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Moderating Effect of Political Instability on ICT and Economic Growth Nexus in Kenya: ARDL Bound - Co-Integration Approach

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ABSTRACT: The government has attempted to target specific macroeconomic factors in order to stimulate economic growth in Kenya through monetary and fiscal policies. Despite these efforts, Kenya's GDP growth is hampered by high interest rates and high interest rate volatility. Kenya's ability to address macroeconomic instability hinges on its ability to increase economic growth. Auxiliary evidence shows that perspectives on the relationship between ICT and economic growth are segmented. The goal of this study was to determine the impact of ICT on economic growth in Kenya, as well as the moderating effect of political instability on the relationship. The research was based on Solow's theory of growth. An explanatory research design was used, with data spanning from 1990-2020 obtained from Kenya Bureau of Statistics. In the empirical analysis, the study used the bound test to test for a long-run relationship and the Autoregressive Distributed Lag model (ARDL) to evaluate the relationship between the variables. The data was subjected to an Augmented Dickey Fuller (ADF) test to determine stationarity.The long run ARDL results indicated that the coefficients of; ICT rate were insignificant 0.089 $(p - value\ 0.30 > 0.05)$. However with the introduction of political instability as the moderator ICT was significant 0.736 $(p - value\ 0.011 < 0.05$ and positively affected economic growth. Political instability moderated the relationship between ICT $(\beta = -0.81, p = 0.000)$ and economic growth. As a result, promoting effective governance should help to improve political stability. The findings of this study will help the government figure out how to address the problem of low economic growth. According to the study, the government should invest in the ICT sector to improve its accessibility and affordability. Additionally, the government should work to improve political stability and good governance by gradually establishing institutions that uphold the rule of law and provide security.

KEY WORDS: Autoregressive Distributed Lag model (ARDL), Political Instability, Internet Communications and Technology (ICT), Economic growth, macroeconomic instability, Moderation and Cumulative Sum of Squares Recursive Residuals (CUSUMQ)

BACKGROUND TO THE STUDY

According to Ismaila *et al.* (2015) In today's world, especially in developing countries, economic growth is a major concern. Kenya's overall economic performance has been underwhelming since its independence in 1964. Economists have been interested in determining the factors that influence long- and short-term economic growth in order to assess their impact. Every sovereign nation's goal is to improve its citizens' living standards by encouraging economic growth and development.

Imimole *et al.* (2014) opines that economic growth is a necessary condition for economic development; this explains why it dominates various government policy thrust documents. Policies aimed at reforming and restructuring the real economy are linked to economic growth. However, inadequate domestic resources, savings and investment to support and sustained the sectors is a major impediment to economic development in the country.

` The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by all United Nations Members in 2015 as a universal call to action to end poverty, protect the environment, and ensure that all people live in peace and prosperity, according to Vision 2030. In this regard, economic growth is seen as the most important goal for reducing poverty and fostering hope for societal improvement (Ketema, 2006).

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ICT AND ECONOMIC GROWTH IN KENYA

The Ministry of Information, Communications, and Technology was established in June 2004 and is in charge of policies relating to information, broadcasting, and communication. The Information, Communications and Technology Authority (ICTA), which was established in August 2013 under the Ministry of ICT (MoICT), is tasked with rationalizing and streamlining the management of all Government of Kenya ICT functions.

Kenya's ICT market was valued at $717 million at the end of 2019, according to Business Monitor International (BMI) 2020, with computer hardware accounting for nearly 60% of total ICT investments and the remaining balance coming from ICT services. Kenya is often referred to as Africa's "Silicon Savannah" because of its technological advancements. Kenya has made significant investments in broadband, making it one of the highest-performing, fastest-growing, and most reliable in the East African region. By creating customer service centers and the e-Citizen web portal to streamline e-government services under one roof, the government has incorporated ICT, a vital industry that has currently underpinned many critical economic sectors, as a driver for economic growth and development (Chege *et al.*, 2020).

According to a recent World Bank report, Kenya's ICT sector has outperformed all other sectors, growing at a rate of over 23 percent annually over the last decade. The sector is now six times larger than it was at the start of the decade, thanks in part to internationally acclaimed innovations like M-pesa, a revolutionary mobile money transfer service that allows users to send and receive money from anywhere in the world. The service is responsible for 80% of all money transfers in the country (Niebel, 2018). Through partnerships and the implementation of the US$2.89 billion National Broadband Strategy, the government's ICT policy aims to improve ICT in rural areas and achieve an 80% access rate.(Chege *et al.*, 2020).

In a recent Economic survey 2021, the most significant contributor to the Kenya's economic growth was ICT propelling the sector into the top ten highest contributors to the economy. According to KNBS, the value of ICT output to Kenya's GDP increased by 2.5% to Sh538.3 billion in 2020. Following the revised GDP figures released yesterday by the Kenya National Bureau of Statistics, the ICT industry has grown dramatically from Sh123 billion to Sh258 billion in 2019.

STATEMENT OF THE PROBLEM

Kenya's long-term development blueprint, Vision 2030, aims to transform the country into a middle-income country. To achieve this, the economy was expected to grow at a rate of 10% per year starting in 2012. The government has implemented policies and targeted specific sectors to propel the economy toward long-term growth. Despite the fact that economic growth has been on an upward trend since 2010, growth rates have been volatile. Since 2009, the country's economic growth rate has been around 4.9 percent.

The Kenyan government has long pursued various stabilization and structural adjustment policies in an attempt to achieve and maintain annual growth rates of more than 10%. The main policy measures implemented to accelerate economic growth rates have been price decontrol, trade liberalization, domestic credit restrictions and adoption of a floating exchange rate .Despite these efforts, the rate of economic growth has been unsatisfactory.

GENERAL OBJECTIVE OF THE STUDY

The general objective of the study was to find out the moderating effect of political instability on ICT and economic growth nexus in Kenya

i. To determine the effect of ICT on economic growth in Kenya
ii. To determine the effect of political instability on economic growth in Kenya

IMPORTANCE OF THE STUDY

A system's dynamics of selected macroeconomic variables impact economic growth. In order to develop economic policies, a better understanding of the dynamic behavior of these variables is required.The study findings will allow relevant authorities like the CBK to improve and enhance the efficiency of their policy formulation processes in order to achieve the broad goal of achieving sustainable economic growth. The findings will help policymakers understand the short- and long-term effects of ICT and political stability on economy’s growth. This information will aid policymakers in making decisions about how to stimulate economic growth.

CHAPTER TWO
LITERATURE REVIEW
Theoretical Literature Underpinning
Solow – Swan model

According to Jhingan (2011)the Solow – Swan model is a long-run economic growth model developed in the context of the neoclassical economics school of thought. It aids in the understanding of long-run economic growth by examining capital accumulation, labor or population growth, and increased productivity, which is referred to as technological advancement.

According to Ejigayehu (2013) The Solow growth model has attempted to answer one of the significant economic growth ambiguities: why are rich countries so rich and poor countries so poor?. Solow proposes a functional form of production that connects output to interchangeable capital and labor inputs.

$Y = AK^{\alpha}L^{\beta}H^{\gamma}.$

Whereby *Y* is total economic output, *K* is physical capital, *L* is labor, *H* is human capital stock, and *A* is technology.

MODERATING EFFECT OF POLITICAL INSTABILITY ON ICT AND ECONOMIC GROWTH NEXUS

A moderator is a third variable that influences how the dependent and independent variables interact. A moderator's impact is statistically defined as an interaction that affects the direction and/or strength of the correlation between the independent and dependent variables (Molonko *et al.*, 2018).

Molonko *et al.* (2018) using an ARDL framework to analyze the moderating impact of political risk on the relationship between sectorial capital expenditure and economic growth in Kenya, the researchers discovered that political risk has a significant moderating effect between capital expenditure and sectoral economic growth. According to the findings, capital expenditure had both a short- and long-term impact on Kenyan sectoral economic growth. Political risk inhibits the effect of capital expenditure on growth in the long run. The study recommended that the government should increase capital expenditure and improve political stability in order to stimulate economic growth.

EMPIRICAL LITERATURE
ICT and Economic Growth

Bahrini *et al.* (2019) used a panel Generalized Method of Moment (GMM) growth model to show that, aside from fixed telephones, other information and communication technologies such as mobile phones, Internet usage, and broadband adoption had a significant impact on economic growth in MENA and SSA developing countries from 2007 to 2016. In terms of Internet usage and broadband adoption, the findings confirmed MENA countries' superiority over SSA countries. In terms of strategy, the findings suggest that governments in the Middle East and North Africa (MENA) and Sub-Saharan Africa (SSA) invest more in ICT infrastructure.

Aghaei *et al.* (2017) investigated the impact of ICT on Economic Growth in the OIC Countries. The study employed a dynamic and static panel data approach within a growth model framework and applied it to the economies of OIC countries from 1990 to 2014. The estimates showed that investments in ICT whose proxy for ICT had a significant impact on economic growth in the countries studied. A percentage increase in an OIC country's ICT investment resulted in a 0.3 percent increase in per capita GDP. The study recommended that OIC countries should develop specific policies to encourage ICT investment.

The impact of ICT on economic growth in OIC countries was investigated by Aghaei *et al.* (2017). From 1990 to 2014, the study used a dynamic and static panel data approach within a growth model framework to examine the economies of OIC countries. Investments in ICT, as a proxy for ICT, had a significant impact on economic growth in the countries studied, according to the estimates. An increase in ICT investment by a percentage resulted in a 0.3 percent increase in per capita GDP in an OIC country. According to the study, OIC countries should develop policies to encourage ICT investment.

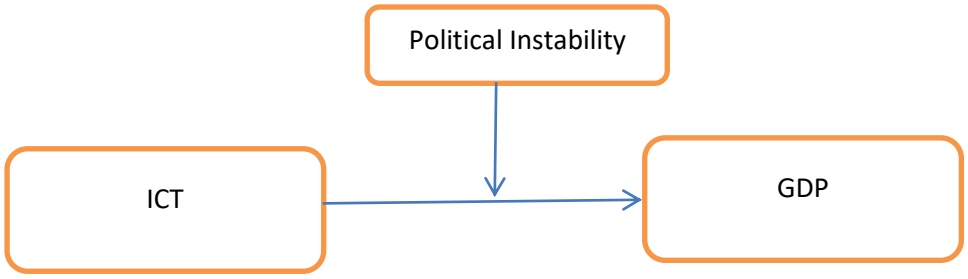
STUDY GAPS

Whereas inadequate ICT and political instability are commonly criticized for Kenya's slow economic growth, there have been few studies in Kenya that provide a detailed overview of the relationship between selected macroeconomic variables. Furthermore, the majority of these mentioned above studies were conducted outside of Kenya, with only a few studies focusing solely on the

Kenyan economy. These countries' institutional structures differ from Kenya's, limiting their generalization and applicability to Kenya's economy.

Even though the effect of ICT on economic growth reveals a gap in the literature that has not been adequately addressed in Kenya, the effect of ICT on economic growth reveals a chasm in the literature that has not been adequately addressed in Kenya. In comparison to other African sectors, the ICT sector has made tremendous progress with significant effect on economic growth.

CONCEPTUAL FRAMEWORK



Source: Researcher, 2021

CHAPTER THREE

RESEARCH METHODOLOGY

Area of Study

This study determined the moderating effect of political instability on ICT and economic growth nexus in Kenya for the years 1990-2020 As a result, the Kenyan economy served as a case study, which is characterized by high levels of foreign debt and interest rates with moderate political stability and ICT infrastructure.

Research Design

According to Kothari (2004) a research design is a set of techniques and procedures for gathering data that is required. It is overall plan for conducting the study, how it responds to the research objectives, and how it achieves the study's goals. The research used an explanatory design that was guided by the study's objectives. Explanatory research establishes a framework for investigating variables with the goal of proving or disproving the existence of a cause-and-effect relationship between them (Salkind, 2010).

Model Specification

The Autoregressive Distributed Lag (ARDL) Model was used in this study. First, the ARDL model is consistent and efficient even when there is a mixture of $I(0)$ and $I(1)$, i.e. different orders of co-integration in this space are accommodated. Second, the model is ideal when the number of observations is limited (Pesaran *et al.*, 2001). As a result, equation below takes the general form of;

$$\Delta \mathrm{Gdp} = \mathrm{f}(\Delta \mathrm{ICT}_t) .$$

The VAR model with P lags and K number of endogenous variables is such that aboveequation can be illustrated as;

$$y_t = v + \beta_1 y_{t-1} + \beta_2 y_{t-2} + \ldots\ldots\ldots + \beta_p y_{t-p} + \varepsilon_t$$

Where;

y_t = K×1 vector of dependent variable

v = K×1 vector of parameters for constants.

β_i are K×K matrices of parameters for coefficients.

ε_t = is a K×1 vector of disturbances white noise. If co-integration exists ARDL contains both long-run and short-run relations among variables set in vectory_t. Subsequently above equation can become a ARDL as shown;

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

Where;

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

α = K×r matrix of adjustment parameters in the co-integrating equations i.e. the error correction term

β = K×r matrix of coefficient parameters of the long-run relationship in the r co-integrating equations

Γ_i = Showing short-run coefficients of lagged variables.

Δ = First difference operator.

r = The co-integrating rank which is 1 ≤ r ≤ K-1

To test the moderating effect of political instability, the following model was used.

$Y = \beta_o + \beta_{11}X + \beta_{12}Z + \beta_{13}(X * Z) + \varepsilon$……3.12

Where; β_o the constant β_{is} is the coefficient that measures the effect of a moderator and $X * Z$ s the interaction between variable X, Z and X_{is} are explanatory variables (Frazier *et al.*, 2004).

MEASUREMENT OF VARIABLES

The description of the variable, its measurement, and the hypothesized relationship with the dependent variables are presented in Table 3.1.

Table1. Measurement of Study Variables

Abbreviation	Name of the variable	Description and measurement	Expected Sign	Source
GDP	Economic Growth	This is annual change in the real GDP (Constant Monetary value of goods and services produced within the boundaries of a country by both nationals and foreigners measured at current prices). It was measured by annual percentage change in the real GDP		KNBS
ICT	Information and Communication Technology	Internet users as a percentage of total population was employed	Positive	World Bank
PI	Political instability	Political risk, a proxy for political instability was employed. It's an index encompasses various weights of political risk components.	Negative	ICRG
μ_t	is the stochastic error term	Factors that affect Economic stability but not captured in the model		

Source: Author's Conceptualization, 2019

UNIT ROOT TEST

Non-stationary data is inherently volatile and cannot be predicted or modeled. The results obtained through the use of non-stationary time series could be misleading. To achieve accurate and reliable results, non-stationary data must be transformed into stationary data. Most macroeconomic variables follow a random walk, also known as a unit root process in time series literature, which can lead to spurious regression (D. N. Gujarati, 2009). The paper used Augmented Dickey-Fuller Test.

AUGMENTED DICKEY-FULLER TEST

The test statistic was calculated using the fitted augmented Dickey-Fuller regression model as shown;

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

The null hypothesis is that the process is more like a random walk than a stationary trend. It's written as; $H_0: \delta = \gamma = \theta - 1 = 0$. If the null hypothesis is rejected, y_t is a stationary time series with an approximately deterministic trend (Verbeek, 2008).

Bound - Co-integration Test

Autoregressive Distributed lag (ARDL) bound test was used (Bertsatos *et al.*, 2021). Because of its advantages, the study chose the ARDL approach over other conventional methods. The ARDL approach has an advantage over the Engle-Granger (1987) test, which is limited to bivariate models, and the Johansen and Juselius (1990) test for VECM, because the underlying endogenous variables can be $I(0)$, $I(1)$or combined co-integrated.

Model Stability Test:

CUSUMQ Test was employed to check for the structural stability the CUSUM test by Brown *et al.* (1975) on stability based on recursive residuals was used. This preference plots the cumulative sum with the 95% confidence interval.

Model Diagnostic Tests

Diagnostic tests are important for validating a model and establishing a relationship between the independent and dependent variables. The LM test was used to perform the autocorrelation test.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

Descriptive Statistics Summary

To determine the overall pattern and trend of the dataset, descriptive statistics were used. It was presented in the form of summary statistics using measures of central tendency as shown below.

Yearly percentage change in ICT as a percentage of total population showed a mean of 6.55 percent, with a low of 0 percent in the early 1990s when ICT usage in Africa was low and a high of 25.06 percent in 2013 when the ICT Authority was established to rationalize and streamline government ICT services in Kenya.

The per year percentage change in political instability was measured by diverse 12 political stability indicators, with the highest index of 12 indicating a politically stable nation. With a minimum of 4, a maximum of 9.92, and a standard deviation of 1.68 percent, Kenya had a mean of 7.1, indicating an averagely political stable nation.

Table 4.1. Summary of Descriptive Statistics

Variable	Obs.	Mean	Std. deviation	Minimum	Maximum
GDP	31	3.794294	2.384278	-.799494	8.405699
ICT	31	6.554595	7.742937	0	25.0638
PI	31	7.161936	1.681534	4	9.92

Source: Research Data, 2021

TIME SERIES PLOTS OF VARIABLES AT LEVELS

The first step in developing a dynamic econometric model, according to Lütkepohl *et al.* (2006), is to conduct a thorough examination of the individual time series characteristics of variables involved. Thus according Hamilton (1994), such an approach is required because when modeling the data generation process of a system of potentially linked variables, the characteristics of individual time series must be taken into account.

Figure 4.1 shows variables at their levels; visual inspection reveals that economic growth rate and political instability have weak stationary. The graphs of ICT showed an upward trend. Seasonal fluctuations and the presence of outliers in the data set are attributed to this scenario.

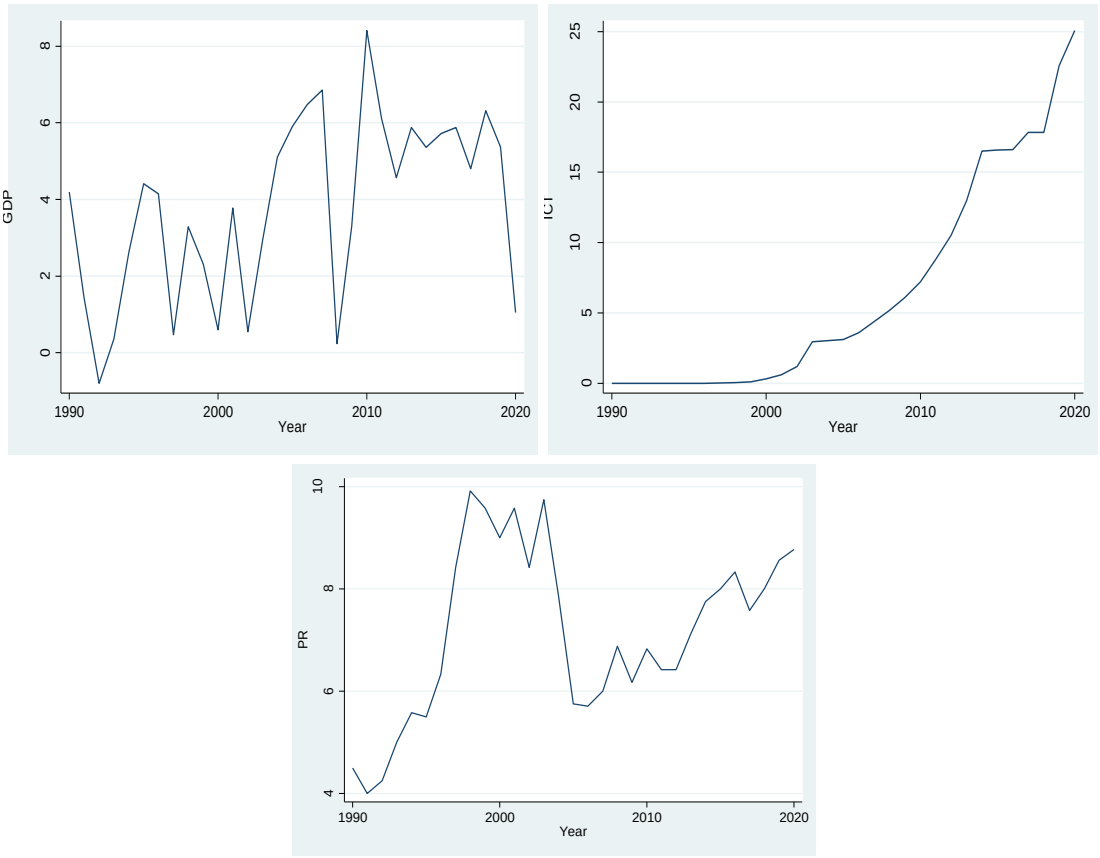
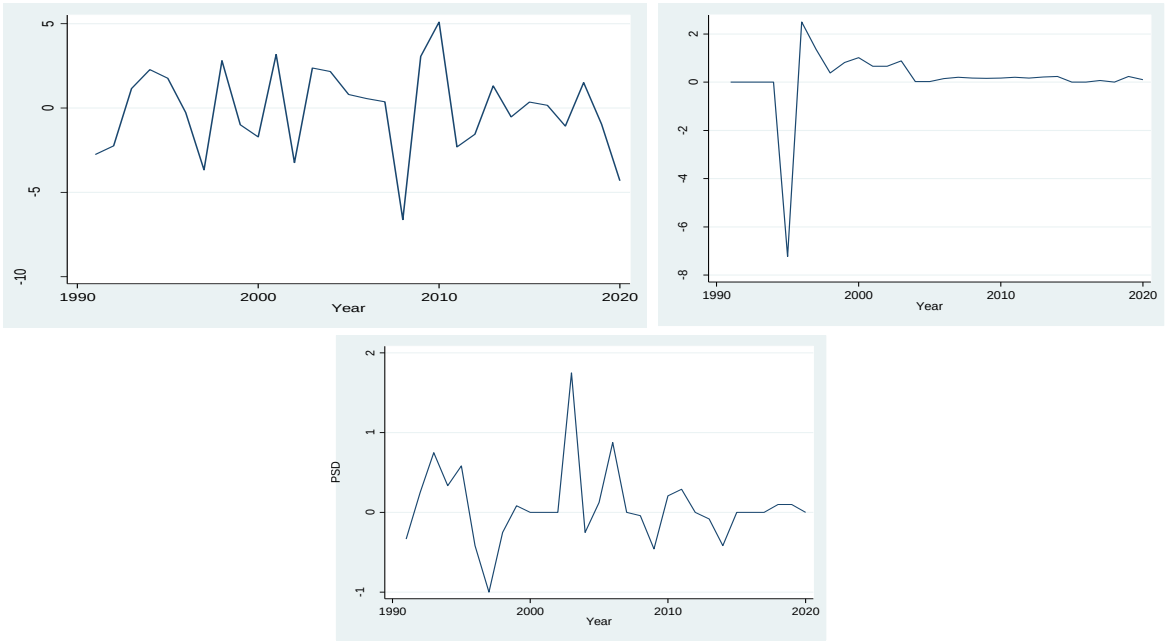


Figure 4.1: Plots of variables at levels

TIME SERIES PLOTS OF VARIABLES AT FIRST DIFFERENCE

Figure 4.2 shows the first difference plot of the variables under investigation. Because they have a clear mean reverting characteristic, the differenced variables are stationary(D. Gujarati, 2012).



Source: Research Data, 2021

Figure 4.2: Variables at First Difference

The result in table 4.2 indicated that all variables were stationary at 5% level of significance with $p\ value < 0.005$ upon first difference.

Table 4.2: Augmented Dickey Fuller Unit Root Tests at Level and First Difference

ADF Unit Root Test at Level						
			Critical Values			
Variables	p-values	ADF Test Statistic	1%	5%	10%	Remark
GDP	0.0185	-3.227	-3.716	-2.986	-2.624	Stationary
ICT	0.9990	2.470	-3.716	-2.986	-2.624	Unit root
PS	0.3791	-1.803	-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)
ICT	0.0003	-4.946	4.352	-3.588	-3.233	I (1)
PS	0.0001	-4.694	4.352	-3.588	-3.233	I (1)

Source: Research Data, 2021

BOUNDS TEST

According to Pesaran *et al.* (2001) when the calculated F statistic is greater than the upper bound critical value, the null hypothesis is rejected, it indicates that the underlying variables in the study are co-integrated. If the F-statistic is less than the lower bound critical value, the null hypothesis is accepted, suggesting that there is no co-integration among the variables. Equally, if the F-statistic is between the upper and lower bounds, the order of integration or co-integration must be known in order to make a conclusive reference. Based on this study's results in table 4.3 below, the calculated F statistic of 7.824exceeds the upper bounds at 5 percent significance levels, indicating that the variables have a long run relationship.

Table 4.3. Bounds Test

	H_O: no level relationship			F = 7.824, t = -3.468
	Critical Values 0.1		0.05	0.01 0.025
	[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_01 L_01
k_6	3.17 4.14	3.79 4.85	4.41 5.52	5.15 6.36
	Accept if F $<$ *critical value for I (0) regressors.*			
	Reject if F $>$ *critical value for I (1) regressors.*			
	Critical Values 0.1		0.05	0.025 0.01
	[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_01 L_01
k_5	-2.57 -3.21	-2.86 -3.53	-3.13 -3.80	-3.43 -4.10

Source: Research Data, 2021

DIAGNOSTIC TESTS

Lagrangian Multiplier Test for Residual Autocorrelation

Serial auto-correlation is the correlation that occurs when residuals in one period $\mathcal{E}_t$ are correlated with residuals in previous lags $\mathcal{E}_{t-1}$. According to (Lütkepohl *et al.*, 2006) a null hypothesis of no serial correlation is accepted if $p - value$ is greater than 0.005 at 5% level of significance otherwise rejected. Breusch–Godfrey LM Test was used. Table 4.4 results indicated a p – value was 0.7203> 0.05 at 5% level of significance the null hypothesis of no serial autocorrelation was accepted.

Table 4.4. LM test for Autocorrelation

Lags	$Chi2$	Df	Prob> Chi2
1	0.128	1	0.7203

Source: Research Data, 2021

STABILITY TEST

CUSUMQ Test

If indeed 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 4.3 shows that there were no structural breaks in the modeled variables, indicating a stable model.

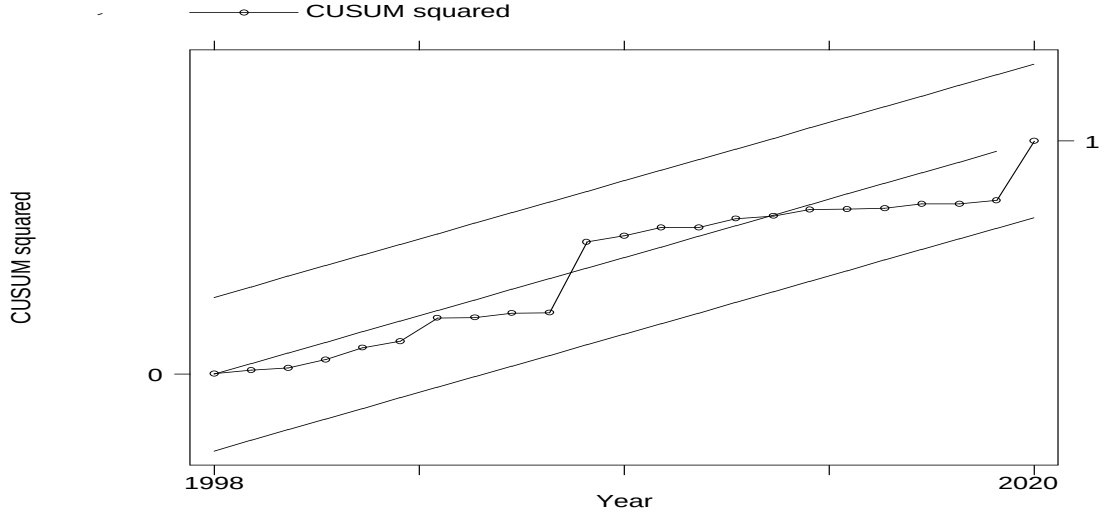


Figure 4.3: CUSUMQ Stability Test

LONG RUN ARDL MODEL WITH ERROR CORRECTION AND HYPOTHESIS TEST FOR DIRECT EFFECT

The bound test co-integration results indicated that the variables are co-integrated of $I(0)$ and $I(1)$ in the long run. Subsequently, long run and short run equations were established together with the adjustment term. Optimal lags were chosen automatically using information criteria, AIC. The regression output was reported in table 4.5.

Table 4.5: ARDL with Error Correction Model

Sample 1990 – 2020 Log likelihood = -62.799755				Number of observations = 31 R-squared= 0.2991 Adj R-squared = 0.2452 Root MSE= 2.2281	
ARDL(1,0)					
	D.GDP	Coef.	Std. Err	T	P > |t|
ADJ	GDP				
	L1	-.6706421	.2130232	-3.15	0.004
LR	ICT	.0891572	.0850876	1.05	0.304
SR					
	Cons	2.166543	.793515	2.73	0.011

Source: Research Data, 2021

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Table 4.5 above shows that the R square has a value of 29.91% and adjusted R squared has a value of 24.52 %suggesting that 29.91% % of the variations in economic growth are explained by Information telecommunication and technology, ICT on economic growth while the rest is accounted for by the residual term. Speed of adjustment to the long run equilibrium is negative and significant (p – value 0.000 < 0.05) with a coefficient of – 0.671, indicating short run adjustments due to shocks converge to equilibrium. A highly significant coefficient of – 0.671 (p value 0.004) indicates that about 67.1% of any disequilibrium caused by the innovations in the explanatory's are corrected annually.

ICT changes affect economic growth in the long run as indicated but the effect was insignificant with a coefficient of .089 p – value 0.304 > 0.05 level of significance. Information and communication technology (ICT) is currently one of the most important drivers of global economic growth. The findings are consistent with Chavula (2013)earlier study on telecommunications development and economic growth in selected African countries. Internet usage did not contribute significantly to economic growth in both low-income and low-middle African countries, according to regression results. This is because an e transaction has not been embraced fully in Africa.

According to Baliamoune-Lutz (2003), most African countries, including Kenya, are still in the early stages of e-commerce development. These countries have mobile producers and sellers, so they can access the market even if they are unable to go to it. Aside from that, buyers in Tropical are encouraged to inspect goods carefully before purchasing them, and they are also encouraged to taste before purchasing, which is not the case when conducting online transactions. Before the internet's potential as a medium for conducting business transactions is fully realized, such advancements will undoubtedly make purchasing via the internet unappealing in developing economies, particularly those in Africa.

Bahrini *et al.* (2019) studied the effects of ICT on economic growth in selected African and Middle Eastern countries. The econometric results revealed a positive and statistically significant correlation between economic growth and ICT indicators such as Internet usage and broadband adoption however the study agreed with the current study on the effect of fixed telephone on ICT as did not spur significant impact on economic growth.

Table 4.6: ARDL with Error Correction Model with Political Instability as the Moderator

Sample 1990 – 2020 Log likelihood = -39.245074				Number of observations = 31 R-squared= 0.8194 Adj R-squared = 0.6527 Root MSE= 1.5482	
ARDL(5,5,0)					
	D.exp	Coef.	Std. Err	T	P > |t|
ADJ	EXP				
	L1	-1.545923	.4457085	-3.47	0.004
LR	ICT	-.0520395	.0848627	-0.61	0.550
	PI	-.4911611	.1897284	-2.59	0.022
SR					
	GDP				
	LD	.3697076	.3462305	1.07	0.305
	L2D	-.123816	.2962956	-0.42	0.683
	L3D	.071022	.2193913	0.32	0.751
	L4D.	-.219915	.1795063	-1.23	0.242
	ICT				
	D1.	.9497408	.453033	2.10	0.056
	LD	.0374561	.3539499	0.11	0.917
	L2D	.8534233	.4237542	2.01	0.065
	L3D	.0027605	.4772408	0.01	0.995
	L4D.	1.923172	.5814666	3.31	0.006
	Cons	10.19808	2.89097	3.53	0.004

Source: Research Data, 2021

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The table 4.6 above shows that political instability has satisfied one of the conditions for moderation since it has got a significant effect on the dependent variable. About 825 of the variations I economic growth are now explained by ICT and political instability. The table too indicate that ICT significantly and positively affects economic growth p value<0.005 at lag four. The results conforms with Farhadi *et al.* (2012) that discovered a positive and significant relationship between technology and ICT and economic growth. In high-income countries, the impact of ICT on economic growth was greater than in low-income countries. As a result, each country's implementation of specific policies will maximize ICT usage.

Furthermore, the findings of Salahuddin *et al.* (2017), who found no link between internet usage and economic growth in the short term, are consistent with the findings of this study. The study concludes that policymakers recognize the importance of internet usage and encourage investment in building and expanding internet infrastructure based on the findings. However, the study differed from other similar studies in that it established a positive and significant correlation over time.

However, political instability affects economic growth negatively with the coefficient of -.49 and p value 0.022< o.005 level of significance. This is in line with the findings of Elbargathi *et al.* (2019), who looked at the impact of political instability on economic growth in Egypt, Jordan, Lebanon, and Tunisia from 1996 to 2016. The study looked into whether there was a link between five political indicators and economic growth over time. Panel data analysis was used for the four Arab countries studied, with annual data spanning the years 1996 to 2016. Based on the Vector Error Correction Model (VECM), the study's empirical findings highlighted the impact of various political instability indicators on economic growth. According to the findings, indicators of corruption control and rule of law have the greatest impact on economic growth, while regulatory quality has the least.Kaplan *et al.* (2017)used GMM to examine political instability, corruption, and economic growth in a panel of OECD countries from 1984 to 2012. The paper's main goal was to look into the empirical links between economic growth and a variety of political instability indicators like corruption, government instability, internal and external conflicts, religious and ethnic tensions, democratic transparency, and bureaucracy efficiency. Political instability is negatively related to economic growth, according to the findings, which agree with the majority of literary works.

MODERATING EFFECT OF POLITICAL INSTABILITY ON THE RELATIONSHIP BETWEEN ICT AND ECONOMIC GROWTH

In the long run, the interaction between political instability and ICT was negative and significant, with a coefficient of 0.81 and a p-value of 0.0000.05 level of significance, according to the moderation results in table 4.7. The short run results also showed a significant effect of the first difference; first lagged difference of the interaction, with P values of 0.003 and 0.012, respectively, at the 0.05 level of significance.

ICT, political stability, and other macroeconomic drivers are all important contributors to economic growth. ICT has a positive effect on economic growth among European country member states, as per Toader *et al.* (2018), but the effect varies depending on the type of technology used. The findings of the study are consistent with Solow's economic theory, which suggests that in a situation of full employment, technology can improve output.

According to Muriithi *et al.* (2016), the political environment, which includes the research environment, national and institutional ICT, and other factors, determine the effects of ICT in collaborative research that contributes to economic development. Politically stable governments support ICT infrastructure by increasing investments, such as adequate internet connectivity and favorable institutional policies that make ICT more accessible.

Table 4.7: Interaction Effect of Political Instability on the Relationship between ICT and Economic Growth

Sample 1990 – 2020 Log likelihood -38.623083				NO: of observations = 31 R-squared= 0.8279 Adj R-squared = 0.6689 Root MSE= 1.5116	
	D.GDP	Coef.	Std. Err	T	P > |t|
ADJ	GDP				
	L1	-2.162881	.3792911	-5.70	0.000
LR	ICT	.1937888	.0471481	4.11	0.001

	PR	.7362117	.248684	2.96	0.011
	PI*ICT	-.805328	.1360811	-5.92	0.000
SR					
	PI*ICT				
	D1	1.352897	.3723186	3.63	0.003
	LD.	8937179	.3048366	2.93	0.012
	L2D.	.2707767	.1626505	1.66	0.120
	_cons	4.606392	.9506948	4.85	0.000

Source: Research Data, 2021

This moderation finding is further supported by Figure 4.4 below, which shows that when ICT is in its early stages, political instability is also high, along with high GDP levels. This is an interaction effect that is either antagonizing or reversing. Economic growth slows as the level of ICT rises in tandem with increased political instability. The findings are consistent with those of with Iro-Idoro *et al.* (2015) who looked at ICT as a strategy for improving political stability and economic growth in Nigeria. The study found that when information and communication technology (ICT) is used correctly, it improves political stability and economic development.

Political stability is a double sword if it is associated with a single party for an extended period of time. The economy does well in attracting foreign investors due to political stability, which creates a favorable investment environment. However, due to a lack of competition and complacency, the economy may suffer. For example, India's economic performance averaged 3-3.5 over a long period of political stability, but in recent years, the country has seen several changes in prime minister, a sign of political instability, and economic growth has topped double digits. As a result, not all forms of political stability lead to economic expansion (Hussain, 2014).

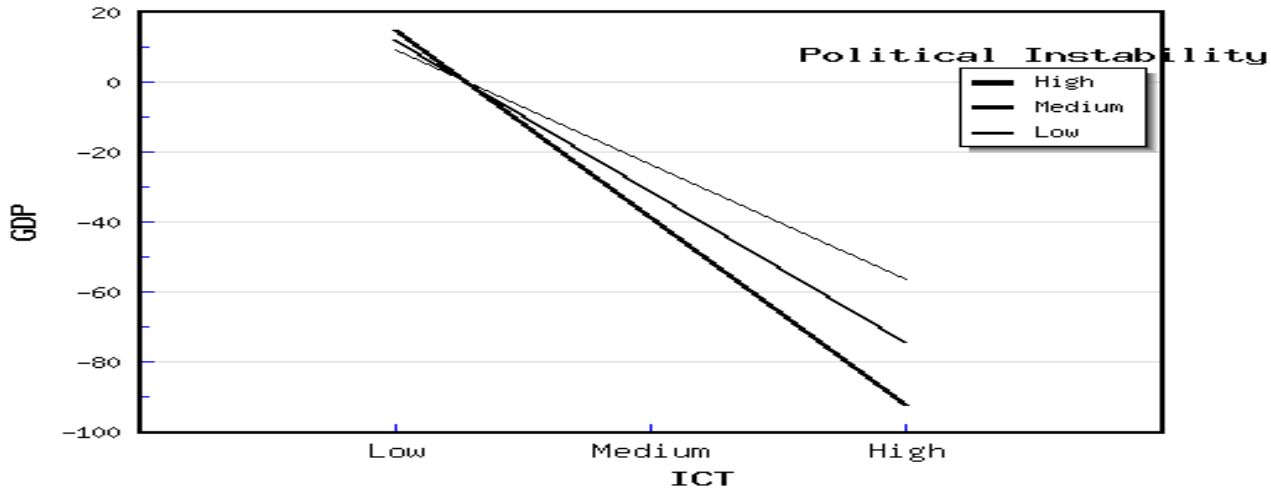

Figure 4.4: Moderating Effect of Political Instability on the Relationship between ICT and Economic Growth

CHAPTER FOUR

CONCLUSIONS AND RECOMMENDATIONS

It was hypothesized that there is no significant effect of ICT on economic growth in Kenya. From the results ICT usage did not statistically affect economic growth and therefore it was concluded that ICT does not affect economic growth in Kenya in the long run during the study period.

However, when political instability was used to moderate the relationship between ICT and economic growth, it was discovered that the relationship was moderated and that ICT had a significant positive impact on economic growth in the long run. This implies that political unrest plays a significant role in determining Kenya's economic growth.

RECOMMENDATIONS

Governments should encourage technological advancements, as well as the use of the Internet for e-learning, business transactions, and other forms of interaction. Governments should invest in the ICT sector because of its critical role and contribution to ICT, such as Rwanda's free wireless internet in Kigali city, to attract investors and e-transactions. Policymakers should regulate the ICT sector to make it more accessible and affordable in order to capitalize on the positive effects of ICT on economic growth.

The government should strive to improve political stability and promote good governance in order to boost economic growth. This could be done by gradually establishing institutions that uphold the rule of law and provide security. Kenya will become an investment hub in East Africa's horn, with a double-digit growing economy.

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