* (2021) investigated the impact of fiscal and monetary policies on Nigerian economic growth from 1985 to 2020 by using ARDL. The results show that while government spending drive growth in Nigeria, government revenues have no effects on GDP growth. The results also show that interest rate impels growth of the economy while money supply deters growth of Nigeria's economy. Moreover, the trade policy was found to maintain her negative influence on the economy. Following the findings, policymakers are recommended to place more emphasis on using fiscal policy, which was found to be stimulating the country's growth rate. Whenever, it is expedient to use monetary policy, policymakers should make use of interest rates as it stimulates growth in the short-run. Nguyen (2015) analyzed the effects of fiscal and monetary policies on inflation for Bangladesh, Cambodia, Indonesia, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand and Vietnam between 1985 – 2012. The study applied both PMG and GMM, and found that while government expenditure, fiscal deficit, and interest rate determine inflation when both PMG and GMM were used, broad money supply determine inflation only when PMG was used

Petrevski *et al.* (2016) investigated the macroeconomic effects of monetary and fiscal policies in Bulgaria, Croatia and Macedonia. The study employed the recursive VAR to examine linkages among fiscal policy, monetary policy, and economic activity using quarterly data. The study found that economic activity exerts significant effect on inflation, provoking a strong reaction of monetary policy, especially in case of procyclical behavior of fiscal policy. The research confirmed that the effects of monetary policy on output and inflation are generally as expected. Finally and more importantly, the study found that monetary policy acts as a strategic substitute to tight fiscal policy, while in case of monetary tightening; fiscal authority behaves in a countercyclical manner. Afonso *et al.* (2019) examined the interaction between monetary and fiscal policies using a panel data set of the 28 EU countries from 1970 – 2015. The study estimated the reaction function of each policy. The results show that, for the all period under analysis inflation has a significant impact on monetary policy, and that government raises their primary balances when facing increases in government debt. In addition, the study found a substitution relationship between both policies, whereby the central bank assumes an active role, especially in case of higher levels of public debt.

But most of these studies analyzed the relative efficacy of fiscal and monetary policies on output and price stabilization; which is necessary but not sufficient condition for deriving the optimal policy-mix. Also, most of the previous studies estimated the reaction functions of fiscal and monetary policies based on game theory to determine which policy dominates the other. To establish a right policy-mix, this research enriches the existing body of knowledge by analyzing the interaction effects of fiscal and monetary policies by using "interaction terms". In addition, despite their undeniable importance, output and price stability are surely not the only objectives policymakers need to consider when designing policy-mix. Thus, this study contributes to the existing literature by evaluating efficacy of fiscal and monetary policies on "macroeconomic stability", which is jointly measured by inflation rate, exchange rate, budget deficit, and public debt.

3.0 Methodology

3.1 Data

This study used annual time series data spanning from 1986 to 2020 collected from the Bank of Tanzania's (BOT) Economic Bulletin. After compilation, the time series data were processed and managed by using SPSS, and then analyzed by using STATA. Time series analysis uses statistical techniques to identify the behavior of one or more variables in terms of statistical regularities in their own past behavior in order to estimate a pattern in the variable's evolution over time. The estimated pattern is important for forecasting, assuming that the pattern behaves the same in the future.

3.2 Operationalization of Variables

3.2.1 Macroeconomic Stability

The study used inflation rate, exchange rate, budget deficit and public debt to evaluate macroeconomic (in) stability. This is because most of the economic theories suggests that public debt and budget deficit are good indicators of fiscal stance while inflation rate and exchange rate are good indicators of monetary stance of an economy. Macroeconomic stability is characterized by low inflation rate, predictable exchange rate, and small public budget and foreign-payments deficits along with declining foreign-debt obligations (Todaro, 2009; World Bank, 1990). Since these indicators; inflation rate, exchange rate, budget deficit and public debt are not identical in several aspects, including their measurement ranges and units, for example, they have different maximum and minimum values; it seems that, it is not logical to construct a combined index from their simple summation or average. To resolve this measurement problem, the study adopted a methodology of the United Nations Development Program (UNDP) in computing Human Development Index (HDI). Thus, Macroeconomic Instability Index (MII) was constructed in two main stages: first, sub-indexes of the four mentioned indicators were derived based on relation (1a); and second, MII was computed as average of the derived four sub-indexes as shown in relation (1b).

$$Y_t = \frac{X_t - X_{\min}}{X_{max} - X_{min}} \dots\dots\dots\dots (1a)$$

$$MII = \frac{Y_1 + Y_2 + Y_3 + Y_4}{4} \dots\dots\dots\dots (1b)$$

Where: Xt; is real value of indicator X in year t, Yt; represents X's sub-index value, Xmin; is the minimum value of X in the sample, and Xmax; is the maximum value of X in the sample period. The value of MII ranges from 0.00 to 1.00 and thus macroeconomic environment is described as "stable" if MII ranges from 0.00 - 0.20; "moderate" if MII varies from 0.21 - 0.50; and "unstable" if MII ranges from 0.51 - 1.00. The smaller the value of MII the more the "stability" and vice versa.

3.2.2 Policy Mix

Policy-mix is a combination of fiscal and monetary policies. In practice, fiscal authority can design and execute expansionary or contractionary fiscal policy. Similarly, monetary authority can formulate and implement expansionary or contractionary monetary policy, depending on economic conditions. Thus, interaction between fiscal and monetary policies has four possible policy-mix options: (1) fiscal and monetary expansion; (2) fiscal expansion and monetary contraction; (3) fiscal contraction and monetary expansion; and (4) fiscal and monetary contraction.

The effects of fiscal and monetary expansion is measured by increase in government expenditure and broad money supply (GM) or decrease in tax buoyancy and interest rate (TI) whereas the effects of fiscal and monetary contraction is measured by increase in tax buoyancy and interest rate (TI) or decrease in government expenditure and broad money supply (GM). The effects of fiscal expansion and monetary contraction is measured by increase in government expenditure and interest rate (GI) or decrease in tax buoyancy and broad money supply (TM) while the effects of fiscal contraction and monetary expansion is measured by increase in tax buoyancy and broad money supply (TM) or decrease in government expenditure and interest rate (GI). Figure 1 displays.

Figure 1: Strategic Interaction between Fiscal and Monetary Policies

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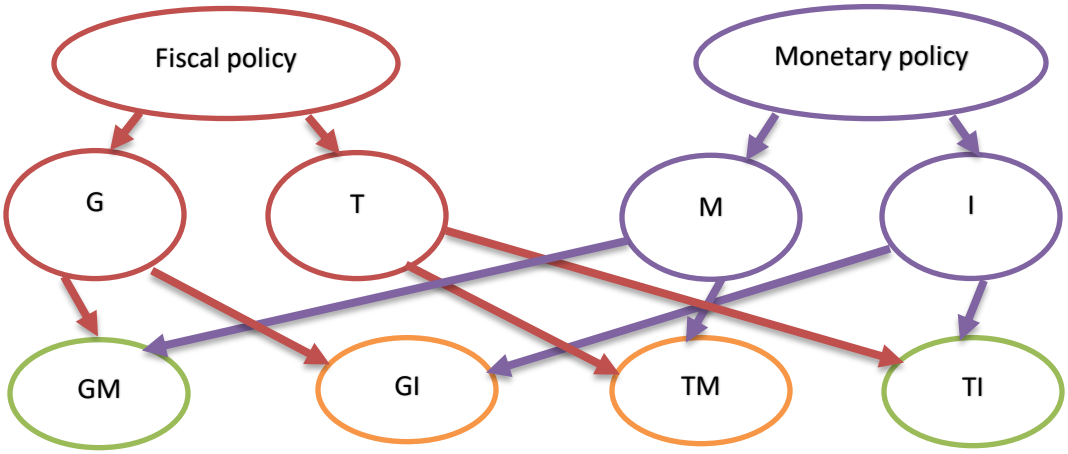

Where: G is government expenditure; T is tax buoyancy; M is broad money supply; and I is interest rate. GM, GI, TM, and TI represents the respective fiscal and monetary policy interaction terms.

3.3 Model

The study adopted the St. Louis Model developed by Anderson and Jordan (1968) of the Fed reserve. As applied by Batten and Hafer (1983) and Ndanshau and Mkupete (2017) the model reads:

$$\Delta GDP_t = \alpha + \beta_m (L)\Delta M2_t + \beta_g(L)\Delta GE_t + \Upsilon(L)\Delta X_t + \mu_t \quad (2)$$

Where: GDP is gross domestic product; M2 is broad money supply; GE is total government expenditure; X is exports; t is time in annual period, L is a lag operator, and ut is stochastic error term.

The St. Louis model (2) determines efficacy of fiscal and monetary policies in relation to growth (GDP). Despite its undeniable importance, economic growth is surely not the only macro objective policymakers need to consider when deciding policy mix. Thus, this paper examines efficacy of fiscal and monetary policies on macroeconomic stability. Also, this model takes the position that export is good measure of the degree of trade openness, which is true for outward-oriented countries. But for inward - oriented countries, import is the best indicator of the degree of trade openness.

Moreover, the St. Louis model (2) is necessary but not sufficient in formulating a right policy-mix for an economy; this is because it does not capture the interaction effects of fiscal and monetary variables. The Beta coefficients (β_m and β_g) in this model measures the relative efficacy of fiscal and monetary policies. Given that government expenditure and tax are two main "tools" of fiscal policy, and that money supply and interest rate are two main "targets" of monetary policy, four fiscal - monetary interaction terms were hypothesized to find out a right policy mix as specified in equation (3):

$$\Delta MII_t = \beta_0 + \beta_1 (L)\Delta GM_t + \beta_2(L)\Delta TI_t + \beta_3 (L)\Delta GI_t + \beta_4(L)\Delta TM_t + \beta_5(L)\Delta IMP_t + \mu_t \quad (3)$$

Where: MII is macroeconomic instability index; GM is government expenditure and broad money supply; GI is government expenditure and interest rate; TM is tax buoyancy and broad money supply; TI is tax buoyancy and interest rate; IMP is import. β_0; is constant that captures non fiscal-monetary forces that affect MII; t is time in annual period, L is a lag operator, and ut is a stochastic error term.

3.4 Estimation

3.4.1 Unit Root Test

The study employed the Phillips-Perron (P-P) non-parametric test to examine the presence of the unit root. The P-P test has an extra advantage over the standard Dickey-Fuller (DF) test because the DF test results are sensitive to different lag lengths of the dependent variable, therefore, biased towards non-rejection of the unit roots when there are structural breaks are incorporated in the data set (Indraratna, 2003; Li, 2001). Moreover, the P-P test is adjusted to take into account serial correlations by using Newey-West (1994) covariance matrix.

3.4.2 Co-integration and Error Correction Model

To ascertain whether variables are co-integrated, the study employed the Johansen co-integration procedure. Both trace ($\lambda trace$) and maximum Eigen-value (λmax) statistics were in place to

ensure robustness of the results. Afterwards, the Johansen Maximum Likelihood method was used to estimate error correction model. The Johansen's approach is superior over the Engle and Granger two-step method because it enables testing for existence of multiple co-integrating vectors and thus, it exploits all dynamic interactions of the variables included in the regression equation (Verbeek, 2004).

4.0 Results and Discussion

4.1 Phillips-Perron Test

The Phillips - Perron (P-P) test results displayed in Table 1 reveal that all variables were not stationary at their levels. However, after taking their first differences all variables became stationary. This is evidenced by their test statistics, which are now less than their corresponding critical values at 1% levels of significance. Therefore, the null hypothesis of the presence of a unit root is rejected at 0.01 significance level; suggesting that all variables are integrated of order one 1(1).

Table 1: Unit Roots Test Results

	Levels		First Difference		Order of
Variables	Test Statistics	Critical Value	Test Statistics	Critical Value	**Integration**
MII	-1.379	-3.682	-5.948***	-3.682	1(1)
GM	-3.428	-3.682	-3.877***	-3.682	1(1)
GI	-2.562	-3.682	-4.979***	-3.682	1(1)
TM	-0.651	-3.682	-5.121***	-3.682	1(1)
TI	-0.795	-3.682	-7.151***	-3.682	1(1)
IMP	-2.277	-3.682	-4.659***	-3.682	1(1)

Note:

MII: is macroeconomic instability index; GM: is government expenditure and broad money supply; GI: is government expenditure and interest rate; TM: is tax buoyancy and broad money supply; TI: is tax buoyancy and interest rate; IMP: is import and *** = significant at 1%.

4.2 Lag Selection

The study used the Akaike Information Criteria (AIC), the Hannan - Quin Information Criteria (HQIC) and the Schwarz Bayesian Information Criteria (SBIC) to establish optimum lag length. The results in Table 2 show that the SBIC selects one (1) lag while AIC and HQIC select four (4) lags. The maximized four (4) lags was selected because using too few lags leaves the models potentially miss-specified, and therefore is likely to cause serial autocorrelation in the residuals (Baum, 2013).

Table 2: Lag Selection Results

Lag order	AIC	HQIC	SBIC
0	47.27	47.36	47.54
1	39.48	40.13	41.35**
2	39.71	40.91	43.17
3	39.80	41.55	44.87
4	35.48**	37.79**	42.15

Note:

** indicates the optimum lag length selected by respective criterion at 0.05 levels of significance

4.3 Johansen Test Results

The Johansen test results in Table 3 reveal that both the $\lambda trace$ and λmax statistics rejected the null hypothesis of no co-integration against the alternative, as evidenced by test statistics, which are greater than critical values. The $\lambda trace$ and λmax statistics show that there are at most three co-integrating vectors. This outcome suggests that there exists long-run relationship among variables.

Table 3: Co-integration Test Results

Null Hypotheses	Trace Statistics	Critical Value	Max-Eigen Statistics	Critical Value
None	202.36	94.15	112.61	39.37
At most 1	89.74	68.52	38.74	33.46
At most 2	51.00	47.21	28.09	27.07
At most 3	22.91**	29.68	9.45**	20.97
At most 4	13.45	15.41	7.76	14.07
At most 5	5.69	3.76	5.69	3.76

Note:

If there are k stochastic variables in the regression equation, there can be up to k-1 co-integrating vectors. However, it may not be easily to give all these relationships meaningful economic interpretation; ** indicates the accepted null hypothesis at 5% level of significance.

4.4 Error Correction Model Results and Discussion

The error correction model results in Table 4 show that the speed of adjustment is negative and statistically significant, – 0.4058; suggesting that when macroeconomic environment is out of equilibrium, the negative adjustment coefficient brings it back to the long-run equilibrium with a correction rate of 40%. Thus, it takes about 1/0.40 = 2.5 times (over a year) to support equilibrium in the absence of other factors. The results also indicate that there are partial adjustments in macroeconomic stability over time as evident by positive and significant coefficient of lagged dependent variable. This outcome implies that the past macroeconomic (in) stability predicts the future macroeconomic (in) stability, other factors held constant. Thus, in Tanzania, the poor (better) the previous macroeconomic stability the poor (better) the next period macroeconomic stability.

The results reveal that, in the short-run, fiscal and monetary expansion characterized by a joint increase in government expenditure and broad money supply deteriorates macroeconomic stability. This is substantiated by the positive and significant coefficients of the lagged interaction term (GM). This outcome is consistent to both the Monetarists and the Keynesians theoretical frameworks. A closer examination of the results, however, show that, in the short-run, fiscal and monetary expansion characterized by a joint fall in tax buoyancy and interest rate enhances macroeconomic stability; as evident by the positive and statistically significant coefficients of the lagged interaction term (TI). These results suggest that, in the short-run, to stabilize macroeconomic environment, the best expansionary policy-mix strategy is jointly reducing tax buoyancy and interest rate rather than increasing government expenditure and broad money supply.

The reiterated results show that, in the short-run, fiscal and monetary tightening characterized by a concurrent decline in government expenditure and broad money supply strengthens macroeconomic stability, as evident by the positive coefficients of the lagged interaction term (GM). The classical dichotomy maintains that increase in money supply will result in higher prices, and not more output, and thus monetary tightening is more effective in restraining an overheated economy. The results, however, show that, in the short-run, fiscal and monetary tightening characterized by increase in tax buoyancy and interest rate weakens macroeconomic stability, as evidenced by the positive and significant coefficients of lagged interaction term (TI). Thus, to nurture macroeconomic stability, in the short-run, the best tight policy-mix strategy is jointly reducing public expenditure and broad money supply rather than increasing tax buoyancy and interest rate.

The results also reveal that, in the short-run, fiscal expansion and monetary contraction characterized by increase in government expenditure and interest rate improves macroeconomic stability, as supported by the negative coefficients of lagged interaction term (GI). The results, however, show that, in the short-run, fiscal expansion and monetary contraction characterized by decline in tax buoyancy coupled with low broad money supply dampens macroeconomic stability, as evident by negative coefficients of lagged interaction term (TM). Barro - Ricardo hypothesis contends that tax cuts enlarge fiscal deficit, which in turn, widens public debt because households will increase their savings in recognizing that they will have to repay the debt in future. Thus, to promote macroeconomic stability via fiscal expansion and monetary contraction, the best strategy is to increase public spending and interest rate as opposed to decrease in tax buoyancy and broad money supply.

The reiterated results show that, in the short-run, fiscal contraction and monetary expansion characterized by decrease in government expenditure and interest rate (GI) impairs macroeconomic stability, as substantiated by lagged interaction term (GI). This outcome aligns with Mundell - Flaming model that with a floating exchange rate regime, decrease in government expenditure and interest rate leads to capital outflows, which in turns, depreciates exchange rate. A closer analysis of the results, however, reveal that fiscal contraction and monetary expansion characterized by increase in tax buoyancy and broad money supply (TM) bolsters macroeconomic stability, in the short-run. Thus, to promote macro stability via fiscal contraction and monetary expansion, the best strategy is to wide tax and monetary base rather than reducing public spending and interest rate.

The results also reveal that import relates positively and significantly to macroeconomic instability index (MII). This outcome is not surprising because it supports most of the economic theories. Mishkin (2004), for example, pointed that, in the long-run, increased demand for a country's exports causes its currency to appreciate while increased demand for imports causes domestic currency to depreciate. Grant et *al.* (2000) noted that an increase in price of imported raw materials such as oil leads to high production costs, which in turns, forces firms or employers to pass extra costs to consumers by rising prices. This outcome strongly reflects the existence of imported inflation in Tanzania. Therefore, increasing import restriction measures, for example, imposing high tariff and/or low quotas would have beneficial effects on macroeconomic stability in Tanzania.

Moreover, in the long-run, the estimated co-integrating equation shows the relative efficacy of the four (4) policy-mix options. First, the results reveal that, in the long-run, fiscal and monetary expansion characterized by a percentage point decrease in tax buoyancy and interest rate improves macroeconomic stability to the tune of 0.0086 percentage points. Second, the results show that, in the long-run, fiscal and monetary contraction characterized by a percentage point decrease in government expenditure and broad money supply enhances macroeconomic stability by 0.0007 percentage points. Third, the results reveal that, in the long-run, fiscal expansion and monetary contraction described by a percentage point increase in government expenditure and interest rate bolsters macroeconomic stability by 0.0023 percentage points**.** Fourth, the results demonstrate that, in the long-run, fiscal contraction and monetary expansion characterized by a percentage point increase in tax buoyancy and broad money supply promotes macroeconomic stability to the tune of 0.0101 percentage points. In general, these results suggest that though all four policy-mix options can be applied to restore macroeconomic stability, in the long-run, the right policy-mix is fiscal contraction and monetary expansion characterized by widening both tax base and monetary base.

4.4 Error Correction Model Results

Variables	**MII**		
	1	2	3
MII	0.3764	0.2285	0.1631
	(0.038)**	(0.223)	(0.278)
GM	0.0005	0.0008	0.0005
	(0.003)***	(0.000)***	(0.003)***
GI	-0.0010	-0.0014	-0.0003
	(0.005)***	(0.000)***	(0.148)
TM	-0.0018	-0.0039	-0.005
	(0.180)	(0.000)***	(0.607)
TI	0.0034	0.0044	-0.0001
	(0.016)**	(0.000)***	(0.939)
IMP	0.0142	0.0069	0.0065
	(0.005)***	(0.052)*	(0.0008)***
ECT	-0.4058		
	(0.002)***		
CON	0.0017		
	(0.805)		

Co-integrating Equation: MII = 0.0246 + 0.0007GM – 0.0023GI - 0.0101TM + 0.0086TI + 0.0500IMP

Note:

MII is macroeconomic instability index; GM is government expenditure and broad money supply; GI is government expenditure and interest rate; TM is tax buoyancy and broad money supply; TI is tax buoyancy and interest rate; IMP is imports; ECT is error correction term; CON is constant. Columns 1 to 3 are coefficients of lagged variables and figures in parentheses are their corresponding p-values; ***, **& * = significant at 1%, 5% & 10%, respectively.

4.5 Diagnostic Tests

The Lagrange Multiplier (LM) test was used to ascertain the presence of residual autocorrelation. The results in Table 5 show that there is no serial autocorrelation at lag order as evidenced by the p-values, which are greater than 0.05 significance level. In addition, Jarque-Bera (JB) test was employed to establish whether residuals are normally distributed. The results reveal that the residuals are normally distributed as supported by p-values, which are greater than 0.05 level of significance.

Table 5: Diagnostic Test Results

LM test							
1		2		3		4	
Chi2	Prob>Ch2	Chi2	Prob>Chi2	Chi2	Prob>Chi2	Chi2	Prob>Ch2
31.21	0.70	36.64	0.44	34.02	0.56	31.27	0.69
		Chi2		Prob>Chi2			
JB test		0.075		0.96			
Skewness		0.047		0.91			
Kurtosis		2.795		0.80			

5.0 Conclusion

The purpose of this study was to find out the right policy-mix for macroeconomic stabilization in Tanzania. The study applied co-integration and error correction modeling approach to explore the short-run and long-run interaction effects of fiscal and monetary policies on macroeconomic stability.

The results show that fiscal and monetary expansion characterized by high government expenditure and high broad money supply detriments macroeconomic stability, but fiscal and monetary expansion characterized by low tax buoyancy and low interest rate enhances macroeconomic stability in Tanzania. The reiterated results reveal that fiscal and monetary tightening characterized by low government spending coupled with low broad money supply strengthens macroeconomic stability, but fiscal and monetary tightening denoted by high tax buoyancy and high interest rate weakens macroeconomic stability environment in the country. Moreover, the results reveal that fiscal expansion and monetary contraction characterized by high government expenditure and high interest rate improves macroeconomic stability, but fiscal expansion and monetary contraction characterized by low tax buoyancy accompanied by low broad money supply dampens macroeconomic stability. Again, reiterated results show that fiscal contraction and monetary expansion characterized by low government expenditure and low interest rate impairs macroeconomic stability, but fiscal contraction and monetary expansion featured by high tax buoyancy coupled with high broad money supply bolsters macroeconomic stability.

The study recommends fiscal and monetary authorities to use fiscal contraction along with monetary expansion characterized by increasing buoyancy of a tax and broad money supply. This is because the results show that, in the long-run, this typical tight fiscal policy and looser monetary

policy has greater positive effects on macroeconomic stability than other policy-mix options in Tanzania.

Acknowledgement
I would like to thank anonymous review and editor of this journal for helpful comments that enriched the earlier version of this manuscript.

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