The effect of bank lending rates on economic growth in Tanzania from 1990 to 2022

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Abstract

This study investigates the effect of bank lending rates on economic growth in Tanzania from 1990 to 2022 using secondary time series data and the Vector Error Correction Model (VECM). The objectives include quantifying the relationship between bank lending rates and economic growth, assessing the impact of foreign direct investment (FDI) on economic growth, and determining the influence of inflation and exchange rates on economic growth. Data were sourced from the Bank of Tanzania (BOT) and World Bank (WB). The Johansen co-integration test confirmed long-run relationships among variables, and Augmented Dickey-Fuller (ADF) tests showed all variables were stationary at order I(1). Results indicate a 59 percent annual adjustment speed towards long-run equilibrium. Short-run analysis revealed that FDI and inflation have an insignificant negative impact on GDP, while bank lending rates and exchange rates have an insignificant positive impact. In the long run, bank lending rates and inflation significantly negatively impact GDP, while FDI has a significant positive impact, and exchange rates have an insignificant negative effect. Lowering bank lending rates will boost borrowing and investment. Measures to control inflation by regulating input costs and managing aggregate demand through monetary policy should be pursued.

Keyword: Economic growth, bank lending rates, foreign direct investment, inflation, exchange rates.

JEL Code: O4, E43, F21, E31, F31

1.0 Introduction

The availability of bank loans is a critical factor in policy formulation due to its effect on the cost of borrowing funds, availability of credit and the capacity employment of the borrowed funds for economic activities. Low rates of loans encourage people and firms to borrow money, invest and expand the economy; conversely, high rates may reduce the level of spending by consumers, the growth of businesses and economic activity generally. This relationship is evident everywhere in the world as central banks pursue interest rate policies as one of the tools for curbing inflation while at the same time promoting growth. For example, in the US, as well as in the EU, when the 2008 crisis erupted or before and after the COVID-19 Pandemic when economies were being suppressed, low interest rates were used to diffuse the economies by improving investments and the flow of credit (IMF, 2021). In fact, it has also been historically evidenced that since the Industrial Revolution, the lending rates have been critical factors, in that low rate, encouraged industrial output as well as technological advancement (Kalu, 2009).

Emerging as well as developing countries are more affected by the impact of bank lending rates whereby affordability of borrowing which is easily available in case of low rates restricts the

economic potential. In Africa, in particular, the sub-Saharan region, high lending costs, deficient credit supply and scant financial literacy are obstacles to economic growth. As noted in the study, lower lending rates will allow enhanced investments by the private sector and growth of businesses as well as creation of jobs which are key for growth of the economy in a sustained manner (AfDB, 2021). In East Africa, SMEs and agriculture, which rely heavily on access to affordable credit, are unable to access such finance, thus hindering growth in the region (IMF, 2021).

The transformation of the banking sector in Tanzania started from independence when it was dominated by foreign banks, then moved to the nationalization of banks as dictated by the Arusha Declaration of 1967. The 1990s saw reforms to the economy, opening up the banking industry through the privatization of state banks and competitive interest rates in the loans market (Ndanshau, 1996). There is still, however, the problem of high lending rates, which in turn constrains the development of the off-take economy including SMEs. High borrowing costs also acts as a deterrent to foreign direct investment, which could develop infrastructure and spur growth within the country (UNCTAD, 2021). As a response to the problems, Tanzania has adopted restructuring measures meant to encourage stability and low lending rates, as well as to improve credit. It has placed an emphasis on interest rate cuts and expansionary policies, particularly targeting agriculture and industry during the administration of President Samia Suluhu Hassan (Bank of Tanzania, 2021). However, the inflationary environment and instability in the macro economy affects the ability to hold out reasonable sustainable interest rates. Despite some advancements, difficulties still persist in establishing a setting that encourages easily accessible credit and sustained economic growth (IMF, 2022).

2.0 Literature Review

Loanable fund theory, proposed by Knut Wicksell in 1898, states that interest rates are determined by the supply and demand for loanable funds. Interest rates rise when demand exceeds supply and fall when supply exceeds demand (Wicksell, 1898). Economists like Hayek and Friedman supported this theory, using it to explain the role of savings and investment in economic development (Hayek, 2008). However, critics like Keynes argued it oversimplifies the financial system by ignoring liquidity preferences and the role of money (Keynes, 1936; Krugman, 1999). Credit creation theory which was introduced by Henry Dunning Macleod, argues that banks create money through lending, generating new deposits and increasing the money supply (Macleod, 1866). Schumpeter and Minsky expanded on this by highlighting the role of banks in funding innovation and creating economic booms or busts (Schumpeter,1934; Minsky, 1986). However, monetarists like Friedman argue that central banks control the money supply, limiting the influence of banks on credit creation (Friedman, 1995). The Keynes' liquidity preference theory proposed that interest rates are determined by the demand for money and the money supply, rather than by savings and investment (Keynes, 1936). Economists like Tobin and Krugman supported this view, explaining how liquidity preferences and economic conditions impact interest rates and investment (Tobin, 1958; Krugman, 1999). Critics, including Friedman, argue that central banks control interest rates through the money supply, not liquidity preferences (Friedman, 1968). Despite this, the theory remains important for understanding how money demand and central bank policies affect interest rates and economic activity.

Studies like Isa, et al. (2019) studied the factors affecting commercial bank lending in Malaysia from 2009 to 2018, finding that deposit volume, liquidity, and bank size significantly influenced lending practices post-2007/2008 global financial crisis. They found that higher deposits and non-performing loans negatively impacted loan issuance, while the rate of bank failures and bank size had a positive effect on lending. These findings provide valuable insights for banks, the Central Bank of Malaysia (BNM), investors, and businesses in formulating informed policies. Similarly, Adzis, et al. (2018) explored lending factors among Malaysian commercial banks, identifying that long-term creditworthiness, GDP growth, and bank size influenced lending ability, while liquidity showed no significant relationship with lending.

Umaru, et al., (2018) estimated the effect of exchange rate volatility on the economic growth of West African English-speaking countries within the period of 1980 to 2017. The study also

employed the ordinary least squares, fixed effect, and random effect as an estimation technique. The data was sourced from the World Bank. Their results revealed that the exchange rate was statistically significant and inversely related to the economic growth of the West African English-speaking countries. Barguellil, et al. (2018) examined the impact of exchange rate volatility on the economic growth of 45 developing and emerging countries. The data used was panel data over the period 1985 to 2015. The results from the study showed that nominal and real exchange rate volatility had a negative and significant effect on economic growth. Kharusi & Ada (2018) analyzed external debt and economic growth nexus in Oman. The time series data employed for the study covered the period 1990 to 2015 and was sourced from the World Bank and the Central Bank of Oman. After estimating the short-run and the long-run results using the ARDL model, the result revealed that external debt exerted a negative and significant effect on the economic growth of Oman. Cavallo et al. (2024) examined how shocks to lending standards affect economic growth using U.S. data. The findings revealed that tighter lending standards significantly reduce GDP when the economy is under-performing, with monetary policy playing a role in mitigating these effects through adjustments in interest rates. The study underscores the macroeconomic importance of bank credit supply during economic downturns.

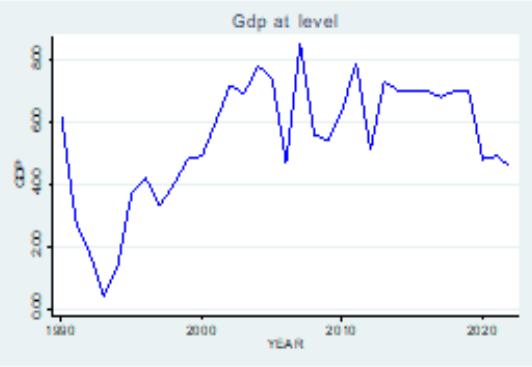
3.0 Research Methodology

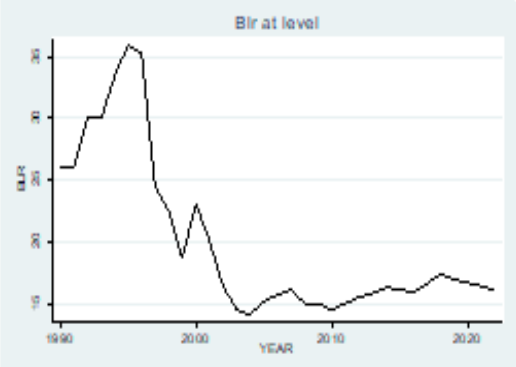
The study relied on yearly time series data spanning 1990 to 2022. Data on Gross Domestic Product (GDP) and bank lending rate were obtained from the Bank of Tanzania database. However, data on Foreign Direct investment, inflation, and exchange rate were obtained from world development indicators of the World Bank (2019) database. Detailed description of all the variables is shown in Table 1.

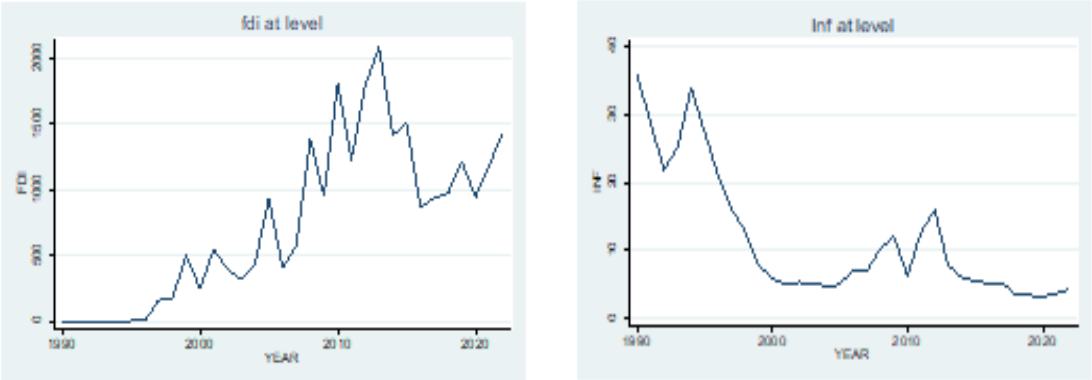
Table 1: Brief description of variables

Variables	Measurement	Expected sign
Economic Growth	Percentage change in GDP	
Bank lending rates	Rate of interest charged by banks on loans	Negative
Foreign Direct investment	Total investment from foreign entities (in USD or local currency)	Positive
Exchange rates	Exchange rate (LCU per US$ per period average)	Positive
Inflation	Consumer Price Index	Negative

The variables used in the current study have been described in terms of trend analysis. The graphical analysis of the variables sheds light on the nature of variables under consideration. This is sometimes referred to as informal unit root analysis because it can virtually tell whether the variable is trending or not trending.







Source: Bank of Tanzania (2022); World Bank (2019)

Figure 1. Graphical Analysis of Variables used in the Study

On the top right corner of the figure, we observe GDP literally trending upward with time. This was expected since the study used the nominal GDP which works with current price. Since the general price level tend to increase every year, the nominal GDP must on average be trending upwards. Foreign direct investment has also taken the similar trend like nominal GDP. However, the country attracted more foreign direct investment from 2005 to 2015. This was in the third political regime of our economy. From 2010 to 2015 (Waryoba, 2018), the country embarked on 2010-2015 industrial development plan which must have attracted more foreign direct investment than any other period as seen in the figure.

The study has made a determination of which independent variables should be included in or excluded from a regression equation. In general, the specification of a regression model should be based primarily on theoretical considerations. We expect gross domestic product (measuring economic growth) to depend on lending rate and other relevant variables (Nasir et al., 2014). The bank lending rate affects money supply negatively. That means low interest rate makes more cash balance preference in the economy. When people refer to hold more money, the general price level soars thereby negatively affecting economic growth. The detailed interaction between money supply and inflation is found in Waryoba (2023) which analyzed the Fisher's equation of exchange. Therefore, the bank lending rate has both a direct and indirect effect on economic growth. That is, through its influence on money supply which directly influence inflation rate in the economy. The inflation rate also affects economic growth as expressed in the model. The functional form of the model is specified in equation (1) below.

$$GDP = f(BLR, FDI, INF, EXR) \quad (1)$$

$$\ln(GDP)_t = \beta_0 + \beta_1 \ln(BLR)_t + \beta_2 \ln(FDI)_t + \beta_3 \ln(INF)_t + \beta_4 \ln(EXR)_t + \mu_t \quad (2)$$

Where, GDP is gross domestic product, BLR is bank lending rate, FDI is foreign direct investment, INF is inflation and EXR is exchange rate. The estimable form of equation (1) is specified in equation (2) which is linear in parameters allowing estimation to take place. The introduction of logarithm form transformed the non-linear Cobb-Douglas formulation into a linear model.

4.0 Results and Discussion

Stationarity of variables is an important phenomenon in the analysis of time series, as it affects the results and interpretation that should be accorded to them. The unit root is a characteristic of processes that change over time and may have implications for statistical inference when subjected to time series models by running regression without testing for unit root resulted to spurious results. Series may be stationary or nonstationary at each level. Non-stationarity in series can be avoided by differencing the variables; if a variable is stationary in levels, it is said to be integrated of order zero *I*(0); if it becomes stationary after differencing once, then the variable is supposed to be integrated of order *I*(1). The Informal and formal non-stationarity tests were done to inspect the stationarity of the sequence. The

informal non stationarity test was used to provide an initial indication of the stationarity of the variables under consideration. This was through the examinations of the line graphs illustration as displayed in Figure 1 above.

Table 2: ADF Unit Root Test Results

Level		**First difference**	
	Test statistics	Test statistics	Order of Integration
GDP	-1.903	-7.558	*I* (1)
BLR	-1.906	-4.525	*I* (1)
FDI	-1.117	-9.294	*I* (1)
INF	-1.652	-4.856	*I* (1)
EXR	-0.230	-4.133	*I* (1)
Critical value (5%)	**-2.986**	**-2.989**	

Ho: There is unit root H1: There is no unit root

Source: Bank of Tanzania (2022); World Bank (2019)

Finally, the legibility of the results has been confirmed after running a formal non stationarity test in form of the ADF. The results are presented in the tables 2 since the study could not rely solely on the illustration assessment analysis, the formal unit root tests in the form of ADF and the summing up of the outcomes as illustrated in table 2. From Table 2, the unit root results that at level, all variable test statistics values are less than the critical value at 5 percent, that is, -2.986. The same happens when considering all p-values that are greater than 5. It follows that the null hypothesis of the presence of unit root fails to reject, implying that these variables are not stationary at levels. After the variables differ once, they are all become stationary. This is because the test statistics of each variable are greater than the critical value and their p-values also less than 5 percent significance level, leading us to reject the H_o and conclude that the variables are now stationary. They are intergraded at once *I* (1).

Table 3: Lag selection criteria

Lag	LL	LR	P	DF	FPE	AIC	HQIC	SBIC
0	-0.59013			1	0.080496	0.316561	0.375626	0.505153
1	5.34662	11.873*	0.001	1	.057366*	-.023905*	.049926*	.211836*
2	5.55684	0.42046	0.517	1	0.060734	0.030562	0.11916	0.313451
3	6.53284	1.952	0.162	1	0.061057	0.032218	0.135581	0.362255
4	6.88982	0.71396	0.398	1	0.064143	0.076564	0.194694	0.453749

Source: Bank of Tanzania (2022); World Bank (2019)

Before cointegration analysis was made, the appropriate lag length selection criteria were undertaken. The Johansen procedure is very sensitive to lag selection. The study considers temporal adjusted Likelihood Ratio test statistics (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Hunnan–Quinn Information Criterion (HQIC), and Schwarz Bayesian Information Criterion (SBIC) to determine the choice of lag length. The results of lag length selection is shown below.

Because the rationale of this study is to look for the link among variables, it is important to choose a criterion that is consistent and has the appropriate sampling techniques. SBIC and HQIC are two criteria that overlap quite a lot. In all small samples, less than thirty, SBIC is a good criterion.

However, HQIC outperforms SBIC in intermediate samples that are more than thirty. Based on AIC, HOIC, and SBIC the result indicates there is one lag selection.

Table 4: Johansen Co-integration test results

Trend: Constant					Number of obs= 29
Sample: 1994 - 2022					Lags = 2
Hypothesized No.ofCE(s) (maximum rank)	Parms	LL	Eigenvalue	Trace statistics	5% critical value
None	30	43.055529		91.8573	68.52
At most 1	39	60.318532	0.69595	57.3313	47.21
At most 2*	46	77.157163	0.68692	23.6540*	29.68
At most 3	51	83.963123	0.37461	10.0421	15.41
At most 4	54	87.53637	0.21841	2.8956	3.76
At most 5	55	88.984168	0.09503		

Source: Bank of Tanzania (2022); World Bank (2019)

Co-integration refers to a long-term relationship among time series variables, as noted by Engle and Granger. When variables are integrated of order *I*(1), testing for co-integration is necessary to avoid spurious results. The Johansen test determines co-integration by comparing the trace or maximum eigenvalue statistics to critical values at a given significance level, typically 5 percent, indicating whether short-term deviations are corrected over time (Engle & Granger, 1987)**.** The Johansen co-integration has benefits for the method: firstly, it can detect the presence of several co-integration vectors, for example, if a linear combination of two variables is an *I* (1) series and an *I* (0) series, then the combination will also be *I* (1). The null hypothesis of one co-integrating equation is rejected for the reason that the trace statistics are greater than 5 percent of the critical value, as shown in table 4. However, the trace eigenvalue statistics fail to reject the null hypothesis of two co-integrating equations. Since the results show that there are two cointegrating equations in the analysis, this necessitated the usage of VECM in this case.

Table 5: Results of Vector Error Correction Estimation

Dgdp	Coef.	Std. Err.	Z	p>z	[95% Conf.	Interval]
Cel_	-0.59114	0.30031	-1.97	0.049*	-1.179734	-0.0025388

Note: * denotes the significance level at 5 percent levels of significance
Source: Bank of Tanzania (2022); World Bank (2019)

The statistics report shows that trace statistic of 23.6540 is less than the critical value of 29.68, we failed to reject the null hypothesis at 5 percent. As a matter of fact, there is cointegration at the maximum rank of two co-integrating equations in the analysis allowing us to further estimate the Vector Error correction Model (VECM). VECM address disequilibrium through the error correction term (ECT). The ECT reflects short- and long-run dynamics, with a significant negative coefficient of -0.59114 indicating that 59.11 percent of disequilibrium is corrected annually, achieving long-run equilibrium within two years. Bank lending rates (BLR) and exchange rate show positive but insignificant effects on GDP in the short run, while foreign direct investment (FDI) and inflation exhibit negative but insignificant effects, confirming a long-run causal relationship between GDP and these variables (Joshi, 2021). The research employed the Johansen normalisation from the VECM to measure the effect of bank lending rates on GDP. The table below demonstrates the normalised co-integration in the long-run relationship among variables.

The finding discovered that in the long-run, bank lending rates (BLR) have a significantly negative impact on GDP, with a 1 percent increase in BLR reducing GDP by 2.05 percent, as higher rates discourage investment and consumption. Foreign direct investment (FDI) has a positive and significant effect, where a 1 percentage increase in FDI boosts GDP by 6.6 percent, highlighting its role

in promoting economic growth. This contends with Waryoba (2017) who found a positive impact of foreign direct investment on China's economic growth. Inflation has a strong negative effect on GDP, with a 1 percentage rise leading to a 25.5 percent decline, indicating its adverse impact by reducing purchasing power. The exchange rate negatively affects GDP, with a 1 percentage increase in exchange rate lowering GDP by 5.5 percent, though this effect is statistically insignificant, suggesting limited direct influence on growth while potentially raising import costs and hindering investment.

Table 6: Long-Run Normalized Co-Integration Results

Beta	Coef.	std. error	Z-Statistic	P-value	[95% Conf.	Interval]
GDP	1	.	.	.	.	.
BLR	2.049536	0.168095	12.19	0.000	1.720076	2.378997
FDI	-0.06699	0.020664	-3.24	0.001	-0.10749	-0.02649
INF	0.254982	0.048412	5.27	0.000	0.160096	0.349868
EXR	0.055646	0.065656	0.85	0.397	-0.07304	0.18433
_cons	-7.88361	.	.	.	.	.

Source: Bank of Tanzania (2022); World Bank (2019)

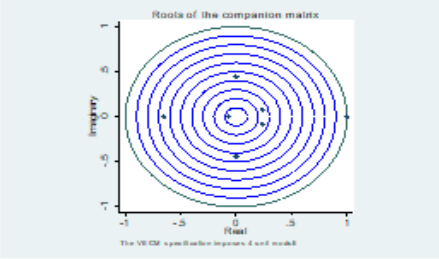
The Diagnostic Test is next, followed by the section as stated below. To prove the consistency of the long-run regression equation post-diagnostic technique when run on VECM includes the LM technique for residual autocorrelation, a test for normally distributed disturbances, and a stability condition test. From the results we failed to reject the null hypothesis of no serial correlation in the model in both lags. The p-value of lag one is 0.201 and that of lag two is 0.311, both lag one and two are significantly greater than the common significance level of 5 percent. Since the p-values for both lag 1 and 2 are greater than 0.05, the null hypothesis could not be rejected. This means that there is no evidence of autocorrelation at lag 1 and lag 2 in the model.

(a) Jarque-Bera Test

Equation	Chi2	Df	prob>chi2
GDP	.511	2	.77819
BLR	47.907	2	.31240
FDI	7.313	2	.76832
INF	4.551	2	.66957
EXR	354.535	2	.00000
All	414.817	10	.00013

(b) Eigenvalue Stability Condition

Eigenvalue		Modulus
-.6512503		-.65125
.00112508		.443597
.00112508	+ .4435952i	.443597
.2370035	- .4435952i	.250241
.2370035	+ .08030993i	.250241
-.069112	- .08030993i	-.069112



(c) Lagrange-Multiplier Test

Lag	chi2	Df	Prob> chi2
1	30.6399	25	.20122
2	27.9253	25	.31131

H0: no autocorrelation at lag order

(c) **Figure 2: Stability condition test results**

Source: Bank of Tanzania (2022); World Bank (2019)

The test reveals that a series of Gross Domestic Product, Inflation NFL, Bank lending rates and foreign direct investment were normally distributed at 5 percent significance level because their probability values were greater than 5 percent significance level, thus the null hypothesis fails to be rejected. The p-value of GDP is 0.7781, and the p-value of INF is 0.6696, the p-value of BLR was 0.3124 and the p-value of FDI was 0.7683. The series of exchange rate was not normally distributed because it's p-value was 0.0000, less than 5 percent, therefore the null hypothesis was to be rejected.

The findings revealed that, the eigenvalue stability condition for VECM indicates that the model is stable in all four units in modules. The model has 4 Eigen-values with a modulus of 1, which corresponds to the 4 co-integrating relationships in the model, implying long-term equilibrium. The remaining eigenvalue have module less than 1, confirming that the short-term dynamics are stable. This means the system will converge to its long-run equilibrium over time without any explosive behavior, ensuring the stability of the estimated model**.** The results of the figure represent the roots of the companion matrix used in a Vector Error Correction Model (VECM) to assess the stability of the model. The key to determining stability was whether the roots of the companion matrix lie inside or on the unit circle with a radius of 1. In this plot, all roots lie either on or inside the unit circle, indicating that the VECM system was stable. Since the specification imposes four units' moduli, this means the model satisfies the stability condition necessary for long-term equilibrium. Therefore, the VECM results were reliable for analysis.

5.0 Conclusion

The study reveals that, in the short run, bank lending rates and exchange rates have an insignificant positive effect on Tanzania's GDP, while FDI and inflation show an insignificant negative impact. These short-run effects indicate that temporary changes in these variables do not immediately drive significant economic growth or contraction. However, the Error Correction Term (ECT) shows that 59 percent of disequilibrium is corrected annually, indicating gradual adjustment toward long-term equilibrium. In the long run, high lending rates and inflation significantly hinder GDP growth by discouraging investment and eroding purchasing power, while FDI positively contributes to growth by providing critical capital, boosting productivity, and fostering infrastructure and technological advancement.

We recommend Tanzania's policy makers to focus on maintaining low and stable lending rates to encourage borrowing and investment while addressing inflation through sound monetary policies to ensure a stable economic environment. Efforts should also prioritize improving credit access, enhancing infrastructure, and fostering economic diversification to create a conducive business environment. A holistic approach that balances monetary policies with structural reforms is essential for achieving long-term sustainable economic growth and development.

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