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ANALYSIS OF MONETARY POLICY TOWARDS CORRECTION OF BALANCE OF PAYMENT DISEQUILIBRIUM IN TANZANIA

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ABSTRACT: *This study investigates the role of monetary policy in correcting balance of payment disequilibrium in Tanzania using time series data running from 1989 to 2022. The data were transformed to natural logarithms for linearity. Autoregressive Distributed Lag (ARDL) model, Unit root test, ARDL Bound cointegration test, and residual diagnostic tests were employed to analyse this data. The study revealed that only the inflation rate (CPI) was stationary at level, while the balance of payment (BoP), real effective exchange rate (REXR), money supply (MS), discount rate (DS), and domestic credit to private sector (DCPS) were stationary at their first differences. Further, ARDL showed that only REXR and MS have a long-run positive effect on the balance of payment (BoP), while other variables have short-run effects. The Error Correction Model (ECM) showed a speed of 40% adjustment of BoP each year. The study recommends that BoP disequilibrium should be corrected by appropriate monetary policy tools.*

KEYWORDS: Monetary Policy, Balance of Payment, Tanzania, ARDL.

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INTRODUCTION

Monetary policy is one of important components in any economic system as it regulates the value and supply of money in order to achieve a certain economic goal (Khan, 2023). In all economies including Tanzania, the objective of monetary policy is to maintain price stability, balance of payment equilibrium, promotion of employment and output growth (BOT, 2023). In order to achieve these objectives, BoT controls money supply to avoid unwanted trends in the economy. This includes unemployment, retard growth rate of the economy, disequilibrium in the balance of payments and inflation rate (Nimenibo et al., 2017). Broadly, monetary policy can be classified as expansionary monetary policy and contractionary monetary policy (Kikwasi & Gladys, 2023). Expansionary monetary policy aims at increasing the aggregate demand through lowering interest rates, increasing credit and lending capacity of commercial banks, as a result consumption and investments increases and hence aggregate demand (Osisanwo et al., 2019). Contrary, contractionary monetary policy aims at reducing the aggregate demand and money supply through high interest rates making borrowing difficult. As the results, consumption and investment is reduced, further it reduces the aggregate demand (Osisanwo et al., 2019). To regulate money supply in the economy, Bank of Tanzania (BOT) uses tools such as Open Market Operation, Statutory Reserve Requirement, Discount Rates, Exchange Rate Regulation, Repurchase Agreement and Reverse Repurchase Agreement (BOT, 2023). However, the achievement in monetary policy depends on the country's economic situation, formal framework approved, choice and mix of the monetary tool used (Imoisi et al., 2013).

Balance of Payment (BoP) is one of important macroeconomic indicators for the health of the economy since it shows the extent of international trade (exports and import) that a country has (Adelegan et al., 2022). Basically, BoP is recorded in three accounts, which are current, capital and financial accounts (Kumar, 2021). According to World Bank World Development Indicators (WDI), Tanzania has experienced a current account balance of payment deficit over the years since 1976 (Mishra, 2017). Tanzania has made more payments to foreign nations than it has received. Thus, this brings about a deficit BoP which ultimately affects the economy, leading to shortages of foreign reserves, reduction on country production and inflationary pressure to the economy due to high imports from the other countries that might experience inflation (Kingia & Muba, 2021). Tanzania's government has made efforts to ensure that Balance of Payment is favorable; however, deficit Balance of Payment still uncertain (Mishra, 2017). For example, Structural Adjustment Program (SAP) with the International Monetary Fund (IMF) in 1986, Privatization Policy in the 1990s which ended in 1996, Integrated Industrial Development State 2025 (IID), and Sustainable Industrial Development Policy for Tanzania (SIDP 1996-2020) adopted in 1996 (Mishra, 2017). All these aimed at improving production through industries, adding value for agricultural products, encouraging export and reducing the country's dependency on imports from the rest of the world but it has not achieved any (United Nations, 2022). Most studies done in Tanzania only explain the factors that determine the balance of payment in a theoretical way but the exact short-run and long-run relationship between monetary variables and BoP is still questionable (Kingia & Muba, 2021; Mishra, 2017).

Monetary approach (MA) to BoP disequilibrium adjustment became popular in the early 1970s, as advocated by J.M Keynes. According to J.M Keynes, disequilibrium in the BoP is brought by disequilibrium in the money market (demand for and supply of money) (Osisanwo et al., 2019). When people demand more money than BOT can supply, excess demand for money

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will be offset by inflow of money from abroad. Conversely, when BOT supplies more money than the economy demands, excess supply of money will be offset by outflow of money to the abroad (Osisanwo et al., 2019). The devaluation of currency can only be viewed as the best policy when the money market cannot find its equilibrium level (Ca' Zorzi et al., 2022).

The objective of this study is to analyse the impact of monetary policy on the correction of BoP disequilibrium in Tanzania. Specifically, to determine how monetary policy variables affect the BoP of Tanzania, to determine whether monetary policy variables establish the long run relationship, and to determine whether BoP is a monetary problem or fiscal problem, as stated by researchers, like the empirical relationship between Balance of Payments (BoP). This will contribute to researchers, policymakers and government on the best way to employ monetary policy variables in fighting against BoP disequilibrium which has prevailed over the decades.

LITERATURE REVIEW

Theoretical Underpinnings

Elasticity Theory of (BoP)

This theory was developed by Bickerdike (1920) and later explored by Robinson (1947) aimed to determine how exchange rate changes affect trade account balances (exports and import in particular) (Khan, 2023). According to this theory, the total elasticity of demand for imports and exports should be much more than the absolute term for currency's devaluation so as BoP (Nimenibo et al., 2017). This has been criticized on the ground that it only considers the partial equilibrium analysis and violates the changes in other macroeconomic impacts that may cause devaluation of currency. For instance, price levels, savings and increased country productivity (Ngozi Victor, 2020).

Absorption Theory of BoP

This theory was officially integrated during the 1950s and further pioneered by Meade (1951) and Alexander (1952) (Osisanwo et al., 2019). It was aimed at investigating how devaluation can change the existing relationship between income (spending) in real and normal terms. Basically, Trade balance absorption is the function of domestic consumption and real output. This theory places much emphasis on the current account of BoP. Therefore, it was criticized on the fact that it completely ignored the capital account of BoP (Kamburawala, 2020).

Monetary Theory of BoP

Monetary theory of BoP adjustment was advocated by Polak (1957), Mundell (1968) and was later elongated by Frenkel and Johnson (1976) (Mundell, 1968). This theory believes that BoP is a purely monetary phenomenon, which means that there is a clear relationship between the country's BoP and money market (Mundell, 1968). It extends further that disequilibrium in the BoP will be restored through change on monetary variables like domestic credit to private sector which consequently will increase the foreign asset, and the process will continue until BoP reaches the state of balance (Kamburawala, 2020). This study rests on this theory since it is the framework through which BoP disequilibrium can be corrected by using the monetary variables (Khan, 2023). Johnson (1977) identified the superiority of monetary approach to BoP

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disequilibrium due to three reasons. Firstly, the BoP disequilibrium is a purely monetary phenomenon, and hence should be treated with the monetary models and not to build models with real sectors and then to integrate the monetary variables. Secondly, the stock adjustment process and stock imbalances conditions are the key factors in identifying monetary disequilibrium because money is a stock, and does not flow as postulated by Keynesian school of thought. Lastly, the domestic credit and foreign currency conversions into the domestic currency are the sources of money but may later affect BoP.

Empirical Review

Khan (2023) investigated the effect of real interest rates, inflation, exchange rates, and local credit on the balance of payments (BoP), as measured by net foreign assets (NFA) in 17 developing nations between 1982 and 2019. This study used granger causality test, unit root test, linear regression for data analysis. The study revealed that real GDP growth rate has a positive significant on BoP and the rest of the variables were negatively significant on affecting the BoP. Similarly, Nimenibo et al. (2017) inspected the relationship among monetary policy variables and BoP in Nigeria from 1980 to 2013. The study employed Augmented Dickey Fuller test and Johansen cointegration test for data analysis. This study revealed that there is a long-run relationship between BoP, interest rate, money supply and government expenditure; this appropriate monetary policy can solve the BoP disequilibrium.

In line with this, Osisanwo et al. (2019) examined the effects of monetary policy on BoP adjustment in Nigeria from 1980–2015. The study utilized the Autoregressive Distributed Lag (ARDL) model, Unit root test, and Bound test for cointegration for data analysis. The study shows the long-run association among monetary policy variables and BoP alteration. This study further showed that Money supply and Trade balance have a positive sustained connection with BoP. Furthermore, Kamburawala (2020) examined the monetary approach for BoP covering data from 1990 to 2018 in Sri Lanka using the data sourced from the Central Bank of Sri Lanka. The study employed a vector error correction model (VECM), Augmented Dickey Fuller (ADF), Johansen cointegration test, and Akaike Section Criterion for optimal lag length selection to analyze the data. The study revealed causality and significant long-run relationship between reserve asset (RA) and money supply (MA) on BoP of Sri Lanka.

Contrary, Mushendami et al. (2017) examined whether monetary policy to BoP holds in Namibia. This study utilized time series data running from quarter of 1991 toward the fourth quarter 2015. Further, the study used VECM, Granger causality test, and ADF test to analyse the data. The study revealed that domestic credit has a negative effect on Net Reserve Asset (NRA), and other variables such as interest rate, exchange rate, GDP, Consumer Price Index (CPI) were insignificant. The study showed that BoP adjustment cannot be achieved by monetary variables but the fiscal balance also can affect BoP. Similarly, Adhikari (2016) examined the recent effect of U.S monetary policy on Balance trade. The study used time series in US and BRICS running from 1995–2014. The study revealed that quantitative easing of money by the Fed has no effect on the balance of trade. Thus, BoP disequilibrium is not a monetary phenomenon. Additionally, Imoisi et al. (2013) explored the effectiveness of monetary policy on BoP determination in Nigeria using time series data running from 1980-1910. The study employed OLS of multiple regression to determine its effect. Further, the study employed all OLS assumptions test to analyze the data. The study indicated that exchange rate was not statistically significant, while money supply and discount rate had a substantial relationship with the BoP.

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Conversely, Ngozi Victor (2020) investigated the monetary approach to BoP as a relationship to foreign reserve assets (FRA) and money supply using the quarterly data from 2007Q1 to 2018Q4 in Ethiopia. The study employed Two Stage Least Squares (2SLS), Johansen Cointegration test to analyze the data. The study revealed that domestic credit is statistically significant and negatively affects the FRA, thus showing that BoP is a monetary circumstance. Correspondingly, Ghilous and Ziat (2021) studied the long-term association between domestic credit and NFA using a monetary approach to the BoP, a sample of five MENA countries chosen between 1980 and 2019, which include Jordan, Egypt, Algeria, Morocco, and Tunisia. This study used the Generalized Method of Moment (GMM) and difference Generalized Method of Moment (DGMM) with augmented mean group and common correlated effect mean group estimator to analyse the data. The study showed that domestic credit has a significant negative impact on net foreign assets in the long run.

Then as well, Tijani (2014) explored the application of monetary approach as adjustment mechanism to correct BoP disequilibrium in Nigeria. The study used data from 1970–2010. The study revealed that BoP is positively and significantly affected by trade balance, exchange rate, and domestic credit, while it is affected positively by gross domestic product (GDP) and inflation rate. Thus, the study showed that BoP disequilibrium can be corrected by using appropriate monetary policy.

METHODOLOGY

Data

The study employed time series secondary data sourced from Bank of Tanzania (BOT) and World Bank Development Indicator. The study covered a period of 42 years running from 1980 to 2022. The selection of this sample is due the unavailability of data for some variables under study for years beyond 1980.

Econometric Model

Regression analysis is the study of how independent variables influence the dependent variable (Sabado, 2023). The objective of regression analysis is to estimate the parameter of the existing relationship between variables (Kikwasi & Gladys, 2023). This study analyses five variables (Real Effective Exchange rate (REXR), Money Supply (MS), Consumer Price Index (CPI), Discount Rate (DR) and Domestic Credit to Private Sector (DCPS)) and one dependent variable which is Balance of Payment (BoP) proxied by Net Foreign Asset (NFA).

Econometric model can be written as:

$$NFAt = f(REXR, MS, CPI, DR, DCPS) \quad (1)$$

$$NFAt = \alpha_0 + \alpha_1 REXRt + \alpha_2 MSt + \alpha_3 CPIt + \alpha_4 DRt + \alpha_5 DCPSt + \mu_t \quad (2)$$

The ARDL approach to cointegration employs the variables and their corresponding lags and all variables are transformed into natural logarithms. Thus,

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$$\Delta lnNFA_t = \alpha_0 + \gamma_1 lnREXR_{t-1} + \gamma_2 lnMS_{t-1} + \gamma_3 lnCPI_{t-1} + \gamma_4 lnDR_{t-1} + \gamma_5 lnDSCP_{t-1} + \sum_{t=1}^{z} \theta_i \, \Delta lnNFA_{t-1} + \sum_{t=0}^{z} \varphi_i \, \Delta lnREXR_{t-1} + \sum_{t=0}^{z} \delta_i \, \Delta lnMS_{t-1} + \sum_{t=0}^{z} \omega_i \, \Delta lnCPI_{t-1} + \sum_{t=0}^{z} \vartheta_i \, \Delta lnDR_{t-1} + \sum_{t=0}^{z} \partial_i \, \Delta lnDCPS_{t-1} + \mu_t \quad (3)$$

where μt represents white noise errors, α_0 is the intercept, and γi is the long run variable

ARDL extends with the bound test, to determine if there exists a long-run relationship between variables.

H0: $\gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = \gamma_5 = 0$ against H1: $\gamma_1 \neq \gamma_2 \neq \gamma_3 \neq \gamma_4 \neq \gamma_5 \neq 0$

When the F-statistic surpasses the critical value, we can refute the statistical hypothesis that there is no long-term association between the variables. Conversely, If the F-statistic is less than the critical values, then we fail to refute the statistical hypothesis. Thus, if F-statistics sprays beneath an upper value critical bound, then the outcome is ambiguous. Following the results from the bound test, ARDL (zo, z1, z2, z3, z4, z5) long-run model is written as:

$$\Delta lnNFA_t = \alpha_0 + \gamma_1 lnREXR_{t-1} + \sum_{t=1}^{z} \gamma_2 \, lnMS_{t-1} + \sum_{t=1}^{z} \gamma_3 \, lnCPI_{t-1} + \sum_{t=1}^{z} \gamma_4 \, lnDR_{t-1} + \sum_{t=1}^{z} \gamma_5 \, lnDCPS_{t-1} + \cdots + \mu_t \quad \ldots. (4)$$

ARDL $(n, m1, m2, m3, m4, m5)$ involves the optimal selection lag using Akaike Information Criteria (AIC), and Schwartz Information Criteria (SIC). Thus, short-run dynamics is estimated by error correction mode (ECM). This is demonstrated as:

$$\Delta lnNFA_t = \alpha_0 + \sum_{t=0}^{z} \varphi_i \, \Delta lnREXR_{t-1} + \sum_{t=0}^{z} \delta_i \, \Delta lnMS_{t-1} + \sum_{t=0}^{z} \omega_i \, \Delta lnCPI_{t-1} + \sum_{t=0}^{z} \vartheta_i \, \Delta lnDR_{t-1} + \sum_{t=0}^{z} \partial_i \, \Delta lnDCPS_{t-1} + \mu_t \quad \ldots\ldots (5)$$

where μ_t is the error correction adjustment represent the coefficient of the ECM term.

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FINDINGS & DISCUSSIONS

Description of the Variables

This section provides an overview of the variables used in this study, specifying their definitions, measurements, source and expected signs, as indicated in Table 1.

Table 1: Description of the Variables

Variable	Measurement	Source	Expected sign
NFA	NFA measured (Current LCU) as proxy of Balance of Payment (BoP)	World Bank (WB)	NA
REXR	Real exchange rate (REXR) measured as the ratio of Tanzania shillings (TZS) to United State Dollar (USD)	Bank of Tanzania (BOT)	+/-
MS	Money supply (MS) is the extended money supply (M3) in USD	Bank of Tanzania (BOT)	+/-
CPI	Consumer Price Index (annual %) measured as a proxy of inflation rate.	International Financial Statistics (IFS)	+/-
DR	Discount Rate measure as interest rate for short term money market instruments (annual %)	Bank of Tanzania (BOT)	+/-
DCPS	Domestic Credit to Private Sector (% of GDP)	World Bank (WB)	+/-

Correlation Matrix

Table 2: Correlation Matrix Result

	LNNFA	LNREXR	LNMS	LNCPI	LNDR	LNDCSP
LNNFA	1.000000	0.2222807	0.750590	-0.737951	-0.743962	0.381111
LNREXR	0.222807	1.000000	0.275538	0.024837	0.034915	0.551372
LNMS	0.750590	0.275538	1.000000	-0.531311	-0.608203	0.743503
LNCPI	-0.737951	0.024837	-0.531311	1.000000	0.700946	-0.037277
LNDR	-0.743962	0.034915	-0.608203	0.7000946	1.000000	-0.151735
LNDCPS	0.381111	0.551372	0.743503	-0.037277	-0.151735	1.000000

Notes: *Correlation Matrix computed to identify and visualize patterns among variables.*

Table 2 shows that some variables are negatively correlated and others are positively correlated, and that correlation coefficient in all variables is less than 75%, suggesting that no multicollinearity among the explanatory variables.

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Descriptive Statistics

This section provides a summary of distribution and characteristics of the data set as shown in Table 3.

Table 3: Summary of Descriptive Statistics for Variables

	LNNFA	LNREXR	LNMS	LNCPI	LNDR	LNDCPS
Mean	12.31049	7.068485	9.956076	2.205172	2.624679	2.169839
Median	12.54306	7.074654	10.14335	1.965342	2.772589	2.424995
Maximum	13.11695	7.291912	11.88563	3.578695	4.188138	2.715263
Minimum	10.94683	6.844960	7.299495	1.190976	1.308333	1.078743
Std. Dev	0.683383	0.116302	0.357991	0.741434	0.625522	0.540528
Skewness	-0.579820	0.088446	-0.342575	0.467547	0.010644	-0.961237
Kurtosis	1.930489	2.412912	1.927846	1.870492	3.144551	2.447510
Jarque-Bera	3.525546	0.532613	2.293505	3.046102	0.030243	5.962699
Probability	0.171568	0.766204	0.317667	0.218046	0.964992	0.051724
Sum	418.5565	240.3285	338.5066	74.97586	89.23908	73.77452
Sum Sq. Dev	15.41139	0.446360	60.85664	18.14088	12.91217	9.641633
Observations	34	34	34	34	34	34

Table 3 shows the descriptive statistics results for 34 observations in each of the variables under study, running from 1989 to 2022. The standard deviations are 0.683383, 0.116302, 0.357991, 0.741434, 0.625522 and 0.540528 respectively for LNNFA, LNREXR, LNMS, LNCPI, LNDR and LNDPS respectively, which is less than 2 suggesting that data has a linear trend along their mean values. The skewness values for LNNFA, LNMS, and LNDCPS are -0.579820, -0.342575 and -0.961237 respectively, which are negatively skewed or left tailed, indicating that data are symmetric, as well as a significant value in the study with an extended tail. Conversely, LNREXR, LNCPI and LNDR are positively skewed or right tailed, indicating that the data are symmetric. Thus, the skewness rests from +1.96 to -1.96, which suggests that distribution of the data is normal. Jarque-Bera with probability values of 0.171568, 0.766204, 0.317667, 0.218046, 0.964992 and 0.051724 for LNNFA, LNREXR, LNMS, LNCPI, LNDR and LNDCPS respectively is greater than 5% level of significant. This shows that the dataset is normally distributed.

Test for Stationarity

Table 4: Summary of Unit Root Test Results

Augmented Dickey Fuller (ADF) Test				**Phillips-Perron (PP) Test**			
Variable	**t-statistic**	**5% critical value**	**Prob.**	**t-statistic**	**5% critical value**	**Prob.**	**Order of integration**
LNNFA	-4.5873**	-3.5684	0.0050	-7.4368**	-3.5578	0.0000	I (1)
LNREXR	-5.5464**	-3.5578	0.0004	-5.0548**	-2.9571	0.0003	I (1)
LNMS	-5.7915**	-3.5578	0.0002	-5.8022**	-3.5578	0.0002	I (1)

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LNCPI	-3.8610**	-3.5875	0.0284	-3.9964**	-3.5578	0.0213	I (0)
LNDR	-5.7281**	-3.5578	0.0003	-6.7317**	-3.5578	0.0000	I (1)
LNDCPS	-5.1834**	-3.5742	0.0012	-4.0326**	-3.5578	0.0093	I (1)

Note: *Unit root test performed by using ADF and PP test at 5% significant level: ** significant at 5% level*

The results of the test for unit root using the combined method of (PP) and (ADF) tests are summarized in Table 4. The results show that LNNF, LNREXR, LNMS, LNDR and LNDCPS are not stationary at level. However, at first difference, I (1) they are free from unit root problem, since the test statistics exceeds 5% critical value for both ADF test and PP test but LNCPI was stationary at level. Some variables are integrated in order I (1) and others in order I (0). This satisfies the conditions for the Autoregressive Distributed Lag (ARDL) model and ARDL-Bound test for cointegration technique of estimating temporary and sustained association among variables.

Optimum Lag Selection

Table 5: Lag Selection Criteria

Lag	LogL	LR	FPE	AIC	SIC	HQC
0	-73.21292	NA	5.69e-06	4.950808	5.225665	5.041939
1	75.01853	231.6116	5.34e-09	-2.063702	-0.139992*	-1.426967
2	130.7148	66.13936*	2.01e-09*	-3.294767*	0.278123	-2.110435*

Note: ** indicates the lag order selected by the criterion, LR: Sequential Modified test statistic (each test at 5%), Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC), Hanna-Quinn Criterion (HQC), Final prediction error (FPE)*

Table 5 shows the lag length result for the estimation of ARDL model; Lag 2 was selected by AIC criterion since it is small compared to others.

ARDL Bound Cointegration Test

Table 6: Cointegration Test Result

F-Bound Cointegration Test			**Null Hypothesis: No levels relationship**	
Test Statistic	**Value**	**Significance**	**I (0)**	**I (1)**
		Asymptotic: n=1000		
F-statistic	5.759919	10%	2.26	3.35
K	5	5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68

Note: *ARDL Bound Test for Cointegration at 1%, 2.5%, 5% and 10% levels of significance.*

Table 6 shows that F-Bound statistics is greater than the upper bound and the lower bound for all levels of significance, justifying that variables exhibit a long-run relationship and ECM can be estimated.

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Autoregressive Distributed Lag (ARDL) Model Results

Table 7: ARDL Short-run and Error Correction Model (ECM) for ARDL (2, 2, 2, 1, 2, 2)

Variable	Coefficient	Standard Errors	Test-statistic	Probability
C	2.493049	0.362135	6.884316	0.0000
D(LNNFA (-1))	-0.379441	0.150766	-2.516758	0.0237**
D(LNREXR)	-0.268858	0.184189	-1.459685	0.1650
D(LNREXR (-1))	0.471898	0.176494	2.673737	0.0173**
D(LNMS)	-0.204313	0.039056	-5.231326	0.0001***
D(LNMS(-1))	0.212258	0.035850	5.920720	0.0000***
D(LNCPI)	0.140851	0.061008	2.308744	0.0356**
D(LNDR)	-0.041313	0.037400	-1.104611	0.2867
D(LNDR(-1))	-0.153162	0.046349	-3.304511	0.0048**
D(LNDCPS)	0.223785	0.084817	2.638465	0.0186**
D(LNDCPS (-1))	-0.354500	0.089204	-3.974023	0.0012***
ECM(-1)*	-0.394881	0.058172	6.788177	0.0000***
R-Squared	0.874956	**Mean dependent var**		0.047272
Adj. R-Squared	0.806182	**S.D. dependent var**		0.161365
S.E of regression	0.071041	**Akaike info criterion**		-2.171134
Sum squared resid	0.100935	**Schwarz criterion**		-1.621483
Log likelihood	46.73814	**Hanna-Quinn criterion**		-1.988940
F-statistic	12.72214	**Durbin-Watson stat**		2.256601
Prob(F-statistic)	0.000001			

Note: ****, **, * indicates 1%, 5% and 10% significance level respectively.*

Table 7 shows that NFA depends on its previous lag period, 1% increase in NFA of previous year leads to 0.39 percent increase in current year NFA, and real exchange rate (RERX) affects NFA positively and significantly, which in turn also affects the BoP. That is appreciation of Tanzania's currency; it will increase the NFA and consequently increase the BoP of Tanzania. Money supply (MS) affects NFA negatively and significantly in the current time while it affects NFA and hence BoP positively for the previous lag time. This is due to the fact that injection of money (M3) in the economy does quickly affect the level output. Precisely, a 1% increase in money supply (M3) will increase NFA by 0.2122%, other factors being equal. Inflation rate (CPI) positively and significantly affects the NFA, one percent increase in the general price level brings about 0.140851 percent increase in NFA, which affects the current account, capital account and later BoP. This is true since moderate inflation encourages short-run production and exports. Discount rate (DR) negatively affects the NFA and the BoP. Thus, one percent increase in discount rate reduces NFA by 0.153%. This is not shocking since an increase in discount rate reduces the lending rate for commercial banks to the public as a result of retardment in investment, production and exports, which consequently affects the BoP. Domestic Credit to Private sector (DCPS) is positive and negative in its previous lag period to NFA. An 1% increase in DCPS increases NFA by 0.223% in the present year and lowers NFA by 0.355% in lagged time, other factors being equal. This result is in line with Osisanwo et al. (2019), Ngozi Victor (2020), Tijani (2014), Khan (2023), Sabado (2023), and Kingia and Muba (2021). The coefficient of ECM is negative and statistically significant at 1% significant level. This implicitly shows that short-run imbalances will be restored to its state of equilibrium in

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the long run by a rate of 40% every year. R^2 is 0.874956 showing that 88.5% variation in NFA can be explained by explanatory variables. High R^2 and probability of F-Statistics (p = 0.001) implies a good model fit.

Table 8: ARDL Long run Result, ARDL (2, 2, 2,1, 2, 2)

Variable	Coefficient	Standard Error	Test -statistic	Prob.
LNREXR	1.944216	0.787082	2.470157	0.0260**
LNMS	0.684311	0.208924	3.275408	0.0051**
LNCPI	-0.102981	-0.599851	-0.599851	0.5576
LNDR	-0.102974	-0.652763	-0.652763	0.5238
LNSCP	-0.724571	0.463244	-1.564122	0.1386

Note: ****, **, * shows significance level of 1%, 5% and 10% respectively*

Table 8 displays that Effective rate of Exchange Rate (REXR) and Money supply (MS) have a long-run and significant effect on Tanzania's NFA and BoP. Explicitly, a 1% increase in REXR brings about a 1.94% increase in NFA and BoP of a country. Similarly, a 1% increase in money supply (M3) will increase NFA and BoP of Tanzania by 0.68 percent in the long run. This suggests that BoP disequilibrium in Tanzania can be corrected through effective monetary policy, while other variables were statistically insignificant in influencing the BoP. This result is in line with Sabado (2023), and Kingia and Muba (2021).

Post-Estimation Diagnostic Test

Table 9: Diagnostic Test

Breusch-Godfrey Autocorrelation LM Test			
Null hypothesis: No serial Correlation			
F-statistic	2.067852	Prob. F (2,13)	0.1661
Obs*R-square	7.723204	Prob. Chi-Square (2)	0.2010
Heteroskedasticity Test: Breusch-Pagan-Godfrey			
Null hypothesis: Homoskedasticity			
F-statistic	0.814739	Pro. F (16, 15)	0.6563
Obs*R-squared	14.87905	Prob. Chi-Square (16)	0.5335
Scaled explained SS	4.087712	Prob. Chi-Square (16)	0.9987
Heteroskedasticity Test ARCH			
F-statistic	0.381975	Prob. F (1, 29)	0.5414
Obs*R-squared	0.403009	Pro. Chi-square (1)	0.5255
Jarque-Bera Test for Normality			
Test Statistic	1.307384	Probability of Chi-square (1)	0.5201

Table 9 displays that the probability of chi-square is 0.2010 for BG (Breusch Godfrey) LM test, which is greater than 5% level of significance, and justified that null hypothesis cannot be rejected, and hence, there is no serial correlation. Furthermore, BG test for heteroscedasticity and ACH test shows that residuals have constant variance (homoscedastic) since probability of

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observed R-square exceeds 5% level of significance. Probability of Jarque-Bera is 0.5201 which is less than 5% significance level, suggesting that error term is normally distributed

Model Stability Test

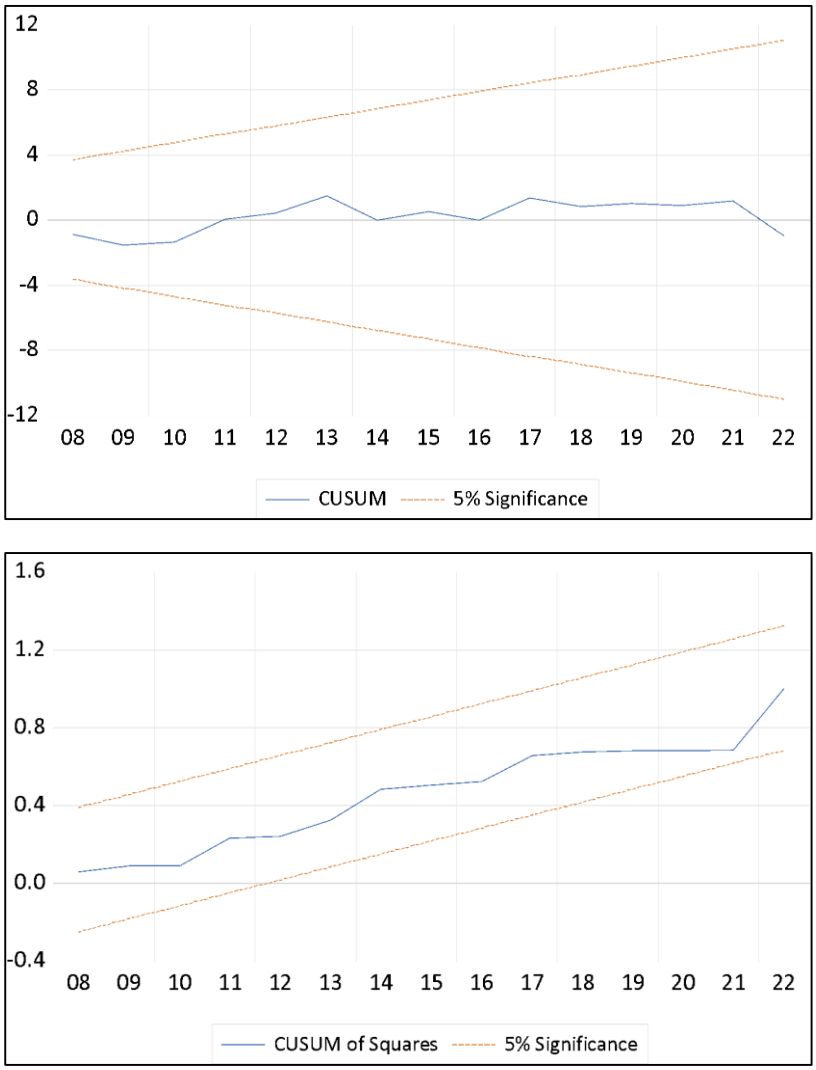

Figure 1: *CUSUM & CUSUM SQ at 5% significance Level*

The CUSUM and CUSUMSQ tests show that the model is stable in both short-run and long-run since they fall within the 5% critical bounds.

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CONCLUSION AND RECOMMENDATIONS

Conclusion

The quest of this study was to analyse how the monetary variables affect BoP disequilibrium adjustment in Tanzania. The study showed that money supply and real effective exchange rate have a long-run and positive impact on the BoP. Money supply (MS) affects NFA negatively and significantly in the current time while it affects NFA and hence BoP positively for the previous lag time. REXR affects positively the level of BoP in the short run, indicating that the appreciation of the currency motivates the international trade. Inflation rate (CPI) positively and significantly affects the NFA, Discount rate (DR) negatively affects the NFA and the BoP, Domestic Credit to Private sector (DCPS) is positive and negative in its lagged period to NFA. Nevertheless, basing on these results, it can be concluded that, among other things, monetary policy variables have a significant impact on Tanzania BoP adjustment mechanisms.

Recommendations

According to the findings of this study, it is recommended that policymakers and the government through Bank of Tanzania (BOT) should enact some contractions and expansionary monetary policies as per existing economic situations so as to improve the country's BoP and the international trade, which have been the quest over the decades. Since money supply and effective exchange rates have a significant long-run effect on correction of BoP disequilibrium, productive investments are essential for the development and alteration of an agriculture-based economy like Tanzania through easing of money and controlling exchange rates in order to enhance the international trade and hence ensure stability in the BoP. Finally, monetary authorities should provide short, medium, and long-term credit to these businesses. This will increase employment and income for various economic actors and have a knock-on effect on private savings and stable BoP.

AREAS OF FURTHER RESEARCH

The study on the analysis of monetary policy towards correction of balance of payment in Tanzania has assessed the monetary approach to balance of payment in Tanzania. Further research may be done on the fiscal approach to balance of payment and inclusion of other macroeconomic variables that affects the BoP of Tanzania.

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