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## Selected Macroeconomic Determinants of Economic Growth in Kenya: A Co-integration Approach

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### **Abstract:**

Kenya's GDP performance is constrained by high level of fiscal deficits, interest rates, and fluctuating exchange rates. Consequently, the economy has been characterized by sluggish cycles of low economic growth with policymakers revising their policies. Potential increase in economic growth level is central for Kenya to address macroeconomic instability. Supplementary evidence available indicates divergent views on the relationship between selected macroeconomic variables and economic growth. This study sought to determine the effect of selected macroeconomic drivers on economic growth. The study was anchored on Endogenous growth theory. Anchored in the philosophical paradigm of positivism, the study adopted an explanatory research design and relied on secondary data from the Kenya Bureau of statistics with the data spanning from 1990 to 2020. The study employed bound test to test for long run relationship and Autoregressive Distributed Lag model (ARDL) in the empirical analysis to evaluate the relationship among the variables. The data was subjected to stationarity test using Augmented Dickey Fuller (ADF) test. The long run ARDL results indicated that the coefficients of; exchange rate 0.080 ( $p$  – value  $0.033 < 0.05$ ), and lending interest rate  $-0.172$  ( $p$  – value  $0.011 < 0.05$ ) significantly affected economic growth. The findings of this study will be useful in fiscal and monetary policy formulation, it inform the government on ways of finding possible solution to the economic growth challenges. The study submits that policymakers in CBK ought to adopt policies that maintain and keep stability in exchange rate, determine effective lending interest rates and maintain a level of fiscal deficit commensurate to economic growth in Kenya.

**Keywords:** Economic growth, Lending rates, Fiscal deficit, Exchange Rate, Macroeconomic Stability , Autoregressive Distributed Lag model (ARDL) and implement modern monetary policy frameworks

### 1. Background to the Study

For a long period of time, Kenya has not experienced a sustained economic growth term. Kenya's growth rate has been fluctuating since 1960s, with higher economic growth rates recorded in the 1960s and early 1970s and then economic output started to decline in the mid-1970s. Between 1974 and 1993, real GDP began to decline as bilateral and multilateral assistance decreased due to resource mismanagement and reduced agricultural production (Ngugi, 2016). To date economic growth has stabilized due to internal and external factors like oil prices and the recent COVID 19.

Kenya has been without a period of sustained economic growth for a long time. Growth rate has fluctuated since the 1960s, with higher economic growth rates in the 1960s and 1970s, followed by a decline in economic output in the mid-1970s. Between 1974 and 1993, GDP growth began to fall as bilateral and multilateral aid decreased as a result of resource mismanagement and lower agricultural production (Ngugi, 2016). To date, internal and external factors such as oil prices and the recent COVID 19 have resulted inconsistent economic growth.

Kenya's Vision 2030 aims to make it a stable country with double-digit economic growth that is successful internationally. This will be accomplished by transforming Kenya into an industrialized middle-income country with a high standard of living for its citizens. Since 2012, the vision has aimed for an average annual economic growth rate of 10%, but this goal has never been met. The following Figure 1 depicts the growth of GDP since 1985:

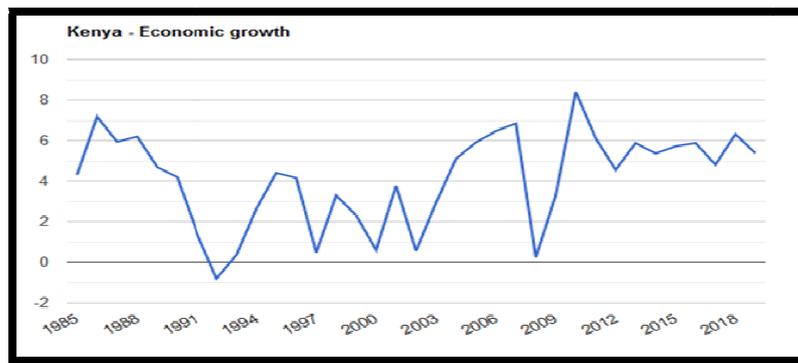


Figure 1: Annual GDP Growth Rate  
Source: Central Bank of Kenya, 2020

For many developing countries, economic growth and selected macroeconomic variables have become a common structural problem. Kenya has implemented reforms based on these variables in the hopes of catalyzing economic growth and putting the country on the road to recovery. In most parts of the country, however, the economy appears to be deteriorating, with high unemployment rates, low living standards, and a poor road network (Kose *et al.*, 2020).

#### 1.1. Economic Growth and Fiscal Deficit Level in Kenya

Fiscal deficits are increasing, which has a negative impact on economic growth. Although developing countries easily met the minimum target of 5% annual GDP growth by the 1970s, nearly half of official foreign exchange receipts were used to service loans to official lending institutions, as noted in the first decade of the United Nations Development Program. The decrease in official government cash flows made debt servicing extremely difficult over time. A large deficit is a sign that a country is losing control of its policy decisions (Osewe, 2017).

#### 1.2. Interest Rates and Economic Growth

The bank lending rates have become increasingly volatile in the last few years. Acts of the Central Bank of Kenya (CBK) triggered this. When the CBK lowered its base lending rates to commercial banks in 2010, many people took out loans to take advantage of the low bank lending rates. The goal was to increase the quantity of money among Kenyans in order to boost business growth. Due to the high level of uncertainty surrounding foreign exchange rates, the CBK reversed its decision and increased the base lending rates for commercial banks toward the end of 2011. Since then bank lending rates have risen as a result of this. Inflation rates have also risen significantly (Mmasi, 2013). The interest rate cap, which took effect in 2016, was enacted in response to public outcry over Kenya's high credit costs. These high rates were viewed by a significant portion of the population as a barrier to credit access, which would help to stimulate economic growth. However, this shift has had unfavorable consequences, including decreased intermediation and openness, decreased banking competition, increased financial stability threats, and a violation of central bank independence and monetary policy. As a result, Kenya raised the interest rate ceiling in November 2019. All of these changes were made in order to achieve long-term economic growth (Mbua, 2017).

#### 1.3. Exchange Rates and Economic Growth

The exchange of a country involves growth in a range of ways. A high exchange rate reduces investor confidence and contributes to capital flight, which occurs when investors purchase securities denominated in foreign currencies and invest abroad. Kenya's currency volatility became more noticeable after the liberalization of the exchange rate in 1993 (Musyoki *et al.*, 2012). High exchange rate pass-through will result in high domestic prices or imported inflation if it is not well regulated.

#### 1.4. Statement of the Problem

Economic growth is a prerequisite for development that is why it is emphasized in various government policy documents. High, long-term economic growth raises our living standards, but Kenya's growth rate has been unimpressive and frequently fluctuating since independence.

The government has undertaken various stabilization and structural reforms in order to achieve and maintain high growth rates of more than 10% per year. Price deregulation, trade liberalization, domestic credit restrictions to avoid crowding out, adoption of a floating exchange rate to reduce volatility, and interest rate deregulation and regulation have been the main policy measures implemented to accelerate economic growth rates. Despite these efforts, the economy has been growing at an unsatisfactory rate.

According to the World Bank (2018), at independence, the size of Kenya's economic growth was at par with that of current economic Asian giants such as South Korea, Hong Kong, Taiwan and other newly industrialized countries. For instance, in 1965 Kenya's GDP per capita was equal to that of South Korea at 104.71 US dollars. Decades later, the East Asian country GDP per capita is 11,526.7336 US Dollars in 2019 compared to Kenya's 1,237 US dollars over the same period. Then an empirical question that arises is what really went wrong with Kenya's economic growth?

According to the World Bank (2018), Kenya's economic growth was comparable to that of current Asian economic giants such as South Korea, Hong Kong, Taiwan, and other newly industrialized countries at the time of independence. For

instance, in 1965, Kenya's GDP per capita was the same as South Korea's, which was 104.71 US dollars. Today, the East Asian country's GDP per capita is 11,526.7336 US dollars, compared to Kenya's 1,237 US dollars. Then the question which rises is what went wrong with Kenya's economic growth.

### 1.5. Specific Objectives of the Study

The specific objectives of the study were;

- To determine the effect of fiscal deficit on economic growth in Kenya
- To evaluate the effect of exchange rate on economic growth in Kenya
- To analyze the effect of interest rate on economic growth in Kenya

### 1.6. Significance of the Study

The Central Bank of Kenya will benefit from the study's recommendations in constructing effective legislation to support the endeavor of formulating policies that reduce interest rates, inflation, and exchange rates to desirable levels in order to stimulate economic growth while maintaining a low inflation target.

This study's findings can be applied to theoretical developments and advancements in the financial and monetary fields.

## 2. Literature Review

### 2.1. Endogenous Growth Model

Paul Romer and Robert Lucas, Jr. proposed the growth theory in the late 1980s and early 1990s. According to the theory, endogenous rather than external forces drive economic growth. According to the theory, investing in human resources, innovation, and expertise, as well as capital and labor, significantly contributes to economic growth. The theory also considers the positive externalities and spillover effects of a knowledge-based economy, which would lead to economic growth (Ojiambo, 2013).

Endogenous growth models attempt to explain economic growth in terms of increasing returns due to the accumulation of human capital and positive externalities associated with learning. As a result, they leave the possibility that the equilibrium growth rate is path dependent open, allowing for empirical research into various factors that influence economic growth. According to this theory, monetary policies are essential for increased economic growth because they have a direct impact on output (Ufoeze, 2018). This is important in the long run, when the country's economic growth rate is influenced by policy decisions.

### 2.2. Fiscal Deficit and Economic Growth

Using annual data from 1970 to 2012, Mwigeka (2016) investigated whether fiscal deficits in Tanzania crowd out or crowd in private investment. The results of the Johansen cointegration test and the application vector error correction model (VEC) show a strong long-term relationship between private investment and the other variables studied. Fiscal deficits, according to the findings, significantly stifle private investment. According to the study, in order to facilitate economic growth, government expenditures should be reduced and the fiscal deficit should be kept low. The capital market should be used to finance the budget deficit.

In their study of how the US budget deficit affects economic growth using time-series data from 1973 to 2004, Roy *et al.* (2009) found that an increase in *ceteris paribus* government deficit spending has a negative impact on economic growth. On growth, the study used a simultaneous equation model.

In his research, Korsu (2009) discovered that fiscal deficits have an impact on current account deficits via the monetary sector. When a fiscal deficit is financed through seigniorage, it increases the supply of money. Increases in money supply raise prices, which causes the real exchange rate to appreciate and the current account to deteriorate.

Using the Johansen methodology, Ajisafe *et al.* (2015) investigated the fiscal deficit and economic growth. The findings confirmed the existence of a long-term relationship between GDP and the variables in question. The findings of the paper show that in the long run, between 1950 and 2007, there is a negative and significant relationship between fiscal deficit and economic growth, and that the two sets of variables are co-integrated. This was consistent with Bose *et al.* (2007)'s earlier study, Public expenditure and economic growth: In 30 developing countries, a disaggregated analysis revealed a significant relationship between budget deficit and economic growth.

### 2.3. Interest Rates and Economic Growth

Mutinda (2014) found that the effect of lending interest rates on economic growth in Kenya over a ten-year period from 2002 to 2013 revealed a negative relationship between interest rates and economic growth. The study concluded that because lending interest has such a strong impact on economic growth, the government must implement policies to keep the interest rate in check.

The findings are comparable to those of Adede (2015), who used OLS regression analysis to investigate the relationship between lending interest rates and economic growth from 2000 to 2014. The study discovered that interbank lending interest rates and economic growth have a negative relationship. The interest rate was studied separately in order to determine its impact on Kenya's economic growth. The study concluded that because lending interest rates have an impact on economic growth, it is critical for the government to implement policies to regulate their movements.

The conditions in large countries affect small economies, according to Dell'Ariccia *et al.* (2012), because a high interest rate encountered in a large country has a significant impact on the domestic economy's GDP growth. However, this effect is concentrated in countries with fixed exchange rates. The direct monetary policy channel and the general capital market or

trade effect both have an impact on small country interest rates. In the short term, a demand shock causes a rise in real interest rates.

#### 2.4. Exchange Rate and Economic Growth

Kogid *et al.* (2012) examined the impact of exchange rates on Malaysian economic growth using time series data from 1971 to 2009. Long-run cointegration exists at both nominal and real exchange rates, according to the results of the ARDL bound test for regression, and is thought to have similar significant and positive effects on economic growth. The findings also show that both exchange rates have a strong causal effect on economic growth. To promote the stability and sustainability of Malaysia's economic growth, the study's findings suggested that a systemic exchange rate should be established through monetary policy.

The findings were in direct opposition to those of Almfraji *et al.* (2014). The study concluded that as the exchange rate depreciated, economic growth grew.

The study of Onyango (2014) on the impact of real exchange rate on Kenya's economic growth from 1980 to 2012, the results output using the ECM indicated that exchange rate volatility has got a positive but insignificant effect on economic growth and thus the study gave policy recommendations that policy makers should find a balance between depreciation and appreciation of the exchange rate to impact on growth.

The results of Onyango (2014) study on the impact of real exchange rate on Kenya's economic growth from 1980 to 2012, as produced by the ECM, indicated that exchange rate volatility has a positive but insignificant effect on economic growth, and thus the study gave policy recommendations that policymakers should find a balance between depreciation and appreciation of the exchange rate to imitate the effects of depreciation and appreciation on economic growth.

#### 2.5. Knowledge Gaps

This research was prompted by a policy recommendation made by the World Bank and the International Monetary Fund in 2015: for low-income countries to develop, eliminate poverty, and maintain economic stability, they should seek to implement modern monetary policy frameworks that better anchor inflation through monetary policy, increase control over short-term interest rates in order to regulate hot money supply, and so on (Rey, 2015).

Despite the fact that various studies have been conducted in Kenya to identify major economic growth determinants, none of these studies have addressed the role of macroeconomic stability in achieving long-term economic expansion.

Given the preceding literature, most researchers have focused on one aspect of the fiscal deficit, such as the effects of foreign debt on economic growth or the effects of internal debt on economic growth.

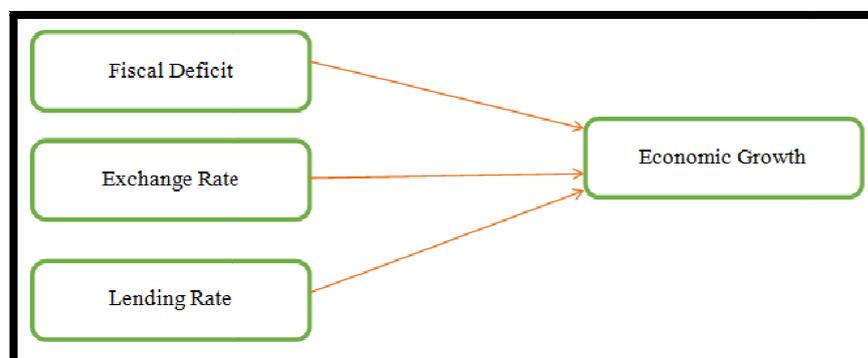


Figure 2: Conceptual Framework

Source: Researcher, 2021

### 3. Research Methodology

#### 3.1. Area of Study

Kenyan economy was the case study.

#### 3.2. Research Philosophy

The philosophic context in which a researcher works dictates the study approach. In fact, most researchers distinguish between advocates of a quantitative research paradigm and advocates of a qualitative research paradigm based on research philosophies and theoretical paradigms about the nature of reality and how reality or knowledge can be deliberated, with advocates of each side being qualified as purists, thus qualitative or quantitative pursuits (Johnson *et al.*, 2004).

This research was approached from a philosophy point of positivism. The school of thought positivism is based on the philosophy that, although only one reality exists, it can be understood imperfectly only because of human limitations, and researchers can only discover this fact within the domain of likelihood (Shariff, 2015).

### 3.3. Research Design

A research design is a comprehensive plan enumerating the basic data collection and analysis methods and procedures to ensure that the information gathered allows the researcher to address the research questions in a straightforward manner. A data-gathering research strategy uses existing theory to develop hypotheses, and these hypotheses are then tested and confirmed, in whole or in part, or refuted, leading to further development of the theory that can then be tested by further research (Rahi, 2017). The research adopted an explanatory design guided by the objectives of the study.

### 3.4. Model Specification

The study used a multivariate model that included endogenous macroeconomic variables that affect economic growth, such as the fiscal deficit, exchange rate, and lending interest rate, and thus the relationship between the variables was represented as a function, as shown below.

$$GDP_t = A_0 + A_1FD_t + A_2ER_t + A_5LR_t + \varepsilon_1 \dots$$

Whereby;

$GDP_t$  = Economic Growth,  $A_0$  = Constant  $A_1, A_2, \dots, A_6$  = variable parameters  $FD_t$  = Fiscal deficit,  $ER_t$  = Exchange rate,  $LR_t$  = lending interest rate and  $\varepsilon_1$  = error term.

An ARDL that was used in data analysis is given as;

$$\Delta y_t = v + \alpha \beta' y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta x_{t-i} + \varepsilon_t$$

Where

$v$  = becomes  $K \times 1$  vector of parameters representing constants in the short-run.

$\alpha$  =  $K \times r$  matrix of adjustment parameters in the co-integrating equations i.e. the error correction term

$\beta$  =  $K \times r$  matrix of coefficient parameters of the long-run relationship in the  $r$  co-integrating equations

$\Gamma_i$  = Showing short-run coefficients of lagged variables.

$\Delta$  = First difference operator.

$r$  = The co-integrating rank which is  $1 \leq r \leq K-1$

GDP	Economic Growth	This is Annual Change in the Real GDP		KNBS
FD	Fiscal Deficit	It was measured as a percentage of the Gross Domestic Product	Negative	KNBS
LEXR	Exchange Rate	The price of the Kenyan currency in relation to the United States dollar measured by the annual average exchange rate was employed, Ksh/US \$	Negative	KNBS
IFR	Inflation	Annual percentage change in consumer price index compared with previous year was employed	Negative	KNBS
LR	Lending Interest Rate	This is the bank rate that usually meets the short- term funding needs of the private sector.	Negative	KNBS
$\mu_t$	is the stochastic error term	Factors that affect Economic stability but not captured in the model		

Table 1: Measurement of Variables  
Source: Author's Conceptualization, 2019

### 3.5. Data Analysis

#### 3.5.1. Unit Root Test

In time series data, determining the order of integration or non-stationarity is crucial. When a non-stationary time series variable is regressed on another time series variable, it is possible to get spurious results. The study used ADF test

#### 3.5.2. Augmented Dickey-Fuller Test, ADF

To calculate the test statistic, we used the augmented Dickey-Fuller regression model.

$$\Delta y = \alpha + \beta y_{t-1} + \delta t + \sum_{j=1}^k \alpha_j \Delta y_{t-j} + e_t$$

### 3.6. Lag Length Selection Criteria

When deciding how many lags to include in the analysis, it's important to weigh the marginal benefits of adding more lags against the marginal cost of increased estimation uncertainty. The Akaike Information Criterion was used in the analysis.

### 3.6.1. Co-integration Test

A time series variable is integrated of order  $d, I(d)$ , if stochastic trends / unit roots can be eliminated by differentiating a series  $d$  times and stochastic trend remains after differencing only  $d - 1$  times (D. N. Gujarati, 2009).

### 3.6.2. Model Stability Tests

When a model is estimated, the model parameters are assumed to be constant throughout the study period. The following method was used in the research:

### 3.6.3. CUSUM and CUSUMQ Test

Brown *et al.* (1975) used the CUSUM test on structural stability based on recursive residuals to check for structural stability. The cumulative sum is plotted with the 5% significant critical lines in this preference. If the cumulative sum goes outside the area between the two critical lines, the test finds parameter instability. The statistic that the CUSUM test is based on is:

$$W_t = \sum_{r=k+1}^t w_r / s.$$

### 3.6.4. Model Diagnostic Tests

Using the Lagrangian Multiplier (LM test), the researchers tested for autocorrelation.

## 4. Data Analysis and Presentation

### 4.1. Descriptive Statistics Summary

According to the data in Table 1, Kenya's GDP growth rate has been fluctuating between 3.79 percent and 3.79 percent per year. The fiscal deficit changed by -4.41 percent of GDP on average. The exchange rate against the US dollar was 73.91, with a minimum of 22.91 and a maximum of 105.2. Inflation was 11.56 percent on average, with a low of 1.55 percent and a high of 45.98 percent. The average lending rate was 19.19 percent, with a minimum of 12.02 percent and a maximum of 36.24 percent.

Variable	Obs.	Mean	Std. deviation	Minimum	Maximum
GDP	31	3.794294	2.384278	-.799494	8.405699
FD	31	-4.413226	3.405241	-11.42	-.04
ER	31	73.90627	21.80618	22.91477	105.2
LR	31	19.18676	6.832595	12.02	36.24

Table 2: Summary of Descriptive Statistics

Source: Research Data, 2021

### 4.2. Time Series Plots of Variables at Levels

This approach is required, according to Hamilton (1994), because the characteristics of individual time series must be taken into account when modeling the data generation process of a system of potentially linked variables.

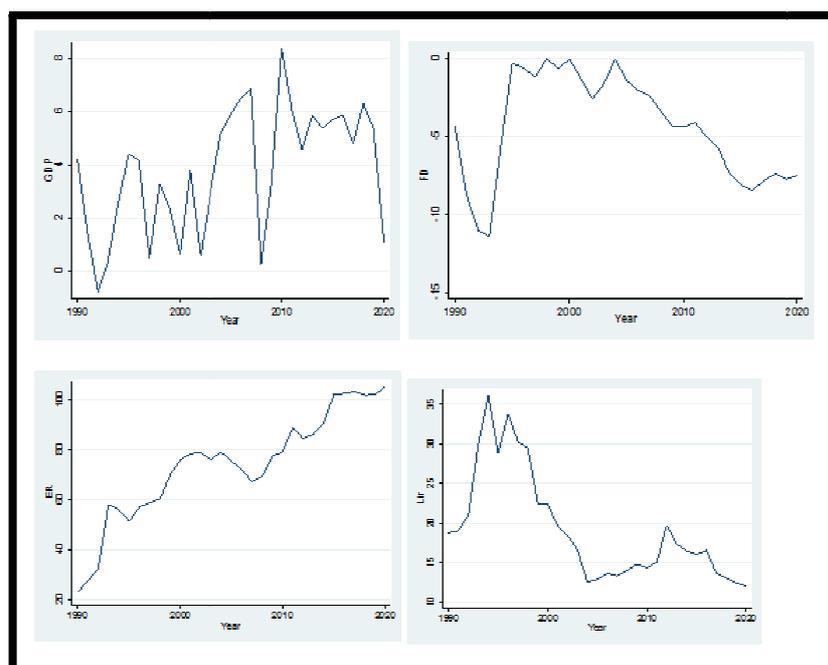


Figure 3: Plots of Variables at Levels

Source: Research Data, 2021

#### 4.3. Time Series Plots of Variables at First Difference

The plot of variables under study at first difference is presented in the figure 4 below. The differenced variables are stationary as they show a clear mean reverting characteristic. Stationarity at first difference simply means that the variables are integrated of order one as per (D. Gujarati, 2012).

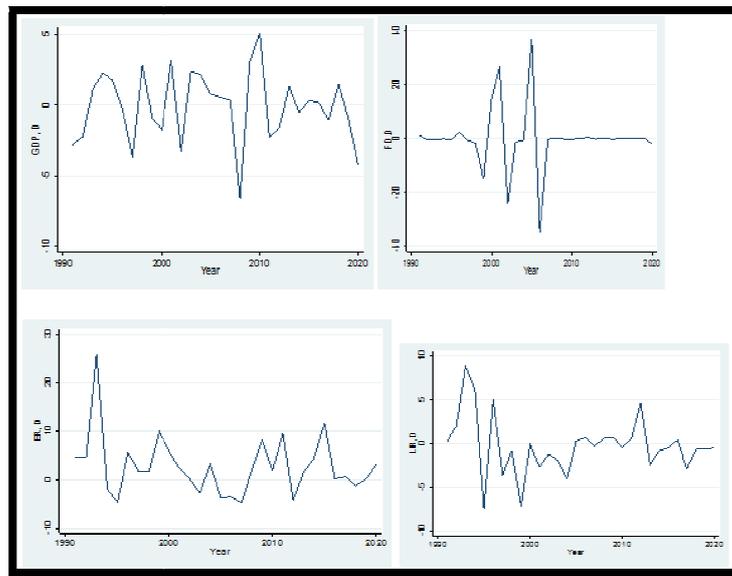


Figure 4: Variables at First Difference  
Source: Research Data, 2021

#### 4.4. Unit Root Tests

Before running an ARDL model, the variables should be checked for stationarity. For this reason, the study used Augmented Dickey Fuller and Kwiatkowski, Phillips, Schmidt, and Shin. to ascertain the presence of unit root or stationarity (Elliott, 1999). The results from ADF, Table 3 below.

The results indicate all variables apart GDP with a p value of 0.0497 and  $0.0185 < 0.005$  were non-stationary at 5% level of significance with  $pvalue > 0.005$ . Therefore, all tests failed to reject the null hypothesis of a unit root. Upon initial differencing all variables became stationary.

ADF Unit Root Test at Level						
Variables	p-values	ADF Test Statistic	Critical Values			Remark
			1%	5%	10%	
GDP	0.0185	-3.227	-3.716	-2.986	-2.624	Stationary
FD	0.5900	-0.5620	-3.716	-2.986	-2.624	Unit root
ER	0.2600	-2.062	-3.716	-2.986	-2.624	Unit root
LIR	0.7009	-1.135	-3.716	-2.986	-2.624	Unit root
Unit Root at First Difference						
GDP	0.0000	-6.338	-4.352	-3.588	-3.233	I (1)
FD	0.0001	-5.183	4.352	-3.588	-3.233	I (1)
ER	0.0001	-5.169	4.352	-3.588	-3.233	I (1)
LIR	0.0000	-5.410	4.352	-3.588	-3.233	I (1)

Table 3: Unit Root Tests  
Source: Researcher Data, 2021

#### 4.5. Optimum Lag Length Selection for Each Variable

In econometric modeling, there is no hard and first rule for choosing the best lag length (Adeleye *et al.*, 2020). The study used AIC automatic lag selection method through the STATA command *matrixliste(lags)*. For each variable under investigation, the outcomes are shown in table 4.3 below.

#### 4.6. Bounds Test

According to Pesaran *et al.* (2001), the null hypothesis is rejected when the calculated F statistic is greater than the upper bound critical value, indicating that the underlying variables in the study are co-integrated. The calculated F statistic of 4.88 exceeds the upper bounds at 10 percent, 5 percent, 2.5 percent, and 1 percent significance levels, indicating that there is a long run relationship between the variables, as shown in table 4.

		<b>H<sub>0</sub>: No Level Relationship</b>						<b>F = 4.88, t = -4.730</b>	
		<b>Critical Values 0.1</b>		<b>0.05</b>		<b>0.025</b>		<b>0.01</b>	
		[I_0] [I_1]	[I_0] [I_1]	[I_0] [I_1]	[I_0] [I_1]	[I_0] [I_1]	[I_0] [I_1]	[I_0] [I_1]	[I_0] [I_1]
		L_1 L_1	L_05 L_05	L_025 L_025	L_025 L_025	L_01 L_01	L_01 L_01	L_01 L_01	L_01 L_01
k_6		2.12 3.23	2.45 3.61	2.75 3.99		3.15 4.43			
Accept if F < criticalvalueforI (0) regressors. Reject if F > criticalvalueforI (1) regressors.									
		<b>Critical Values 0.1</b>		<b>0.05</b>		<b>0.025</b>		<b>0.01</b>	
		[I_0] [I_1]	[I_0] [I_1]	[I_0] [I_1]	[I_0] [I_1]	[I_0] [I_1]	[I_0] [I_1]	[I_0] [I_1]	[I_0] [I_1]
		L_1 L_1	L_05 L_05	L_025 L_025	L_025 L_025	L_01 L_01	L_01 L_01	L_01 L_01	L_01 L_01
k_5		-2.57 -4.04	-2.86 -4.38	-3.13 -4.66		-3.43 -4.73			
Accept if t > criticalvalueforI(0) regressors. Reject if t < criticalvalueforI(1) regressors.									
k: # of non – deterministic regressors in long – run relationship.									

Table 4: Bounds Test  
Source: Research Data, 2021

4.7. Diagnostic Tests

4.7.1. Lagrangian Multiplier Test for Residual Autocorrelation

When residuals from one period  $t$  are correlated with residuals from previous lags reason, the  $\epsilon_{t-1}, \epsilon_{t-2}$  and so on, this is known as serial correlation. Autocorrelation may result from an insufficient number of lag lengths, resulting in incorrect estimator values with large standard errors. Because the null hypothesis of no serial autocorrelation had a p-value of  $0.7203 > 0.05$  at the 95 percent confidence interval, the null hypothesis of no serial autocorrelation was accepted.

Lags	Chi2	Df	Prob> Chi2
1	0.128	1	0.7203

Table 5: LM test for Autocorrelation  
Source: Research Data, 2021

4.7.1.1. Stability Test

The study used CUSUMQ Test

4.7.1.2. CUSUMQ Test

Lütkepohl *et al.* (2006) found that unstable models yield forecast estimates that differ significantly from stable models. The test plots the model's residuals and checks for stationarity in the face of structural breaks. If the residual plots around the central line without closing the two parallel lines at the 5% level of significance, the model is stable and can be used for forecasting or projection. The residual experiences have a mean reverting characteristic, which indicates that the model is stable. Figure 5 shows the regression results. There were no structural breaks in the modeled variables, indicating that the model was stable.

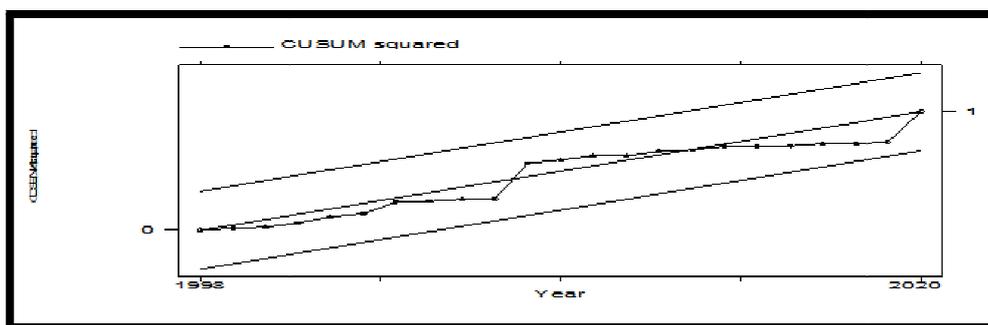


Figure 5: CUSUMQ Stability Test

4.7.2. ARDL MODEL in Short Run

The regression results for ARDL are as displayed in table 6 shown below.

Lags ( (2,0,0,2,0)				
Sample 1990-2020			NO: of Observations = 31	
Log Likelihood = -47.308198			F (11,17) = 3.24	
			Prob> F = 0.0520	
			R-squared = 0.5899	
			Adj R-squared = 0.4076	
			Root MSE = 1.7091	
GDP	Coef.	Std. err	T	P >  t
GDP				
L1	.1816318	.1827346	0.99	0.333
L2	-.2856007	.172579	-1.65	0.115
FD	-.000347	.0001256	-2.76	0.013
ER	-.0657731	.0368371	-1.79	0.091
LIR --.	.1777092	.1423755	1.25	0.228
L1.	-.2036027	.151918	-1.34	0.197
L2.	-.1949278	.1083588	-1.80	0.089
_Cons	15.61414	4.409691	3.54	0.002

Table 61: ARDL Model Results

Source: Research Data, 2021

The table 6 indicates the effects of, is the fiscal deficit FD, exchange rate ER and lending interest rate, LR and on economic growth, GDP in the short run. From the results, the value of  $R^2$  is 59.00 implying that 59.00% of the variation in economic growth were explained by the endogenous variables in the model. Exchange rate and lending rates were statistically insignificant at 5% level of significant.

Sample 1990 - 2020				Number of Observations = 31	
Log Likelihood = -52.787505				R-squared= 0.6486	
				Adj R-squared = 0.5213	
				Root MSE= 1.9510	
	D.GDP	Coef.	Std. Err	T	P >  t
ADJ	GDP				
	L1	-.9985559	.2111284	-4.73	0.000
LR	FD	0.010315	0.023893	0.432	0.671
	ER	0.080460	0.035204	2.286	0.033
	LIR	-0.171520	0.060810	-2.821	0.011
	Cons	-18.4509	15.94865	-1.16	0.263

Table 7: ARDL with Error Correction Model

Source: Research Data, 2021

The R - squared has a value of 64.86, and the adjusted R squared has a value of 52.13, implying that the fiscal deficit FD, exchange rate ER, and lending interest rate LR account for 64.86 percent of the variations in economic growth. With a coefficient of - 0.998, the speed of adjustment to the long run equilibrium is negative and significant (p - value 0.000 0.05), inferring that short run shock corrections converge to equilibrium. A high significant coefficient of -0.998 (p value 0.000) indicates that approximately 99.8% of any disequilibrium caused by explanatory innovations is corrected annually.

With a coefficient of 0.01 and a p-value of 0.671 > 0.0500, the long run ARDL model indicates that fiscal deficit is insignificant. An increase of one unit in fiscal defect leads to a 0.01 unit increase in economic growth. On the relationship between Pakistan's budget deficit and economic growth, this study agrees with reason, theNayab (2015). The study found no evidence of a link between the budget deficit and economic growth. Because the budget deficit was unsustainable at 7% of GDP, it had no effect on GDP growth. Fiscal deficits that are well-managed are beneficial to a growing economy, but a self- sustaining limit of 3.696 percent of GDP must be maintained. A fiscal deficit of more than 3.696 percent has a negative impact on economic growth (Nayab, 2015). Kenya's fiscal deficit averaged -4.4 percent of GDP over the study period, indicating a negative impact on the country's economic growth. The current study's findings, on the other hand, support Keynesian views on the budget deficit.

The findings contrast with those of Osoro (2016), who discovered a positive and significant relationship between budget deficit and economic growth in Kenya, thus supporting Keynesian theory, which advocates for deficit spending to stimulate economic growth during recessions.

The long run ARDL results show that exchange rate changes are positively and significantly related to economic growth, with a coefficient of 0.08 (p-value 0.03 0.05 level of significance), implying that a 1% increase in exchange rate results in an 8% increase in economic growth on average. The foreign exchange rate and economic growth, according to orthodox economists, have a positive relationship. Increment in currency exchange rates increases net exportation volume, which boosts economic growth by increasing commodity demand. Nevertheless, structural economists contend

that the exchange rate and economic growth are inversely related (Karahana, 2020). Structural economists, on the other hand, argue that the exchange rate and economic growth are inversely related (Karahana, 2020).

The study is consistent with SELIMI *et al.* (2017) who investigated the effects of the Macedonian exchange rate on economic growth rate. The findings are in line with those of SELIMI *et al.* (2017), who looked into the impact of the Macedonian exchange rate on economic growth.

As per the regression analysis results, lending interest rates have a negative and significant relationship with economic growth (p-value 0.011 0.005 level of significance) and a coefficient of -0.17, which means that a unit decline in lending rates plays a role to a 0.17 unit increase in economic growth when all other factors are held constant. Interest rate cuts encourage capital inflows, which strengthens the local currency (Boivin *et al.*, 2010).

Interest raising rates stifles economic growth by lowering consumers' purchasing power and reducing their desire to borrow. Adede (2015) who studied the effects of commercial bank lending rates on economic growth in Kenya, agrees with the findings of this study. In Kenya, the study discovered a negative correlation between lending rates and economic growth. The CBK has a significant impact on the performance of any sector through its bank rate policy.

Similarly, in their study of the effects of interest rate stability on economic performance in Kenya, Toroitich *et al.* (2017) found that purchasing power parity and credit supply, which were used as proxies for interest rate stability, had a positive and significant impact on a country's economic growth. Low interest rates increase the amount of credit available. In order to regulate interest rates, the government should develop appropriate monetary policies.

## 5. Conclusions and Recommendations

### 5.1. Conclusion

Founded on the findings of the study, the following conclusions were reached.

According to the first hypothesis, Kenya's fiscal deficit has no significant impact on economic growth. The results of the ARDL regression showed that fiscal deficits boosted economic growth but were statistically insignificant in the long run. Any increase in Kenya's budget deficit has no impact on economic growth. This could be due to the high fiscal deficit to GDP ratio, which was at 4% during the study period, well above the recommended 3.7 percent.

Second, it was hypothesized that the exchange rate has no significant impact on Kenyan economic growth. Based on the long run regression analysis, it was concluded that exchange rates have a positive and statistically significant impact on Kenyan economic growth. This lends credence to the conventional wisdom that there is a positive relationship between the exchange rate and economic growth. Increases in exchange rates increase net exportation quantity through devaluation, which boosts economic growth by increasing commodity demand.

The third hypothesis, that lending interest rates have no effect on economic growth in Kenya, was also refuted. Interest rate cuts encourage capital inflows, which strengthens the local currency and attracts investors. According to the findings, lending interest rates have a significant impact on economic growth, with lower bank lending rates resulting in increased economic growth.

### 5.2. Recommendations

Following the results of the ARDL model regression, the study makes the following recommendations;

The government should control and reduce its spending in order to reduce the fiscal deficit, which is currently at 4% of GDP. Expansion of the tax base so as to reduce massive deficits that result in high interest rates during debt repayment. In order to create more fiscal space, the government should explore the public-private partnerships option in financing projects.

CBK policymakers should adopt policies that maintain and keep exchange rate stability to avoid fluctuations in order to foster economic growth. This includes imposing high tariffs to discourage importation. Attempts should also be directed toward export diversification. Export control policies should be implemented in order to determine the optimal value of the exchange rate, which will help strengthen the currency through devaluation in the long run.

In an economy that will drive economic growth, low interest rates will increase credit availability. As a result, the CBK of Kenya must regulate, determine, and maintain effective and stable lending interest rates.

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