Impact of Financial Liberalization on Economic Growth: An Empirical Evidence from Tanzania

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Abstract: *The current study analyzes the impact of financial liberalization on economic growth in Tanzania. It focuses on the inability to attain targeted economic growth. The study employed time-series data spanning from 1970 to 2017. The error correction mechanism was used for estimation. The study contributes to the literature by analyzing short- and long-run effects using financial liberalization index as a proxy of the financial reform in Tanzania. The study reveals that financial liberalization is positive and statistically significant, thus spurring economic growth in the long run, though in paucity of effect. Therefore, policymakers are advised to strengthen more effort on financial liberalization policies to attain the targeted growth level.*

1.0 Introduction

The focus on the performance of economy by majority of the economists and policy developers is a phenomena that cannot be overemphasized in most developed and developing countries (Igbinovia & Igbinovia, 2023; Wakyereza, 2017). This is because the growth of the economy of any particular state or region reflects not only the well-being of the people but also the reduction of poverty in a particular country (Hungu, 2023). Despite its importance, the targeted growth level that reflects the well-being of citizens, particularly in developing countries, has been critical to achieve. For instance, in the years between the 1960s and 1970s, many developing countries, especially in Latin America, Asia, and Sub-Saharan Africa (SSA), experienced small or negative percentage changes in economic growth (Mutambi, 2011). Poor economic growth occurred as a result of the adoption of the financial repression policy. This policy directed the governments of the developing countries to control the financial market prices by imposing interest rate ceilings, high reserve ratios, credit rationing, and mandatory holding of Treasury bills, among others Orji, Ogbuabor & Anthony-Orji, 2015). This scenario contributed to the inefficiency of the financial systems and further hindered the involvement of the private sector in engendering economic growth among the developing countries (Odhiambo, 2011; Patabendige & Senarath, 2014).

Later, in the years between the 1980s and 1990s, following the persistency economic crisis, most of the developing countries embarked on an Economic Reform Programmes (ERPs). Central to ERPs was financial liberalization. This is a policy that was emphasized by the

International Monetary Fund (IMF) as a call for the developing countries to lessen the financial repression policies for growth inducing (Kahsay, 2015). In short, financial liberalization is an exercise of removing restrictions on credit allocation, market interest rates, bank entry and ownership, and capital account (Adeel-Farooq, Bakar & Raji, 2017). In so doing, the financial sector become liberalized for enhancing economic growth (MacKinnon, 1973; Schumpeter, 1934).

Based on the embracement of financial liberalization, several achievements are evident, including an increase of players in the financial sector, an increase of commercial banks' lending to the private sector, and increased participation of the private sector in economic activities, among others (Ministry of Finance and Planning Planning, 2020; Mwakalobo, 2013). Despite the achievement, the majority of developing countries have not yet achieved a satisfactory level of economic growth (Belkacem, Abu Bekr, and Sarah, 2016; Ozekhome, 2022). In that respect, many scholars have shown their interest in working on the impact of financial liberalization on economic growth in developing countries. However, their empirical studies on the topic remain contentious (Belkacem et al., 2016). This means that some scholars confirm that financial liberalization stimulates economic growth, e.g., Chisimbili (2015) and Mwakalobo (2013). On the other hand, other scholars show evidence that financial liberalization causes no change or creates an economic crisis (Benallal, Senouci, & Bouri, 2016; Orji, Ogbuabor, et al., 2015).

The inconclusiveness of the findings is attributed to the fact that financial liberalization is measured differently by various scholars. In most cases, studies in this area have been using a single indicator (the interest rate) as a proxy for financial liberalization due to the unavailability of data. Moreover, some studies have employed proxies that belong to financial development rather than using financial liberalization policies to capture the reform (Naveed & Mahmood, 2017). Besides, other empirical studies on the topic employ cross-country regression analysis while ignoring differences among the countries, e.g., economic structure, size of their economies, economic development, and the way of mitigating monetary and fiscal policies (Bumann, Hermes & Lensink, 2013). Thus, the approach is criticized for not bringing out useful information specific to the particular country because of the combination of data (Kahsay, 2015). In that regard, it becomes clear that each country ought to be studied separately.

Tanzania is among the developing countries that are struggling for satisfactory economic growth. For instance, over the past two decades, it has been struggling to attain a growth rate of 8–10% in GDP. However, this growth level is yet to be achieved for the betterment and well-being of its citizens and poverty reduction (Ministry of Finance and Planning, 2020). Besides, several studies exist on the topic (Chisimbili, 2015; Kapaya, 2021; Maganya, 2018; Mutambi, 2011; Mwakalobo, 2013). As noted earlier, their findings lack common conclusions on the way financial reform has spurred the growth of the economy in Tanzania. Furthermore, none of these studies examined the impact of financial liberalization on Tanzania's economic growth. It is against this backdrop that the current study examines the impact of financial liberalization on economic growth in Tanzania. Specifically, the paper analyzes the long-run and short-run effects of financial liberalization on Tanzania's economic growth, focusing on the broader perspective of its financial policy reform. As such, the paper is structured into five sections

whereas, section two introduces theoretical and empirical review, section three involves the methods of the article, section four comprises on results and discussion of the paper while the last section furnishes conclusion and implications of the study.

2.0 Literature Review

Financial liberalization theory is prominent in addressing the impact of financial reform on the growth of the economy and therefore forms the theoretical framework of the study at hand (Adenutsi, 2014; Ahmed, 2016; Moyo & Le Roux, 2020). The theory was introduced by MacKinnon (1973) and Shaw (1973) while opposing the common practice ("financial repression hypothesis") that was in place, particularly in the developing countries between the 1960s and 1970s (Ahmed, 2016; Banam, 2010). This common practice was initially challenged by Goldsmith Goldsmith (1969) and later by McKinnon (1973) and Shaw (1973), who argued that the financial repression hypothesis promotes low savings, credit rationing, and low investment and, as a result, retards the growth of the economy. Indeed, the financial repression empowered governments to impose restrictive monetary policies on the financial system, such as interest rate ceilings, high reserve ratios, restrictions on credit allocations, and bank entry and capital flows, among other things (Ahmed, 2016; Banam, 2010). In this regard, the financial liberalization theory was employed to remove the repressive environment in the financial system to enhance the economic growth.

Ideally, the financial liberalization theory postulates the removal of government control and restrictions on financial markets so that prices and credit supply are determined by market forces to enhance economic growth (Ahmed, 2016). It was believed that implementation of financial liberalization would spur economic growth through increased saving, availability of bank credit to the private sector, and attraction of foreign financial resources for inducing private investment (Adenutsi, 2014; Orji, Anthony-Orji & Mba, 2015; Yakubu et al., 2020). Basically, interest rate ceilings, high reserve ratios, selective credit allocation, bank entry and ownership restrictions, restrictions on the security market, development, and weak prudential regulations in the financial market are examples of repressive policies that should be removed (Agbaeze & Onwuka, 2014; Naveed & Mahmood, 2017; Orji, Anthony-Orji, et al., 2015). Only the interest rate has been adopted by one scholar in the current study location for addressing credit allocation and investment efficiency (Mutambi, 2011). Therefore, the present study uses seven policies of financial liberalization to capture a wide range of reforms in examining the topic at hand.

On the empirical aspect, several studies that explain the reaction between financial liberalization and economic growth have been reviewed. Basically, the relationship between financial liberalization and economic growth has yet to produce empirical consensus among researchers. Theoretically, the relationship is ambiguous, and empirically motivates scholars to undertake researches. As such, scholars have come up with inconclusive findings (Bumann et al., 2012). For example, a study by (Orji, Ogbuabor, et al., 2015) in Nigeria investigated the impact of financial liberalization on economic growth for the years 1981–2012 and revealed a positive impact. The dependent variable in this study is real GDP, and the explanatory variables are the real lending rate, the real exchange rate, private investment, inflation, and the financial liberalization index. However, the real lending rate showed a negative effect on growth.

Obamuyi (2009) investigated the relationship between interest rate liberalization and economic growth in Nigeria using co-integration and error correction models on annual series data from 1970 to 2006. The study revealed a significant effect of real lending rates on economic growth in the long run in Nigeria. Actually, the findings of this study are consistent with the findings of (Okpara, 2010 and Sulaiman et al., 2012) in the same country, but they proxied financial liberalization with financial deepening (M2/GDP) and degree of openness.

Owusu and Odhiambo (2013) examined the same relationship using the autoregressive distributive lag-bounds testing approach for the data spanning from 1969 to 2008 in Nigeria. In this study, financial liberalization was represented by an index created by a principal component analysis (PCA). The study confirmed a long-run relationship between economic growth and financial liberalization. The study concluded that financial liberalization has spurred the growth of the economy in Nigeria in both the long and short run.

On the other hand, the study by Bumann et al. (2013) examined the relationship between financial liberalization and economic growth in 60 empirical studies using meta-analysis. The study found a weak effect of financial liberalization on growth. This implies that financial liberalization experienced a stronger negative effect on economic growth during the study period. The same outcome was achieved by Belkacem et al. (2016) in Algeria using annual time series from 1980–2013. This finding was attributed to the weakness of the country's banking liberalization and capital account. Likewise a study by Orji, Anthony-Orji, et al. (2015) found a negative relationship between the variables of interest in Nigeria whereby financial was proxied by credit to private sector. The study employed ordinary least square (OLS) to estimate time series data from 1986 to 2011. The findings suggest that credit might have been used in unproductive activities within the study period. In the same vein of examination, Yakubu et al. (2020) used quantile regression to investigate the effect of the financial liberalization by capital account and financial development on growth in Kenya using time series data spanning 1970-2016. It was found that the capital account and financial development were not growth-inducing in Kenya within the study period. This finding corroborates what was achieved by Mansour and Hassan (2021) in Egypt and Saudi Arabia using the ADRL approach with time series data spanning from 1970 to 2018 while proxying financial liberalization with four indicators: broad money supply; domestic bank credit to the private sector; monetary credit to the private sector; and inflows of foreign direct investments.

In Tanzania, only a few studies exist and focus on the relationship between financial development and economic growth. However, the studies did not examine economic growth from the financial liberalization policy point of view. For instance, studies by Kapaya (2021) and Maganya (2018) are notable. Kapaya (2021) investigated the relationship between financial development (in terms of liquidity, depth, and efficiency) and economic growth in Tanzania using an ARDL approach with a sample of time series data spanning from 1990–2017. Only financial depth was found to have a positive effect on economic growth. The study concluded that the financial reforms have not yet exerted the expected effect on the Tanzanian economy. The similar findings were attained by Maganya (2018) and Mwang'onda, Mwaseba, and Ngwilizi (2018), who indicated financial development in terms of M2, FDI, customer deposits in foreign and domestic banks and credit extended by foreign and domestic banks as a percent

of GDP. These studies employed the vector error correction model (VECM) and ARDL, respectively, to estimate the time series data. In particular, Maganya (2018) concluded that there is a need to strengthen regulatory and macroeconomic policies for sustainable financial sector development in Tanzania. To that end, it appears that the empirical evidence demonstrates contentious findings and conclusions regarding the relationship between financial liberalization and economic growth. Based on this scenario therefore, it prompts the importance of examining the short- and long-term effects of the relationship between financial liberalization and economic growth in the context of developing countries like Tanzania.

3.0 Methods

3.1 Data Sources and Types

The study at hand employs variables with annual time series data from 1970 to 2017. The data were collected from the Bank of Tanzania's (BoT) economic bulletins and the United Nations Conference on Trade and Development (UNCTAD). The variables under study include economic growth (which captures the amount of goods and services produced in the country at a particular time) as a dependent variable and the financial liberalization index as an independent variable constructed using principal component analysis (PCA). Moreover, access to finance (availability of bank credit to the private sector), private investment, private savings, and foreign direct investment were used as control variables on the relationship between the first two variables. The operationalization of variables in terms of measurement, definition, expected sign, and source is detailed in Table 1.

3.2 Analytical Framework

The current study adopts the MacKinnon-Shaw framework to convey a clear picture of the variables under the study objective (Ahmed, 2016). The MacKinnon Shaw framework stresses that the implementation of financial liberalization promises to spur economic growth through increased saving, access to finance, foreign financial resources, and private investment (Adenutsi, 2014; Orji, Anthony-Orji, & Mba, 2015; Yakubu et al., 2020). In this regard, the finance-growth economic model was established as shown below:

$$EG = f(FL, X) \qquad\qquad 1$$

Whereby: EG stand for economic growth, X denotes control variables to include access to finance (AF), private investment (PI), private savings (PS), and foreign direct investment (FDI). Econometrically, an economic model (1) is transformed into the following estimation regression equation:

$$EG_t = \pi_0 + \pi_1 EG_{t-1} + \pi_2 FL_t + \pi_3 AF_t + \pi_4 PI_t + \pi_5 PS_t + \pi_6 FDI_t + \varkappa_{1t} \qquad 2$$

Whereby: π_s represents the parameter to be estimated, $\varkappa_t$ is a stochastic or error term and t stands for time series data. The main concern in this model is the magnitude and direction of the financial liberalization index denoted by π_2, which ought to be positive and statistically significant. The regression equation 2 includes a lagged dependent variable in economic growth

so as to control its convergence (Sghaier & Abida, 2013). Based on the theoretical review, all parameters of economic activity are expected to be positive (Ikoera, Igbodika & Jessie, 2016).

3.3 Estimation Methods

Before embarking on the estimation process, significance tests, including descriptive and statistical analysis, the unit root, and co-integration, are important to ensure that variables are free from outliers, no unit roots, and have long-run relationships, respectively. Ultimately, non-spurious regression must also be confirmed (Montgomery, Jennings & Kulahci, 2015).

3.3.1 Descriptive and Correlation Analysis

For the significance of the data, descriptive and correlational analysis are important. Descriptive statistical analysis determines whether variables under regression are free of data outliers. Correlation analysis, on the other hand, verifies the relationship between variables, which must be less than 0.9 (Wooldridge, 2012).

3.3.2 Unit Root Test

This is an imperative test that scrutinizes the presence of a unit root in any time series variable. A time series variable with a unit root can be presented as follows:

$$y_t = \theta y_{t-1} + \varepsilon_t \qquad\qquad 3$$

Whereby: θ is equal to one to signify the presence of unit root, $\varepsilon_t \sim N\ (0, \delta^2)$.

The presence of a unit root implies that the time series' mean, variance, and covariance are not constant over time, hence it is non-stationary. If the variable has such properties, the findings are regarded as nonsense. To solve this problem, time series variables must be differentiated to become stationary (Montgomery et al., 2015). To attain stationary variables in this study, Augmented Dicker Fuller (ADF) and Phillips-Perron (P-P) tests were used under the following hypotheses: - Null hypothesis that **(H0)**: This variable contains a unit root; hence, it is non-stationary. Alternative hypothesis **(H1)**: This variable does not contain a unit root; hence, it is stationary. D**ecision rule:** Reject **Ho** when the ADF's statistical test is greater than Mackinnon's critical values (both in absolute terms) at the 1%, 5%, or 10% level of significance; otherwise, "do not reject" earns a favor.

3.3.4 Co-integration Analysis

This is a test that uses the residuals of the time series to prove that a combination of two or more variables has a long-term relationship. It also confirms that the regression is not spurious (Sibindi, 2016). As such, the current study is in line with past studies by Agbélénko and Kibet (2015) and Ahmed (2016), who employed the autoregressive distributed lag (ARDL) approach established by Pesaran and Shin (1999) and Pesaran, Smith, and Shin (2001). This approach was chosen because it outperforms the traditional approaches; the Engel-Grover approach and maximum likelihood, in detecting autocorrelation and endogeneity problems (Ahmed, 2016). According to Kripfganz and Schneider (2018), the model is presented as follows:

$$y_t = c_0 + c_1 t + \sum_{i=1}^{p} \emptyset_i y_{t-i} + \sum_{i=1}^{q} \beta'_i x_{t-i} + u_t \qquad 4$$

Where: p and q are optimal lag orders specified as $p \geq 1$, $q \geq 0$, y_t = dependent variable, c_0 = mean intercept, c_1 = the difference from the mean, x_{t-1} = explanatory variable(s) with lagged (past) values, y_{t-1}= stochastic explanatory variable, and u_t= a vector of the error terms. The model is executed under the null hypothesis: no co-integration (i.e. H_o: $\pi_1 = \pi_2 = ---- = \pi_n = 0$), against the alternative: co-integration exists (i.e. H_1: $\pi_1 \neq \pi_2 \neq ---- \neq \pi_n \neq 0$). **Decision rule**: Reject **H_o** when F-statistic value lies above the upper bound value irrespective of whether the variable is I (0) or I (1). Do not reject the **H_o** when F-statistic value falls below the lower bound of critical value. If the computed value falls inside the critical value bounds, the co-integration test proves inconclusive.

3.3.5 Estimation Process

The estimation of variables was executed by the Error Correction Mechanism (ECM) (Wooldridge, 2012). ECM is a model within an ARDL approach that corrects the disequilibrium that occurs due to loss of information during differencing of the time series data (Gujarati, 2004). The use of ECM assists in attaining short-run and long-run impacts from the regression equation (Aftab, Jebran, Ullah & Awais, 2016). The model often evidences the impact by giving a negative value to the adjustment coefficient of the error-correction term (ECT). Following a study by Nyasha (2014), the ECM model for the current paper is presented as follows:

$$\Delta EG_t = \theta_0 + \sum_{i=1}^{n} \theta_{1i} \Delta EG_{t-1} + \sum_{i=0}^{n} \theta_{2i} \Delta FL_{t-1} + \sum_{i=0}^{n} \theta_{3i} \Delta AF_{t-1} + \sum_{i=0}^{n} \theta_{4i} \Delta PI_{t-1}$$
$$+ \sum_{i=0}^{n} \theta_{5i} \Delta PS_{t-1} + \sum_{i=0}^{n} \theta_{6i} \Delta FDI_{t-1} + \gamma_1 ECT_{t-1}$$
$$+ U_t \qquad 5$$

Where: θ_0 is a constant; $\theta_1 - \theta_6$ and γ are respective coefficients; $ECT_{t-1}$is the error-correction term lagged once; U_t is a white noise; Δ is the difference operator; and n is the lag length.

4.0 Results and Discussion

4.1 Descriptive Statistics

The variables under the study were subjected to descriptive analysis to visualize the structure of the data (Table 2).

Table 2: Descriptive statistics results

Variables	EG	FL	AF	PI	PS	FDI
Observations	48	48	48	48	48	48
Mean	4.64	1.27	12.96	12.45	19.75	1.50
Stand. Dev.	2.33	1.30	4.46	6.37	5.09	1.71
Min.	-2.38	0.00	3.91	4.20	11.63	-0.09

Max.	8.41	2.62	18.98	26.60	31.38	5.60

Source: Author's computation based on data set

Where:
- EG — Economic growth
- FL — Financial liberalization
- AF — Access to finance
- PS — Private savings
- FDI — Foreign direct investment
- PI — Private investment

The highest mean value was 19.75 for private savings, while the low mean value of 1.27 is for the financial liberalization variable. Private investment appears to have a high standard deviation of 6.37, which signifies high volatility in investments, contrary to FDI, which has a minimum standard deviation of 1.71. The general picture of the results indicates that there is no outlier, meaning that no data deviates far from the others.

4.2 Associations of Variables

The variables under the study were subjected to correlation analysis to understand the association of variables (Table 3).

Table 3: Correlation results matrix

Variables	EG	FL	AF	PI	PS	FDI
EG	1.00					
FL	0.57	1.00				
AF	-0.28	-0.71	1.00			
PI	0.45	0.68	-0.11	1.00		
PS	-0.41	-0.31	0.42	-0.16	1.00	
FDI	0.55	0.86	-0.51	0.61	-0.20	1.00

Source: Author's computation based on data set

The results confirm that there is no pair of variables with a correlation value equal to or above 0.90. Such a result implies the presence of high collinearity among the variables, which often ends with biased results (Wooldridge, 2012). As such, the results in Tables 2 and 3 confirm that all variables under study are plausible for further steps of analysis.

4.2 Unit Root Test Results

Based on ADF and P-P tests, the variables under consideration were run for the unit root test under Schwartz-Bayesian Information Criteria (SBIC), which is parsimonious as compared to others like Akaike Information Criteria (AIC) (Nyasha, 2014) (Table 4).

The unit root test results reveal that all variables are stationary at the first difference (order one (I (1))), except economic growth, which became stationary at level (order zero (I (0))). The stationarity was confirmed by test statistic values, which are greater than the upper critical values in absolute terms in both ADF and P-P tests at the 1% level of significance. Thus, the

findings provide evidence for rejecting the null hypothesis and conclude that the variables have no unit root. This action is supported by the argument of rejecting the null hypothesis as Montgomery et al. (2015) recommend.

Table 4: Summary of unit root tests results

Variable	At level $I(0)$		At first difference $I(1)$		At level $I(0)$		At first difference $I(1)$	
	Test Statistics	Lags	Test Statistics	Lags	Test Statistics	Lags	Test Statistics	Lags
EG	-1.243 (0.655)	3	-5.594* (0.000)	2	-3.354** (0.013)	3	-10.971* (0.000)	2
FL	-0.133 (0.702)	2	-3.076** (0.028)	1	-0.763 (0.830)	2	-3.564** (0.007)	1
AF	-1.727 (0.418)	1	-5.762* (0.000)	0	-1.580 (0.494)	1	-5.762* (0.000)	0
PI	-0.751 (0.833)	1	-5.498* (0.000)	0	-0.528 (0.886)	1	-5.498* (0.000)	0
PS	-2.349 (0.157)	2	-5.088* (0.000)	0	-1.943 (0.312)	2	-5.088* (0.000)	0
FDI	-1.106 (0.713)	3	-4.337* (0.000)	2	-2.186 (0.211)	3	-14.578* (0.000)	2

*, ** Denote 1% and 5% levels of significance respectively

Source: Author's computation based on data set

4.3 Co-integration Test results

After determining the order of integration, the co-integration test was employed using the ARDL approach. The model was adopted as variables under study contain mixed order of integration (Benarbia & Aiboud, 2023). The dependent variable was in difference form, as required by the ARDL model, while the covariates were in level form to attain robust results than when they were in contemporaneous form (Banam, 2010). Referring to Pesaran et al. (2001), an optimal lag of 4 was chosen under AIC in Stata 15. As such, the economic growth variable was regressed against the explanatory variables. Thus, the results are tabulated in Table 5.

Table 5: ARDL Bounds Test results

Model	F-Statistics	t-Statistics	Co-integration?
ΔEG (ΔEG; FL, AF, PI, PS, FDI)	11.488*	8.264*	Yes
Critical values (Lower vs Upper):	(3.41, 4.68)	(3.43, 4.79)	

*Denotes 1% level of significance; Δ Is a difference operator

Source: Owner's estimation based on data set

Referring to Table 5, are the bound test results. Basically, the results show that the variables under consideration are co-integrated based on F and t statistics values. This is because the F-

statistic 11.488 is greater than its upper critical value 4.68, whereas the t-statistic 8.096 is greater than upper critical value 4.79, both at 99% confidence. This implies that the findings are statistically significant at the 1% level, suggesting the rejection of the null hypothesis and concluding the existence of co-integration among the variables. In fact, the decision falls in vein with that of Benarbia and Aiboud (2023).

4.4 Short-run and Long-run Estimates of Growth Equation

After all the confirmatory tests that justified the final step to be executed, the parameters as per equation 5 were estimated using ECM. The economic growth variable (EG) was regressed on its covariates (financial liberalization, access to finance, private investment, private savings, and foreign direct investment) all in differenced form under ARDL (3, 0, 2, 2, 0, 0) with an optimal lag-length of 4 based on AIC. The ARDL (3, 0, 2, 2, 0, 0) are the lags under the regression equation 5. Thus, the short-run and long-run estimates of the variables are tabulated in Table 6.

Moreover, the results in Table 6 explicitly tabulates the findings of the ECT -2.581 (p = 0.000). The negative coefficient of ECT is negative and statistically significant at the 1% level.

Table 6: Short-run and long-run estimates

Long-Run Results: Dependent Variable is ΔEG				
Regressor	Co-efficient	Standard error	T-Ratio	Probability
Constant	1.197	0.272	0.72	0.475
ΔFL	1.673**	0.808	2.07	0.047
ΔAF	0.411*	0.148	2.78	0.009
ΔPI	-0.246*	0.095	-2.59	0.015
ΔPS	-0.138*	0.044	-3.17	0.003
ΔFDI	0.033	0.084	0.39	0.698
Short-Run Results: Dependent Variable is ΔEG				
ΔAF	-0.785*	0.230	-3.42	0.002
ΔPI	0.692*	0.199	3.48	0.002
ECT (-1)	-2.581*	0.398	-6.49	0.000
R-squared	0.851			
F-statistic	3.300*			0.004
Dw-Statistic	1.811			
Akaike Inf. Criteria	18.750*			0.000
Optimal Lag AIC	4			

*, ** Denote 1% and 5% levels of significance respectively
Source: Author's estimation based on data set

Key: ECT   Error correction term   AIC   Akaike information criteria

The results confirm not only the stability of the regression model but also existence of the long run relationship among the variables of interest as Rahman and Shahbaz (2013) justify. Furthermore, Narayan and Smyth (2006) advocate that when the value of ECT is less -1, implies that ECT is not directly converging monotonically to its equilibrium route rather fluctuates closer to long run value in a declining manner. And, once the process finishes, it converges rapidly to its equilibrium path. Another important confirmatory result is that of Durbin-Watson (DW) which is higher than the coefficient of determination ($R^2 = 0.851 < DW = 1.811$).

This value of DW not only confirms the existence of co-integration but also the absence of spurious regression among variables as Musamali and Kipkirong (2013) posit. Moreover, the output of coefficient of determination ($R^2 = 0.851$) is better and indicates the variations in the dependent variable due to the combined effect of changes of regressors in Tanzania. This denotes a high acceptable proportion explained by the explanatory variables in growth trends in Tanzania.

The Table also displays an F-statistic value of 3.300 (p = 0.004) at the 1% level of significance. This proves the robustness of covariate findings in explaining the dependent variable. On the other hand, the Durbin-Watson value (DW = 1.811), which is closer to 2, indicates that there is no autocorrelation in the model. In that regard, the estimated results are proved validity for discussion.

According to the findings in Table 6, all covariates except foreign direct investment were found to be statistically significant in the long run, albeit in different directions and at different levels of significance. For instance, financial liberalization and access to finance found positive and statistically significant affecting economic growth, as evidenced by 1.673 (p = 0.047) and 0.411 (p = 0.009) at 5% and 1% significance levels respectively. Furthermore, private savings and investment were found negative affecting the economic growth in the long run, as evidenced by -0.246 (p = 0.015) and -0.138 (p = 0.003), both at the 1% significance level.

This antagonistic effect of the predictors on growth in the long run might suggest weak economic growth in Tanzania. On the other hand, only access to finance and private investment revealed statistical significance at the 1% level in the short run, however, in opposite directions as evidenced by coefficients -0.785 (p = 0.002) and 0.692 (p = 0.002) respectively. The results depict that Tanzania experienced a J-curve effect on economic growth, as access to finance produced unexpected findings. Although not explained earlier in this study, Manwa and Wijeweera (2016) note that, this is the situation where a variable has an insignificant or negative effect in the short run and a positive effect in the long run. In this respect, this finding might suggest that the financial sector in Tanzania experiences hurdles within a short period of time in streamlining credit funds to the private sector's activities for growth induction. In all those explanations, the findings answer the null hypothesis that there is only a long-run effect of financial liberalization on economic growth in Tanzania.

With regard to the specific objective, Table 6 tabulates that the effect of financial liberalization on economic growth in Tanzania is positive and statistically significant at the 5% level, as

evidenced by the coefficient of 1.673 (p = 0.047), but only in the long run. This implies that a one-percentage-point change in financial liberalization leads to a 1.67-percentage-point increase in economic growth in the country in the long run. This could further mean that an adjustment in one policy of financial liberalization has a chance of spurring real economic growth by 1.67 percent in the long. In general, this result implies that, in the long run, financial liberalization boosts Tanzanian economic growth under the study period, albeit in a single-digit of magnitude.

The result also indicates that there is a significant decrease in interest rates on deposits and opened accounts, an increase in bank competition, and a reduction in the cost of debt in the financial markets following the implementation of financial liberalization. Basically, the result is in line with economic growth studies by Bumann et al. (2012), Naveed and Mahamood (2017), Orji et al. (2015) and Ozekhome (2020). In so doing, the finding lends support the financial liberalization theory, which postulates that the reform of the financial sector promotes the growth of the economy. However, the finding negates studies by Balkacem et al. (2016), Bumann et al. (2013), Kapaya (2020), and Mwang'onda (2018), who revealed negative or no impact on economic growth following the implementation of financial liberalization in Algeria and Tanzania. As a result of this empirical evidence, the null hypothesis was rejected, and the study concludes that the financial liberalization implemented in Tanzania exerts a positive long-run effect on economic growth.

4.5 Diagnostic Test Results

As an important aspect of this paper, diagnostic tests were performed to confirm the validity of the findings obtained from the analysis. In line to the findings of Manyeki and Kotosz (2017), the results in Table 7 indicate that all the diagnostic tests pass well because their p–values are greater than 0.05. In other words, the results tell us that the model does not suffer from serial correlation or heteroscedasticity, the data are normally distributed as proved by the Shapiro-Wilk test, the model is well specified based on Ramsey results and the mean of variance inflation factor (VIF) 1.820 which less than ten indicates lack of multicollinearity among variable. Likewise, the parameter stability/structural break test indicates that there is no change in the slope coefficients in two sample periods from the financial reform point in 1993. Thus, the null hypothesis of no structural break was not rejected as the computed F value was less than the critical value. This signifies that the structural change captured by ECM is due to financial liberalization only.

Table 7: Diagnostic test results

Type of Test	Chi2 Statistic	Probability
Breusch-Godfrey Serial Correlation Test	1.678	0.7946
White Heteroscedasticity Test	43.000	0.4282
Shapiro-Wilk W Test	1.632	0.1503
Ramsey RESET Test (log likelihood ratio)	2.090	0.1256
Mean Vif	1.820	
	Computed F Value	**Critical F Value**
Parameter Stability Test (Chow Test)	0.949	2.500

Source: Author's estimation based on data set

5.0 Conclusion and Policy Implications

The study examined the impact of financial liberalization on economic growth in Tanzania. The study utilized time series data spanning from 1970 to 2017 using the ECM in the ARDL model for estimation. Specifically, the study analyzed the short-run and long-run effects of financial liberalization on economic growth in Tanzania. This study was underpinned by the idea that the financial liberalization based on its policies has no impact on the Tanzanian economy. In that aspect, economic growth as a dependent variable was regressed on financial liberalization as an explanatory variable coupled with other control covariates. These control variables included access to finance, private investment and savings, and foreign direct investment. Contrary to previous studies, the empirical evidence from the analysis proved that financial liberalization is positive and statistically significant, thus spurring economic growth in Tanzania in the long run, though with a relatively small magnitude of effect. Therefore, the study concluded that financial liberalization has a long-run effect on economic growth in Tanzania. As a result, policymakers are advised to put more effort on implementing financial liberalization policies in order to propel Tanzania's economic growth to the desired trajectory level.

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Appendices

Appendix1: Operationalization of variables under study

S/n	Variable (Symbol)	Measurement and Definition (Sign)	Source of Data
1	Economic growth (EG)	Captured in annual growth rate as % change in real GDP.	UNCTAD
2	Financial Liberalization (FL)	Measured through a constructed index. The index was constructed using PCA for the data spanning from 1970 to 2017. The index comprises seven policy instruments (Interest Rates (INTR) - covering both lending and deposits rates, Reserve Requirement (RER) - a threshold of 20% which indicates how high reserve requirements are, Credit allocation (CAL)-whether credit is directed/subsidized to a favoured sector or not, Bank Ownership (BON) - referring to share in the banking assets as whether state or private sector owned, Pro-competitive measures (PRC) - restrictions by government of entry of new domestic or foreign banks, Prudential Regulation (PRR), and Openness of Capital Account (OPA) - captures the exchange rate deregulation). (Positive/Negative)	Odhiambo (2012) and Balele et al. (2018)
3	Access to Finance (AF)	It refers to funds fuelled to private sector by commercial banks as loans, trade credit, and other claims for reimbursement. Captured in bank credit to private sector as % of GDP.	BoT
4	Private Investment (PI)	This involves land developments, machinery, plant and equipment procurement, and construction of roads, railways, hospitals, schools, office, private residential dwelling, and commercial and industrial buildings. Captured in gross fixed capital formation as % of GDP. (Positive)	NBS
5	Private Savings (PS)	These are savings of households and corporates served into commercial banks. Measured in private savings as % of GDP (Positive)	BoT
6	Foreign Direct Investment (FDI)	This is the business foreign capital inflows in the host country with a least 10% stock management control. Measured in FDI inflows as % of GDP. (Positive/Negative)	UNCTAD

Source: Dinh et al. (2019); Herwartz and Walle (2014); Komal and Abbas (2015); Nwanne (2014)

Appendix 2: Optimal lag for the estimates

Lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-422.350		36	0.000	29.090	20.398	20.489*	20.649*
1	-382.128	80.444	36	0.000	24.243	20.197	20.834	21.934
2	-341.288	81.679	36	0.000	21.430	19.966	21.149	23.193
3	-304.985	72.607	36	0.000	28.449	19.952	21.680	24.668
4	-243.749	122.47*	36	0.000	16.588*	18.750*	21.025	24.956

Appendix 3: Data set for Financial Liberalization Index

Years	LNDR	DEPR	INTR	RER	CAL	BON	PRC	PRR	OPA	FL
1970	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0.33	0	0
1992	0	0	0	0	0	0	0	0.33	0.5	0
1993	0.33	0.5	0	0.33	0.33	0	0	0.33	0.66	0
1994	0.66	1	0.9793838	0.66	0.66	0	0	0.66	0.66	1.154286
1995	0.66	1	0.9793838	0.66	0.66	1	0	0.66	0.66	1.898322
1996	1	1	0.9793838	0.66	0.66	1	0.5	0.66	0.66	2.622434
1997	1	1	0.9793838	0.66	0.66	1	0.5	0.66	0.66	2.622434

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Years	LNDR	DEPR	INTR	RER	CAL	BON	PRC	PRR	OPA	FL
1998	1	1	0.9793838	0.66	0.66	1	0.5	0.66	0.66	2.622434
1999	1	1	0.9793838	0.66	0.66	1	0.5	0.66	0.66	2.622434
2000	1	1	0.9793838	0.66	0.66	1	0.5	0.66	0.66	2.622434
2001	1	1	0.9793838	0.66	0.66	1	0.5	0.66	0.66	2.622434
2002	1	1	0.9793838	0.66	0.66	1	0.5	0.66	0.66	2.622434
2003	1	1	0.9793838	0.66	0.66	1	0.5	0.66	0.66	2.622434
2004	1	1	0.9793838	0.66	0.66	1	0.5	0.66	0.66	2.622434
2005	1	1	0.9793838	0.66	0.66	1	0.5	0.66	0.66	2.622434
2006	1	1	0.9793838	0.66	0.66	1	0.5	0.66	0.66	2.622434
2007	1	1	0.9793838	0.66	0.66	1	0.5	0.66	0.66	2.622434
2008	1	1	0.9793838	0.66	0.66	1	0.5	0.66	0.66	2.622434
2009	1	1	0.9793838	0.66	0.66	1	0.5	0.66	0.66	2.622434
2010	1	1	0.9793838	0.66	0.66	1	0.5	0.66	0.66	2.622434
2011	1	1	0.9793838	0.66	0.66	1	0.5	0.66	0.66	2.622434
2012	1	1	0.9793838	0.66	0.66	1	0.5	0.66	0.66	2.622434
2013	1	1	0.9793838	0.66	0.66	1	0.5	0.66	0.66	2.622434
2014	1	1	0.9793838	0.66	0.66	1	0.5	0.66	0.66	2.622434
2015	1	1	0.9793838	0.66	0.66	1	0.5	0.66	0.66	2.622434
2016	1	1	0.9793838	0.66	0.66	1	0.5	0.66	0.66	2.622434
2017	1	1	0.9793838	0.66	0.66	1	0.5	0.66	0.66	2.622434

Source: Balele et al. (2018) and Odhiambo (2012)