THE EFFECT OF RULE OF LAW ON TOTAL FACTOR PRODUCTIVITY IN KENYA

PETER MUCHUGU MUNGAI

K102/CTY/PT/38163/2017

A PROJECT SUBMITTED TO THE SCHOOL OF ECONOMICS, BUSINESS & TOURISM IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR A MASTER'S DEGREE IN ECONOMICS (POLICY AND MANAGEMENT) OF KENYATTA UNIVERSITY.

NOVEMBER, 2023

DECLARATION

This project is my original work and has not been presented for a degree in any other University or any other award.

Signature …….Date……..

Peter M. Mungai

B.A Economics.

K102/CTY/PT/38163/2017.

I confirm that the work reported in this thesis was carried out by the candidate under my supervision

Signature……..Date…….

Dr. Shadrack M. Mwilaria

Department of Economic Theory

Kenyatta University.

DEDICATION

I dedicate this work to my Dad, James Mungai, Mom, Ruth Njambi, late bro Ken, and Sisters Beth and Jane for your unconditional love and unwavering support throughout my life; I would never trade you for anything in this world.

ACKNOWLEDGEMENTS

First, to the Almighty God, all glory and honor for granting me the gift of life, perfect health, energy, and endurance to undertake the program.

Secondly, to my able supervisor, Dr. Shadrack Mwilaria, I sincerely appreciate your guidance, insights, constructive criticism, contribution and motivation in writing this project. Equally, to all my lecturers in the School of Economics for imparting me with the knowledge and skills needed during the coursework.

Thirdly, my parents and siblings for your selflessness, sacrifice, and support both financially, emotionally, and spiritually. You made that extra mile to ensure I achieved all my dreams; I will forever be indebted to you, Dad, and mom. For my late bro Ken, thank you for making me believe I have the potential to achieve the highest level of academic excellence. To my lovely sisters Beth and Jane, thank you for holding my hand all through; I'm blessed to have you.

Lastly, to my classmates Joakim, Frecia, Aput, Doreen, and Ann, for your support during the entire program; I am grateful to my friends who were by my side and became my pillars of strength. Special mention to Joakim, Pinto, Paul, Sam, John, Gicheha, Ann, Josphine, Tabby, and Jackline; you have been more than brothers and sisters to me.

`

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS AND ACRONYMS

ALP	Aggregate labor Productivity
ADF	Augmented Dickey-Fuller Test
ARDL	Auto Regressive Distributed Lag
EAC	East Africa Community
ECT	Error Correction Term
ERS	Economic Recovery Strategy
GCI	Global Competitive Index
GDP	Gross Domestic Product
MENA	Middle East and North Africa
MTP	Medium Term Plan
NPCC	National Productivity and Competitiveness Centre
OECD	Organization for Economic Corporation and Development.
OLS	Ordinary Least Square
PCK	Productivity Centre of Kenya
RL	Rule of Law
SDG	Sustainable Development Goal
SSA	Sub-Saharan Africa
TFP	Total Factor Productivity
WDI	World Development Indicator
WEF	World Economic Forum
WGI	World Governance Indicators
WPT	World Penn Tables
WJP	World Justice Program
UNGA	United Nations General Assembly
VECM	Vector Error Correction Model

OPERATIONAL DEFINITION OF TERMS

Total Factor Productivity (TFP) is the variable that accounts for effects in output not explained by capital and labor and is measured as a residual.

Rule of Law (RL) refers to perceptions of the extent to which agents have confidence in and abide by the rules of society, particularly the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.

Adjusted Human Capital (AHC) refers to the skills and knowledge of workers adjusted for quality improvements due to educational attainment between the ages of 15 and 64 years.

Trade Openness (TO) refers to the extent to which a country engages in transactions with the rest of the world

Aggregate Labor Productivity (ALP) refers to a measure that summarizes the average contribution of labor to the production of goods and services in an economy. .

ABSTRACT

Economies across the globe have witnessed wide variations in incomes, inviting researchers and policy makers to explore various interventions to bridge the gap. Among the interventions floated is focusing more on productivity levels than the accumulation of inputs. Total Factor Productivity, defined as a measure of output growth not explained by factor inputs, has been fronted as the solution to the widespread variations. Kenya targets achieving an annual Total Factor Productivity growth rate of 2.5 from the current 0.352 to achieve vision 2030 and Sustainable Development Goals. One way to increase Total Factor Productivity is by creating an enabling and conducive environment where factor inputs operate. Institutions, specifically the Rule of Law, play a vital role in ensuring a thriving environment is created. This project, therefore, sought to establish how the Rule of Law affects Total Factor Productivity in Kenya from 1996 to 2021. The period of study was chosen based on the availability of data. A time series data set from secondary sources was used. The research objectives of this project were; (i) to determine the trend of Total Factor Productivity in Kenya and (ii) to determine both the short-run and the long-run effects of the Rule of Law on Total Factor Productivity in Kenya. The standard growth accounting approach was used to determine the trend of TFP. The significant departure from the existing computed Total Factor Productivity estimates was the inclusion of labor quality improvements due to educational attainment. The second objective was achieved using an Auto Regressive Distributed Lag Model with an error correction term. The model was adopted due to the presence of co-integration relationships as established by the ARDL bound test. The ARDL bound test for co-integration was employed since variables were found to be of mixed series. Total Factor Productivity computations were done using Excel, while regression analysis used Stata. The study found incorporating labor quality improvements when computing Total Factor Productivity growth estimates yielded a 0.1041 average growth. In comparison, exclusion yielded a -0.9209 average growth, therefore, indicating the essence of factoring in improvements in human capital in TFP estimations. Secondly, the study found a positive long-run relationship and a negative short-run relationship between the Rule of Law and Total Factor Productivity in Kenya. Consequently, the study recommended that future computations of TFP estimates should include improvements in labor quality due to education attainment. Secondly, the study recommended that the government should support institutions that promote the entrenchment and adherence of rule of law.

CHAPTER ONE: INTRODUCTION.

1.1. Background of the study

Income variations across the globe continue to attract the attention of scholars, policymakers, and researchers on a plausible explanation for income variations. The difference in productivity levels, with the emphasis being on total factor productivity, has been fronted as the answer to the income variations since conventional economic theories such as Solow and endogenous growth theories have failed to explain the same. Factor input accumulation isn't enough to guarantee high economic growth rates and per capita incomes. Subsequently, prudent and efficient utilization of factor inputs becomes a key concern for policymakers. The utilization of resources shifts the discussion to productivity levels.

Observations can support the shift in the debate that countries with the same level of endowment of natural resources and within the exact geographical locations have been shown to develop differently. Equally, at the micro-level, firms in one industry have different profitability margins despite having access to the same level of materials and being in the same environment. This paradox justifies why the focus has shifted to productivity levels.

Kenya is not an exemption from the income variations witnessed across the world. A comparison between Kenya and Malaysia depicts a similar trend despite the two countries being at par in the 1970s. Malaysia has increased its per capita income from the low $400 in 1970 to $29000 in 2018. Surprisingly, Kenya has moved her per capita income to $1711 in the same period, according to the World Bank report (2018). Such variations invites empirical research to understand the variations. A country's output can be explained as a function of its input which includes the conventional inputs of labor and capital, as well as the efficiency parameter, which is the TFP.

1.1.1 Total Factor Productivity

Total Factor Productivity refers to the variable that accounts for effects in output not explained by capital and Labor. The efficiency parameter is highly significant in achieving economic growth, as observed by studies such as Van (2009), Park (2010), Eichegren, Park and Shin (2012), Aiyar and Duval (2013), Tran (2013), Zhao (2015) and Anne (2019). Eichengreen et al. (2012) established that 85 percent of growth stagnation could be attributed to an average decline in TFP. In contrast, a corresponding decrease in capital and Labor has a relatively minor role; therefore, improving productivity levels is a significant policy intervention in catching up with developed economies. Equally, Aiyar et al. (2013) established that the poor growth performances of Latin America were primarily because of negative TFP and not because of impediments to factor accumulation in comparison with emerging Asian Tigers such as China. The tremendous growth witnessed in the East Asia Tigers has been associated with a steady growth of TFP.

Tran (2013) observed that for poor and developing economies to attain developed status, they have to change the focus from factor accumulation to improvements in the productive capacity of the available resources. In Kenya, Anne (2019) found that TFP was the most significant contributor to economic growth. TFP importance cannot be underrated since it's a vital ingredient for economic growth. TFP growth allows society to improve their welfare, which is the sole goal of any government. Consequently, it's worthwhile for policymakers and researchers to ask which interventions are needed to spur TFP growth rate, which is the aim of this project.

Despite the massive investments in physical capital and increase in the labor force over the years, and the improvements in human capital as supported by high levels of school enrolment rates and an increase in institutions of higher learning, a look at Kenya's TFP over

the years shows TFP oscillating between a constant trend and a decreasing trend as shown in Figure 1.1.

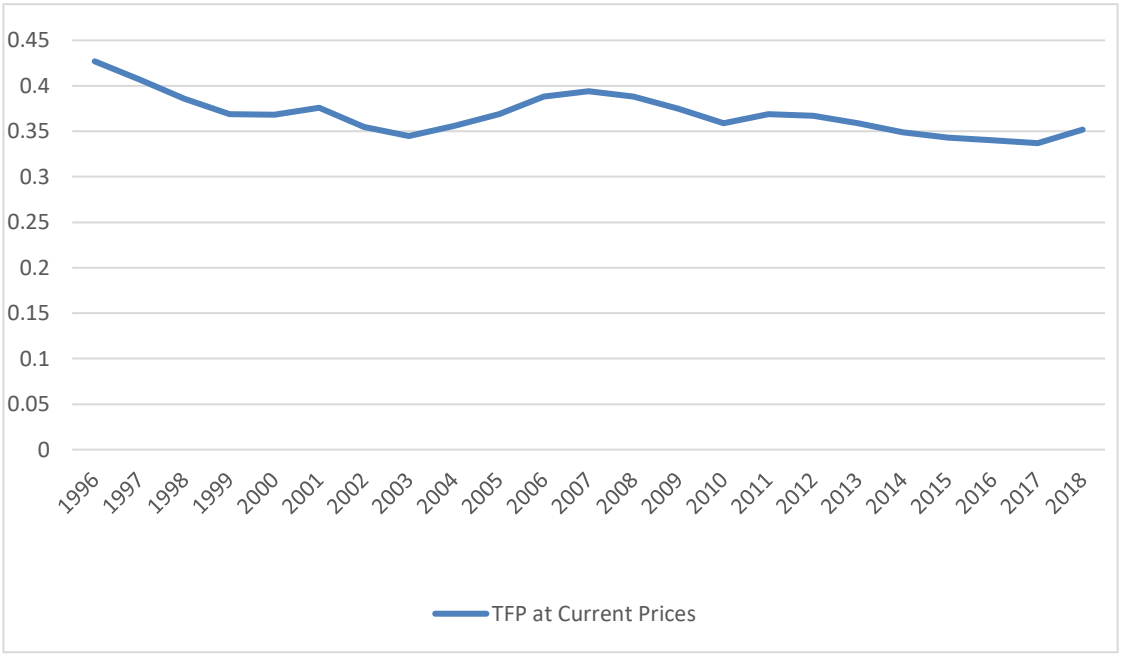

Figure 1. 1 The trend in TFP in Kenya for the period 1996-2018

Data Source; Penn International Tables (2019).

The Kenya TFP trend shows a decreasing rate, with the highest at 0.427 in 1996 and the lowest at 0.337 in 2017. According to Global Competitive Index (2021, Kenya ranks 95 out of 141 economies with a productive score of 45.6. The GCI is anchored in economic growth literature and has a progressive scale of 0-100, where 100 represents the frontier and is developed under 12 pillars, including institutional and governance quality. The GCI report (2021) showed that the productivity level in Kenya lags behind in comparison to world leaders especially the emerging South East Asia nations. Table 1.1 shows the productive scores of selected countries as per the GCI report (2021).

Table 1. 1 ; A Summary of Selected Countries' Productive Scores

Most productive (Globally)		Least Productive (Globally)		Most productive (SSA)		Least Productive (SSA)		Most Improved (Globally)	
Singapore	84.8	Chad	35.1	Mauritius	64.3	Chad	35.1	G. Bissau	2.9%
USA	83.7	Yemen	35.5	South Africa	62.4	DRC	36.5	Burundi	2.7%
Hong Kong	83.1	DRC	36.5	Namibia	61.8	Mozambique	38.1	Uganda	2.1%
Kenya Productive Score		45.6		East Asia and Pacific Region productive score				73.9	
Kenya Improvement Rate		0.5%		Europe and N. America Region Productive Score				68.7	
SSA improvement Rate		2.5%		Sub Saharan African Region Productive Score				46.3	

Source; Global Competitive Index Report, (2021).

Table 1.1 shows that the top three productive economies globally are Singapore, the USA and Hong Kong, with productive scores of 84.8, 83.7, and 83.1, respectively. The bottom three economies are Mozambique, Haiti and DRC, with 38.1, 36.3 and 36.1, respectively. East Asia and Pacific Region are the most productive regions, with a median score of 73.9, followed by Europe and North America with a score 68.7. Sub-Saharan Africa is the least productive, with a median score of 46.3. However, on a positive note, SSA was the most improved with an improvement rate of 2.3 percent. Mauritius was the most productive economy in SSA, with a score of 64.3, followed by South Africa with 62.4, and lastly Namibia with a score 61.8. Guinea Bissau, Burundi and Uganda, recorded the most significant improvements with 2.9, 2.7 and 2.1, percent, respectively. Kenya's productive score was 45.6 which is below the SSA median score. The improvement rate for Kenya was 0.5 percent.

Low productivity levels in Kenya have been identified as the biggest threat to the transformation envisaged in Vision 2030 of achieving an annual GDP growth rate of 10 percent. This is an apparent shortfall bearing in mind until 2020, Kenya's GDP growth rate

was 6.4 percent. Kenya's National Productivity Policy observes that productivity has remained low at an index of 0.84 in comparison to the East Asia countries, where the productivity index is five.

The problem of low productivity prompted the establishment of a legal framework to guide improvements in productivity levels through the enactment of The National Productivity Authority Act (2013), which drove the renaming of the Productivity Centre of Kenya (PCK) to National Productivity and Competitiveness Centre (NPCC). It's in the backdrop of this severe threat that low productivity levels pose to attaining Vision 2030 and SDGs that led to this study. Kenya has a long way to go to enhance productivity and compete globally. One way to improve the productivity level of Kenya is to improve institutional quality.

Isaksson (2007), after reviewing extensive literature on TFP, concluded that there are five drivers of TFP: innovation, education, market efficiency, physical infrastructure, and governance / institutional quality. The author noted that high-quality institutions provide a friendly environment and policies that increase productivity spurring economic development. Institutions are essential components, and their quality is generally associated with productivity. It is this driver of TFP that this study explored.

1.1.2 The Rule of Law and Institutions

The significance of institutional matrix in the growth agenda of different economies has been explored exhaustively with the empirical works of Acemoglou, Robinson & Johnson (2000), (2004), (2012), Rodrick (2007), Lubker, Smith and Weeks (2002), and North (1990) providing significant contributions. Institutions are the game's rules that configure human interactions in the social, economic and political arena. The need to constrain human behavior is necessary because humans are rational beings who act on the principle of self-interest to derive maximum benefit or utility, hence the need for self-made rules. Interactions of human beings and other economic agents, such as firms, are occasioned by transaction and

production costs. Institutions play a vital role in their interplays since they determine both the transaction and production costs, ultimately determining the feasibility of an exchange.

Additionally, exchange agreements and contractual obligations are needed to facilitate smooth interactions among the economic agents. Therefore, resources are required to define, interpret, and enforce contracts that affect the country's economic performance. According to Acemoglou, et al. (2004), there are two institution categories: inclusive and extractive.

Inclusive institutions relate to a system of checks and balances, secure property rights, an impartial law system, an independent judiciary, and prudent utilization of public resources. The former promote the effectiveness of contractual enforcements and reduce transaction and production costs per exchange, ensuring maximum gains from the trade exchange are realized. Gains in terms of profits, wealth, or welfare are the incentives to trade and innovation, which is vital for economic growth. Inclusive social, political, and economic institutions are essential to an effective institutional matrix that creates a favorable economic environment that nurtures creativity, innovation, and productivity. Inclusive institutions promote private property rights, secure property rights, patents, and enforce contractual obligations, which help build investors' confidence in a country.

On the other hand, extractive institutions relate to non-existent property rights, a biased law system, disregard for the law, and a judiciary directed by the executive. Okinade and Adebayo (2021) observed that the latter create a weak and poorly developed infrastructure that cannot check excesses, corruption, abuse of power, and violation of the Rule of Law. A poorly-developed institutional framework hinders the channelization of capital from fostering productive investment, promoting increased productivity and sustainable growth.

Extractive institutions do not instill confidence in property rights, private property, and enforcement of contracts, lowering the likelihood for investors to invest. Additionally, Barbier and Burgess (2021) opines that strong institutions are a catalyst for speedy growth.

Institutions encourage and nurture various economic activities that promote the accumulation of human capital and innovations, brought about by complexities in economic processes that call for productivity improvement.

North's (1991) work demonstrated the effect of institutions in explaining why Spain, which was the great power of the 16th century in Europe, declined while the Northlands and England flourished. According to the author, protecting private property, securing property rights, and enforcing contracts made the difference between Spain and England. Additionally, Acemoglou et al. (2004) highlighted the example of South Korea and North Korea, which are similar in many aspects. South Korea, which adopted inclusive institutions, fostered economic growth, productivity, and prosperity. North Korea adopted extractive institutions that are inclined to the suffering of most citizens to benefit a few elites in power, continued to stagnate in growth, productivity, and innovation.

The importance of institutions was captured adequately by North and Thomas (1973) in their work when they observed that factors emphasized by the economic theories, including innovations and human capital development, are not growth factors, but rather outcomes of growth and therefore the plausible explanation for different levels in incomes is institutions.

Additionally, Acemoglou et al. (2004) collaborated with North and Thomas (1973) regarding the importance of institutions in output growth. The scholars observed that institutions determine the structure of economic incentives in the country and help in efficient resource allocation. Therefore, the caliber of institutions is a vital consideration in expounding the overall economic performance, since their evolutions leads to growth, stagnation, or decline. Hussein (2016) report captured the nexus between institutions and TFP. The findings were that the dismal performance of TFP in Sub-Saharan Africa resulted from poor institutions and restrictive trade policy. The findings suggested that improving institutional quality in SSA

provides considerable room to speed up TFP growth rates. Equally, a comparative analysis of the report shows that SSA has the lowest institutional quality and TFP.

Adherence to the Rule of Law is a vital determinant for the institutional quality. The World Governance Indicators (WGI), defines the Rule of Law as the perceptions of the extent to which agents have confidence in and abide by the rules of society, particularly the quality of contract enforcement, property rights, the police, and the courts as well as the likelihood of crime and violence.

The rule of Law is the cornerstone and foundation of democracy, forming the basis of economic development. Furthermore, the Rule of Law creates an enabling environment for steady and fundamental growth, translating to increased rates of economic growth and a more even society. Countries that have disregarded the Rule of Law have witnessed massive embezzlement of public resources, abuse of human and property rights, and lawlessness that often results in anarchy.

Aresty and Bridgesmith (2021) from the World Justice Program (WJP), ranks countries on the rule of law index. The index is from zero to one where zero is the minimum score while one is the maximum score. Table 1.2 provides a summary of selected countries with the maximum and minimal scores both globally and in the Sub Saharan Africa.

Table 1. 2; A Summary of Selected Countries' Productive Scores

Top Three in RL Index (World)		Bottom Three in RL Index (World)		Top Three in RL index (SSA)		Bottom Three in RL Index (SSA)	
Denmark	0.90	DRC	0.33	Namibia	0.62	Cameroon	0.37
Norway	0.89	Colombia	0.32	Rwanda	0.61	Mauritania	0.35
Finland	0.87	Venezuela	0.28	Mauritius	0.60	DRC	0.33
Highest Improvement Rate		**Highest decline rate**					
Ethiopia	5.6%	Cameroon	4.6%	Kenya's Rule of law Index		0.48	
Malaysia	5.1%	Iran	4.1%				

Source; World Justice Program, 2021

As presented in Table 1.2, Denmark was ranked as the top country in the Rule of Law index with a score of 0.90, followed by Norway in the second position with a score of 0.89 and Finland in the 3rd rank with 0.87. DRC, Colombia, and Venezuela were ranked the poorest scoring 0.33, 0.32, and 0.28, respectively.

Globally, more countries registered a decline. Namibia was ranked first in SSA with a score of 0.62, followed by Rwanda in the second position with a score of 0.61, and Mauritius closed the top three spots with 0.60. The poor performers in SSA were Cameroon, with a score of 0.37, Mauritania with 0.35, and DRC with 0.33, respectively. Ethiopia and Malaysia registered the highest improvement rates at 5.6 and 5.1 percent, respectively. On the other hand, Cameroon and Iran had the highest decline rates at 4.6 and 4.1 percent, respectively.

Kenya's trend in the Rule of Law since the inception of the World Governance Indicators in 1996, is represented in Figure 1.2.

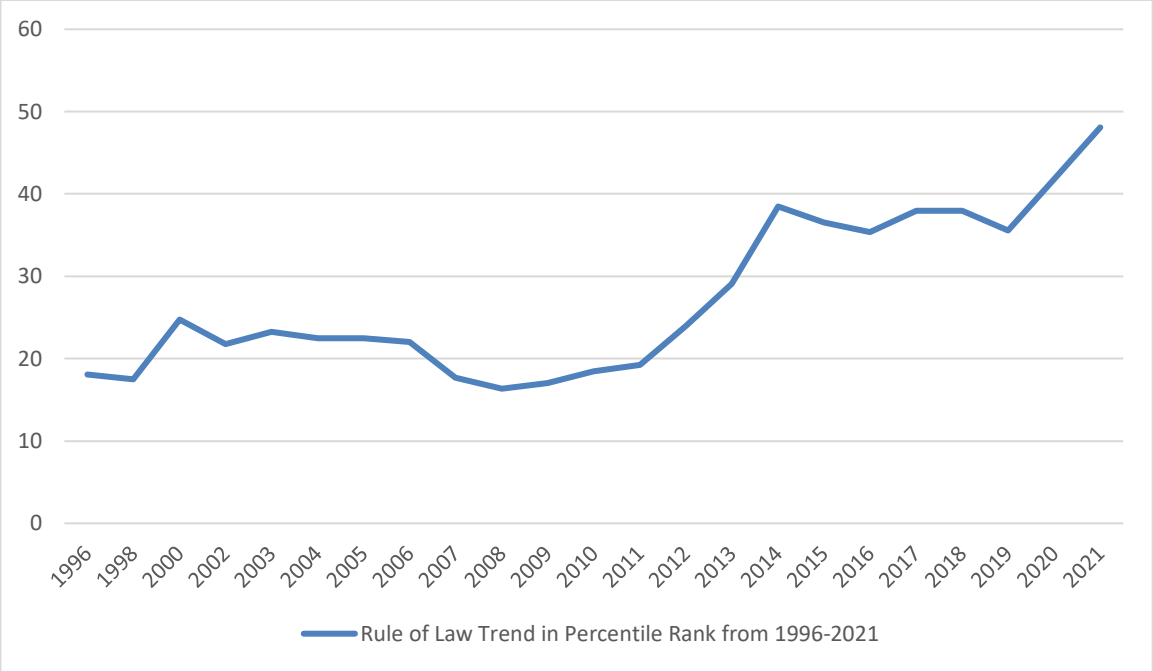

Figure 1. 2 The trend of Rule of Law in Kenya from 1996-2021

Data Source; World Governance Indicators Report (2021).

Figure 1.2 shows an upward trend for the period under review. However, the performance has declined in 2008 and in the recent past, from 2014 to 2019 but with an improvement in the last two years. The highest score obtained was 48.08 percent in 2020, while the lowest was 16.35 percent in 2008. Kenya was ranked 102 out of 128 countries in the index. This was a marginal improvement compared to yester year where Kenya was ranked position 105. However, the current status leaves room for improvement, and more needs to be done for Kenya to score above average.

Cuenca, Sanchez and Pabsdorf (2019) captured the relevance of the Rule of Law in analysing MDGs and SDGs. The authors noted that one of the reasons that MDGs were not achieved is because of failure by member countries to follow the Rule of Law principle, which was agreed by the United Nations General Assembly. The author opined that SDGs would suffer the same fate as the MDGs if countries disregard Rule of Law principles, especially in less developed economies.

Rule of Law has been chosen as the variable of interest since the sub-indicators constituting the Rule of Law index touch on other governance indicators according to WGI. Rule of Law is also among the six World Governance Indicators (WGI) that measure governance and institutional quality. Cuenca et al. (2019) noted that upholding the Rule of Law promotes productivity by ensuring disputes are solved amicably, enhancing fairness, accessibility, involvement, openness, empowerment, and equality to the law. It's, therefore, not a coincidence that Kenya ranks poorly on the Rule of Law and productivity index. A diagnosis is needed, which justifies the need for this study.

1.2 Problem Statement.

Kenya has made significant achievements in factor accumulation, as evident by the growth in capital and labor. As per the author's computation, the capital stock has grown at 138.2 percent during 1996-2021, while labor has also grown significantly at 107.96 percent in the same period. The quality of human capital has greatly improved with high school enrolment rates and better health care. However, TFP growth hasn't been in tandem with the growth of factor inputs depicting decreasing trend from an index value of 0.427 in 1996 to 0.352 in 2018, according to data from World Penn Tables (2019).

Despite SSA region being the most improved in productivity with an improvement rate of 2.3 percent, Kenya's improvement rate is 0.5 percent which is still far below the improvement rate of the region, according to the Global Competitiveness Index (2021). Similarly, at 45.6, Kenya productive score is still below the median score of the Sub Saharan Africa which is at 46.3. Equally, a TFP of 0.352 is far below the recommended TFP Growth minimum rate of 2.5 for attaining Vision 2030, per the National Productivity Policy.

Failure to address the low productivity levels will risk achieving Kenya Vision 2030 and the SDGs. One way to manage low productivity levels is through upholding the Rule of Law. Rule of Law provides an apt approach for creating an efficient economy with an enabling

environment, for improving the welfare of the citizens. Additionally, it is the fabric of economic prosperity as it promotes institutional quality, encourages efficient macroeconomic management, and ensures effective implementation of growth-enhancing policies that positively impact TFP.

The need to uphold Rule of Law was underpinned in the UNGA at its 67th session, where member states affirmed their commitment to upholding the Rule of Law in a consensus of a declaration on Rule of Law. Moreover, the Agenda 2030 notes that sustainable development can't be achieved without an equitable and inclusive society, which can only be achieved through a strong Rule of Law. The significance versus the consequences of not upholding the Rule of Law necessitates an empirical study to test the interrelationship that exists between the two variables, which the study seeks to achieve.

1.3 Research questions

The research questions that the study seeks to answer are;

i. What is the trend of Total Factor Productivity in Kenya?
ii. How does the Rule of Law affect Total Factor Productivity in Kenya in the short and long term?

1.4 Research objectives.

The general objective of this paper is to establish the relationship between the Rule of Law and the Total Factor Productivity of Kenya.

The specific objectives are;

i. To determine the trend of Total Factor Productivity in Kenya.
ii. To determine how the Rule of Law affects Total Factor Productivity in Kenya in the short and long term.

1.5 Significance of the Study.

The study sought to explain the importance of the Rule of Law in explaining the sub-optimal performance of Kenya's economy. It will be critical in advising different groups in the economy.

First, the policymakers in understanding how Rule of Law and, by extension, institutional quality impacts the economic level in Kenya. This will assist them in developing policy interventions and allocating adequate resources geared toward entrenching, upholding, and adhering to the Rule of Law in Kenya.

Secondly, National Productivity and Competitiveness Centre (NPCC), established to guide and suggest ways to improve productivity levels in Kenya, will find this study resourceful.

Thirdly, the study will assist civil society groups that carry out civil education to the citizens and help them understand how the Rule of Law affects the outcomes of economic activities. Additionally, this study will help civil society to prosecute their case on the need to uphold the Rule of Law, especially by the Executive, as they play their role of keeping the government in check. The executive arm of the government should exercise goodwill and be in the forefront in promoting the independence of other institutions and state agencies such as the police service, directorate of criminal investigations, and office of the public prosecutions, among others which play a crucial role in maintaining, promoting and entrenching rule of law.

Scholars in academia and other independent researchers will find this study a great source of contribution in carrying out further research in the broader scope of governance and economic growth.

Lastly, the curriculum developers can use this study to provide a basis for incorporating governance lessons in the school curriculum, especially in secondary and post-secondary

education, to equip students to contribute better to societal matters and be agents of good governance after leaving school.

1.6 Scope of the Study.

The study is limited to Kenya covering the period 1996 to 2020. The justification for this period is informed by data availability. The World Governance Indicators (WGI) is the single most comprehensive database for Rule of Law and it was introduced in 1996, hence the study period starting in 1996. The last report was released in 2021.

CHAPTER TWO: LITERATURE REVIEW.

2.1 Introduction.

The chapter presents theoretical literature, empirical literature, and a summary of the literature reviewed.

2.2 Theoretical Literature.

This provides economic theories that have been found to explain the economic growth of a country.

2.2.1 Solow Theory.

The theory, as advanced by Solow (1988), postulates that, economic growth rate is driven by accumulation of factor inputs and improvement in productivity levels. A country's output can be presented in a simple form of a Cobb Douglas function;

$$Y= A*K^{\alpha} *L^{\beta} \quad \text{..... (2.1)}$$

Where Y is output, K is capital, L is Labor, alpha and beta represents the respective factor shares of inputs in output, and A is the TFP.

The unexplained change in the output growth after accounting for the effect of factor accumulation is referred to as Solow residual. The theory postulates that TFP cannot be estimated, excluding capital and labor. Therefore, the factor inputs' contributions must be considered when calculating TFP estimates. TFP measures productivity, which is represented by letter A. The theory is built on the following assumptions;

i. There is a stable functional relation between inputs and output at the economy-wide level of aggregation.
ii. That the function exhibits constant returns to scale, that is output increases by that same proportional change as all inputs change
iii. That inputs are paid the value of their marginal product

iv. That technical change has the Hicks neutral form, that is the ratio of marginal products remains the same for a given capital-labor ratio. The Solow Residual can be computed as follows.

Assuming the following Cobb-Douglas production function.

$$Y_t = A_t (K_t^{\alpha} L_t^{1-\alpha}) \quad \ldots\ldots\ldots\ldots (2.2)$$

Where *Yt* denotes real GDP, *At* is TFP, *Kt* is total capital, and *Lt* is total Labor used in the production process. Obtaining the derivatives for equation (2.1) with respect to time yields

$$\frac{\Delta Yt}{Yt} = \alpha \frac{\Delta Kt}{Kt} + (1-\alpha)\frac{\Delta Lt}{Lt} + \frac{\Delta At}{At} \quad \ldots\ldots\ldots\ldots (2.3)$$

Equation (2.2) is the key equation in the growth accounting framework. Specifically, the parameters *α* and *(1-α)* in (2.2) are input shares/elasticities, and α is obtained as

$$\alpha = (\Delta Y_t / \Delta K_t)(K_t / Y_t) \quad \ldots\ldots\ldots\ldots (2.3)$$

TFP is, therefore, a residual of the contributions of capital and labor, as shown below,

$$\frac{\Delta At}{At} = \frac{\Delta Yt}{Yt} - \alpha \frac{\Delta Kt}{Kt} - (1-\alpha)\frac{\Delta Lt}{Lt} \text{ and } \alpha = (\Delta Y_t / \Delta K_t)(K_t / Y_t) \quad \ldots\ldots\ldots\ldots (2.4)$$

This provides the theoretical background in which the trend of TFP in Kenya has been tested. Additionally, the Solow model helped in assessing the effect of Rule of Law on TFP in conjunction with the key factor inputs considered in the Solow framework. The interaction mechanism is that Rule of Law creates an enabling environment for the factor inputs to operate optimally.

2.2.2 Endogenous Growth Model.

It was developed by Romer (1994) as a critique to the Solow model. Unlike Solow's theory, where economic theory is viewed as exogenous, this theory postulates that economic growth is an endogenous outcome of an economic system. According to this model, instead of measuring growth by accounting for residuals that grow at different levels in different

economies, the empirical work in the endogenous world seeks to understand the patterns in the public and private sector that brings about the variations in growth rates observed across the globe. The endogenous school of thought arises from two issues that bothered economists in the early 1980s: the convergence controversy and the assumption of perfect competition.

The model brings out an important aspect of the role on public and private sector in explaining the different levels of growth witnessed. As previously discussed, constrains in form of rules are needed to regulate the interplays of economic agents hence the need to consider Rule of Law and by extensions the institutions involved both in the public and private sector.

2.2.3 Endogenous Technological change.

The model was developed by Romer (1994) where technological progress is considered as the key driver of output growth resulting from investment by profit-maximizing economic agents. In this case, technology is considered an input that is neither public nor private good. It assumes such features because it is non-rival in utilization; however, it excludes agents who don't invest in research. Due to the non-convexity introduced by non-rival goods, the model cannot support price-taking competition. The equilibrium in this model assumes monopolistic competition.

i. The stock of human capital determines the rate of growth.
ii. Having a large population is not sufficient to generate growth
iii. In most cases, there is very little human capital that is devoted to research.
iv. Greater openness or access to global markets increases growth.

The theory helps to strengthen the grounds for inclusion of labor improvements as well trade openness as variables to be considered in relation to the expected effect of Rule of Law on Total Factor Productivity.

2.3 Empirical Literature.

Rule of Law, as previously defined, refers to self-made constraints that shape human interaction in political, social, and economic spheres and is one of the critical governance indicators. At a broader level, considerable research linking governance and economic growth has been done, and substantial findings suggest that institutions determine productivity levels and economic growth. The importance of institutions in growth literature can be traced to the works of Acemoglou et al. (2004). However, contemporary studies have established the interrelationship between institutions and economic growth. Such studies include;

Roth (2022) explored the nexus between the rule of law and labor productivity at the micro level limited to individual businesses in the European Union using a panel data set covering 1998-2005. The author employed a two-stage least square method and found that rule of law significantly determines labor productivity.

Aloui (2019) conducted a study on governance, poverty eradication and productivity in Africa utilizing a panel dataset covering 1996 to 2016. The author similarly made use of the WGI to measure governance. The author considered the governance indicators at individual level. The study employed a vector error correction model for regression analysis. The study showed that Rule of Law has no role in increasing productivity levels.

Mustafa and Jamil (2018), undertook a panel estimate study of 12 Asian countries using a vector error correction model. The study focused on establishing the link between governance, Aggregate Labor Productivity (ALP), and Total Factor Productivity (TFP). The study findings were that there existed a positive relationship among the variables.

Orayo and Mose (2016) conducted a comparative study using panel data on the contribution of governance to economic growth in EAC from 1999-2013. The authors used both Random

Effect and OLS for their analysis. The governance parameter was measured using the six dimensions provided by the WGI. The results showed that only The Rule of Law was significant under the OLS model in Kenya.

Shitero (2016) explored the connection between corruption, governance quality, and economic growth in Kenya. The author employed Contact Intensive Money as a proxy for governance quality and used OLS for its analysis. The results showed that the quality of governance and institutions have a significant effect on economic growth than the effects of corruption.

Udah & Ayara (2014) established that high-quality governance structures and institutions are essential for improved welfare. The authors used a time-series data set for 1970-2011 with OLS and factor analysis estimation techniques to establish the connection between the three parameters in Nigeria. The quality of institutions was measured by adherence to the Rule of Law and was established to be a significant variable in explaining the economic performance in Nigeria.

Van (2009) utilized a WGI data set to assess the link between governance and infrastructure development in Sub-Saharan Africa using a panel dataset covering 2000 to 2013. The study employed the two Stage Least Square Method and found a positive and significant relationship between the two variables. Although the author didn't capture TFP, it can be deduced that infrastructural development and good governance boost a nation's productive capacity.

De (2010), while analysing the link between governance and growth in Asian economies, employed the OLS analysis technique using cross-sectional data from 1998- 2008. The author utilized the six governance indicators given by WGI to measure governance. The Rule of

Law indicator was a significant factor in growth. Equally, countries with higher adherence to the Rule of Law grew faster by 1.2 percentage points annually.

Cuzman and Dima (2010) investigated various forms of economic freedom and governance dimensions to assess their influence on growth in OECD countries for the period 2004 to 2007. The study employed a Vector Auto Regressive model for analysis. Corruption control, political stability, and the Rule of Law measured governance. The findings were that economic growth was positively affected due to political stability and the rule of law. Economic freedom, primarily determined by the role of institutions, positively affected economic growth.

Gehlbach and Earle (2010) used democracy in establishing its link with economic growth. The study was carried out in Ukraine for the period 1996-2009 using Ordinary Least Square method. The authors concluded that democracy promotes stability since state stability or fragility affects both macro and micro outcomes.

Cavalcanti, Magalhaes and Tavares (2008) employed quartile regression methods. The results showed that productivity, as measured by output per work, increased by five percent as a result of a unit institutional improvement.The authors conducted a cross-sectional analysis for the years 1988 -2003 in South America region.

A weak rule of Law negatively affects property rights protection, as Suyitno (2008) reported. The author observed that people are likely to invest in their lands if they know that in case of disputes, they will be resolved promptly. The study focused on Brazil, Indonesia, the Philippines, and Thailand, where there was an upsurge in land values after people were given title deeds. The study had employed factor analysis method. This is because they were willing and confident to develop their lands. Land is a primary factor of production and therefore, in

countries where land disputes are resolved promptly, there is a better usage of the land, which in the long run boosts its productive capacity as a primary factor of production.

Bose, Haque and Osborn (2007) analysed the effects of governance quality in conjunction with capital and Labor as part of TFP on a country's economic output using data from 43 countries in Middle East and North Africa (MENA) region, from 1996 to 2010. The study utilized the WGIs to measure governance, including the Rule of Law. The study adopted random effects methodology for its analysis. Rule of Law was the second most significant indicator of governance after corruption. The composite governance variable supported the hypothesis that better government quality positively impacts productivity, output, and economic growth.

Son & Kakwami (2007) studied the Rule of Law and pro-poor growth, which is more likely to benefit low-income people than non-poor people. The study was a cross-country analysis capturing 80 countries in East Asia and covering 1984 to 2001. An ARDL model was used in doing the cross-country analysis. The findings were contrary to most studies since there was no association between the variables of interest.

Gerring et al. (2005) used a cross-country regression model for the period 1950-2000 and got contra findings on the link between democracy, productivity, and economic growth. The results suggested that democracy has a negligible effect on productivity.

Anderson, Charterjee and Lakshmanan (2003) work focusing on India for the year 1990-2001 employed a two stage least square method. The study explored on the relationship between Rule of Law and Poverty levels. The authors observed that a weak rule of Law increases poverty. The authors further noted that the poor populace suffers the most in countries where the state institutions and authorities don't adhere to the Rule of Law.

Acemoglou et al. (2004) disapprove of the geography hypothesis that relates variations in per capita incomes to differences in geographical scope in exploring the role of institutions in Europe. The authors concluded that institutions explain differences in income levels among countries by pointing out a reversal of fortune where prosperous economies in the sixteenth century are today poor. The author attributed this to institutional reversal, which led to a regression in income levels.

Rivera- Batiz (2002), in their cross-sectional study covering the period 1960-1990 in Africa, developed a general model to proof that democracy enhances good governance, which increases the productivity levels of a country, spurring economic growth. The conclusion was that stable democracy was a significant determinant of TFP growth levels and output growth in 1960-1990 by taming the actions of corrupt officials.

Hall and Jones (1999) explored the role of social infrastructure in productivity growth. The authors argued that institutions are the fundamental causes of cross-country income-level variations. Their analysis showed that institutions promote productivity and, consequently, growth.

Other studies considered the effect of Rule of Law on TFP as part of democracy. Sen (1999) suggested that democracy is vital in improving living standards.

Feng's (1997) research on the link between democracy and economic growth, while utilizing data from 96 countries in South East region from 1960 to 1980, found that democracy is a critical factor for growth. The study had used OLS method for analysis. The conclusion made was that political stability and the Rule of Law, both vital elements for any functional democracy, is the channel through which democracy positively influences productivity and economic growth.

Kaufmann & Kraay (1999) utilized a combination of cross-country investor surveys to evaluate the connection between governance indicators, per capita incomes, and literacy levels. The findings were that a unit increase in the Rule of Law was associated with a 2.5 fold increase in per capita incomes and a 25 percent increase in literacy. Increased literacy improves human capital, which is an essential determinant of TFP.

Grandvoinet (2001) in assessing the relationship between rule of law and poverty reduction further notes that upholding the Rule of Law facilitates access to legal information and the court system necessary for poverty reduction measures. The author expounds that such access to information facilitated by upholding the Rule of Law reduces the poor's vulnerability to exploitation and deception. Moreover, access to information enables the vulnerable poor group to exploit viable opportunities and improve their livelihoods. The study was carried out in Pakistan using factor analysis method.

Other empirical studies such as Kaufmann (2003), Roll and Talbot (2003), Rodrick (2008), Paitoon (2015), Hamid (2017) and Samangire (2017) considered rule of law as part of the broader composite index of governance and its effects on growth and development. The studies showed a consensus that where there is no good governance, there is no development.

Concerning TFP research in Kenya, several studies have been done, the most recent one by Kithinji and Onono (2020), who researched on effects of e-commerce on output and TFP using OLS. Ndegwa (2019) looked at the association between TFP and Economic growth at an aggregate level using OLS. Gachanja, Were and Etyang' (2013) explored changes in productivity in several manufacturing subsectors using data envelopment analysis (DEA). Kalio, Muteyo and Awour (2012) researched on effects of TFP on economic growth employing an ARDL model with an error correction term, while Gerdin (2002) concentrated on sectorial productivity, specifically in the agriculture sector used OLS as well.

2.3 Overview of the Literature.

Literature reviewed suggests a positive correlation exists among our variables of interest, namely Rule of Law and Total Factor Productivity. However, contra findings are present with studies such as Aluoi (2019), Son and Kakwani (2007), and Gerring et al. (2005) showing that the Rule of Law has either a negligible effect or has no effect at all.

The differing findings can be attributed to an array of factors but not limited to methodology, geographical scope and scope in terms of whether the study is on aggregate scale or sectorial level. More specifically, Aluoi (2019), employed Ordinary least square method which may probably explain the divergence. The study didn't factor in the lag effect of Rule of law, a limitation that will be addressed by this current study. Furthermore, the study failed to assess if there are both short run and long- run effect on variables. The limitation was as a result use OLS which is limited, hence the adoption of ARDL model which is best suited to capture both the short term and long term effects.

Son and Kakwani (2007), experienced a geographical scope limitation since the study was a cross country analysis of East Asia countries. Gerring et al. (2005) study was a sectorial study that was limited to the agriculture sector. The current study related to the variables at an aggregate level.

Two studies closely connected to Kenya, namely Shitero (2016) and Orayo and Mose (2016), have been reviewed. Shitero (2016) focused on the corruption, institution, and economic development in Kenya, while Orayo and Mose (2016) focused on the effect of governance on economic growth in the wider EAC, where Kenya is a member state. However, the studies didn't explore specifically the relationship between Rule of Law and TFP, which is the gap this study intend to fill.

CHAPTER THREE: RESEARCH METHODOLOGY.

3.1 Introduction.

The chapter discusses the approach used in computing TFP estimates and in examining the effects of the Rule of Law on Total Factor Productivity in Kenya. The chapter provides a theoretical and empirical model used to achieve the research objectives.

3.2 Research Design.

Quantitative research approach was adopted which was informed by the nature of the variables. Explanatory research design was adopted to explain the association between the dependent and the regressors. The usefulness of the explanatory research design is explaining what is observed by descriptive studies. Explanatory research design was chosen over other research designs since it enables an in-depth understanding of the study. Moreover, explanatory research design offers more flexibility and adaptability as the research progresses.

3.3 Theoretical Framework.

The study employed the seminal work of Solow in determining the model used. The Solow model was utilized since it provides a framework for understanding long run economic growth besides factor inputs accumulation. It's important to note that Total Factor Productivity is also called the Solow residual. The Solow model provides an avenue of exploring other factors which explains the unaccounted production growth. Among the explanations considered is the environment in which the factor inputs operate which is determined by the institutional quality. The quality of institutions is driven by the respect different actors in the economy have on rule of law, hence making the Solow model appropriate.

The theoretical framework is formulated by considering a simple production function consisting of labor and capital as given below,

Q= F (K, L, t))……………………………………………………………....... (3.1)

Where Q is output, K is capital, L is Labor, and t is time, which has been employed to capturethe technical change over time as represented by A in equation 3.2

Q= A(t) f (K, L)…………………..………………………… …………………….(3.2)

Taking the derivative of equation 3.2 and obtaining the quotient,

$$\frac{Q\bullet}{Q} = \frac{A\bullet}{A} + A\frac{df}{dK}\frac{K\bullet}{Q} + A\frac{df}{dL}\frac{L\bullet}{Q} \quad \ldots (3.3)$$

Where dot (•) indicates time derivatives

Defining r_k as $\frac{dQ}{dK}\frac{K\bullet}{Q}$ and W_l as $\frac{dQ}{dL}\frac{L\bullet}{Q}$ as the relative shares of capital and Labor and substituting in equation 3.3

Note that,

$\frac{dQ}{dK} = A\frac{df}{dK}$ and $\frac{dQ}{dL} = A\frac{df}{dL}$, the results therefore are,

$$\frac{Q\bullet}{Q} = \frac{A\bullet}{A} + r\kappa\frac{K\bullet}{K} + W\iota\frac{L\bullet}{L} \quad \ldots (3.4)$$

Where *Q/Q* is the rate of change of output, *K/K* is the rate of change of physical capital, and *L/L* is the rate of labor change.

TFP is given as $\frac{A\bullet}{A} = \frac{Q\bullet}{Q} - (r\kappa\frac{K\bullet}{K} + W\iota\frac{L\bullet}{L})$………………………………….............… (3.5)

Taking the natural logarithm of equation 3.4

$$\frac{dLnQ}{dt} = \frac{dLnA}{dt} + r\kappa\frac{dlnK}{dt} + W\iota\frac{dLnL}{dt} \quad \ldots (3.6)$$

Rearranging equation 3.6

$$\frac{dLnA}{dt} = \frac{dLnQ}{dt} - r\kappa\frac{dlnK}{dt} - W\iota\frac{dLnL}{dt} \ldots (3.7)$$

3.4 Model Specification.

The study adopted Solow (1957) model while using a direct accounting estimation method as shown in equation (3.8)

$$Y_t = A_t K_t^{\alpha} (HL)_t^{1-\alpha} e^{ut} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3.8)$$

where *Yt* is aggregate output (real GDP), *K* is the aggregate stock of capital, *HL* is human capital–augmented labor force, alpha denotes the share of capital while the complement of share gives the labor share, which is one minus alpha. *At* is an index of TFP. The error term (*ut)* captures all other variables not considered in the model. The Cobb Douglas function is used since it satisfied all the qualities of a production function.

Dividing Equation (3.8) both sides by L and applying logarithmic transformation to obtain per unit of labor;

$$\mathrm{Ln}\frac{\mathrm{Y_t}}{\mathrm{L_t}} = \mathrm{LnA_t} + \alpha \mathrm{Ln}\frac{\mathrm{K_t}}{\mathrm{L_t}} + (1-\alpha)\mathrm{Ln\ H} + \mathrm{U_t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3.9)$$

Rewriting equation (3.9) yields equation (3.10) as given below;

$$y_t = a_t + \alpha\, k_t + (1-\alpha)\, H_t + u_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3.10)$$

Where *yt* and *kt* represent the natural logarithms of per capita output and capital stock.

As pointed out earlier, the study factored in improvements in labor since the quality of labor can be enhanced by schooling. Additional years of schooling automatically improve the quality of Labor. The adjustment is a major gap in TFP analysis since most of the studies didn't factor in the improvements in labor. Despite WPT having data on TFP trends as given in the background, improvements in the quality of labor have not been factored until 2016 in developing WPT Version 9.0 as observed by Feenstra, Inklaar and Timmer (2017). Labor was therefore adjusted for quality improvements by factoring in educational attainment.

Therefore, human capital is included as a determinant of TFP through its effect on labor. The inclusion of human capital was done borrowing from Barro and Lee (2013), where human capital per worker was estimated as provided in equation (3.11).

$$H_t = L_t e^{\propto Yt} \quad (3.11)$$

Where *Ht* is the Human capital, L_t is the labor force, α is the elasticity of output for each additional year of education, and Yt is the average number of years of schooling. As pointed out earlier, the study borrowed from the empirical works of Barro and Lee (2013), where human capital is assumed to be improved by eight percent per additional year of schooling. Adjustment for labor quality has been supported by micro labor literature, and therefore α, the elasticity of output for each additional year of education, was estimated at 0.08. The elasticity of factor inputs was guided by the empirical works of (Baier et al., 2006; Gollin, 2002), where shares were 0.3 and 0.7 percent, respectively.

TFP estimation was carried out in the Hicks- neutral case as given in equation (3.12),

$$a_t \cong y_t - \propto^* k_t - (1-\alpha)^* h_t \quad (3.12)$$

Equation (3.12) achieved research objective (i).

To achieve research objective two, the study had proposed adopting a VECM model since literature reviewed shows that, one of the challenges associated with establishing the relationship between RL and TFP is simultaneity bias resulting from the feedback effect between the variables.

However, the study adopted an ARDL model since variables were found to be of mixed series, making VECM inappropriate. This is because an ARDL model is more suitable with variables integrated of mixed order than a VECM model. Additionally, an ARDL model gives more accurate results when few observations are under consideration hence its adoption. The general form of an ARDL model is given as follows;

$$Y_t = \gamma_{0i} + \sum_{i=1}^{p} \delta i\, Y_{t-1} + \sum_{i=1}^{q} \beta i\, X_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.13)$$

Where

Y_{t-1} = Vector

X_{t-1} = Variables that are of the same order.

p and q = number of lags for the dependent and independent variables, respectively.

ε_t = error term

The presence of co-integration was confirmed through the ARDL Bound test, necessitating the adoption of an ARDL-ECT model.

The general format of the model, therefore, changes to;

$$Y_t = \gamma_{0i} + \sum_{i=1}^{p} \delta i\, Y_{t-1} + \sum_{i=1}^{q} \beta i\, X_{t-1} + \varphi ECT_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.14)$$

Where φ is the coefficient of ECT.

To achieve objective two, the study adopted and adapted Hakim et al. (2009) model to include the Rule of Law variable and other control variables as supported by the literature.

The reformulation and adaptation were affirmed by Kithinji &Onono (2020), who adapted the model to capture their variable of interest: e-commerce. The adapted equation can be expressed as;

$$A = f(RL^{\alpha 1}, AHC^{\alpha 1}, GFCF^{*\alpha 2}, TO^{\alpha 3}, FD^{\alpha 4}) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.15)$$

Where A is the TFP, RL is the Rule of Law, GFCF represents Physical Capital, AHC represents education Adjusted Human Capital, TO represents Trade Openness, and FD is the Financial Deepening.

It's imperative to note that the key variable of interest is Rule of Law, while adjusted human capital, gross fixed capital formation, trade openness and financial deepening are control variables as guided by the literature on economic growth. GFCF which is a proxy measure for physical capital and labor which has been adjusted for quality improvements has been included as the key variables applied in the Solow framework, therefore the two variables can't be omitted. The two variables as guided by the economic growth literature are expected to have a positive effect on TFP.

Trade Openness has been included because it is an indispensable enabler of growth which promotes efficient allocation of resources, factor accumulation, technology diffusion and knowledge spill overs. Trade with the outside world is expected to have a positive effect on Total Factor Productivity. Financial Deepening in an economy enables financial markets to operate efficiently by mobilizing optimal amount of resources and channelling them to the productive sectors of the economy. Therefore, Financial Deepening is a significant factor of consideration in TFP analysis, and it's expected to positively affect TFP growth.

For purposes of our regression analysis, equation (3.15) can be expressed mathematically as follows;

$$A_t = \alpha 0 + \alpha 1 RL_t + \alpha 2 GFCF_t + \alpha 3 AHC_t + \alpha 4 TO_t + \alpha 5 FD_t + E_t \ldots\ldots\ldots\ldots \quad (3.16)$$

Incorporating the variables of interest, the specific empirical model to be estimated is as follows;

$$\Delta TFP_t = \beta_0 + \sum_{i=1}^{p} \beta_{1i} \Delta TFP_{t-1} + \sum_{i=0}^{q} \beta_{2i} \Delta RL_{t-1} + \sum_{i=1}^{q} \beta_{3i} \Delta GFCF_{t-1} + \sum_{i=1}^{q} \beta_{4i} \Delta AHC_{t-1} + \sum_{i=1}^{q} \beta_{5i} \Delta FD_{t-1} + \sum_{i=1}^{q} \beta_{6i} \Delta TO_{t-1} + \varphi ECT_{t-1} + \varepsilon_t \quad (3.17)$$

Equation (3.17) helped us to achieve research objective (ii).

3.5 Definitions and Measurement of Variables.

Dependent variables

Total Factor Productivity (TFP) - Refers to the variable that accounts for effects in output not explained by capital and Labor. TFP is measured as a residual using an index from 0-10 where zero is the least score and ten is the maximum score. TFP estimates were obtained from the World Penn Tables.

Independent Variables

Rule of Law (RL) - Perceptions of the extent to which agents have confidence in and abide by the rules of society, particularly the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Rule of Law is measured as a percentile rank from 0-100 where 0 is the minimum score and 100 is the maximum score. The data source was World Governance Indicators Report (2021).

Gross Fixed Capital Formation (GFCF) – A proxy measure for Physical capital which refers to new and second-hand assets acquired by the producers minus disposal that are included for the production of other goods and services for more than one year. It is measured as an annual total value of gross fixed capital formation for all the producers less the

disposable assets. Physical capital estimates will be obtained from the World Development Indicators.

Adjusted Human Capital (AHC) - Refers to the skills and knowledge of workers adjusted for quality improvements due to educational attainment between the ages of 15 and 64 years. The variable was estimated by adjusting for the quality improvements and considering the impact of schooling on Labor via an exponential functional relationship depending on the average years of schooling as explained in the model specification.

Trade Openness (TO) - Refers to the extent to which a country engages in transactions with the rest of the world. The variable was measured as the sum of exports and imports as a proportion to GDP, as defined in the empirical work of Rodrick and Rodriguez (1999). Data was obtained from the World Development Indicators (2021).

Financial Deepening (FD) – Financial deepening refers to the increasing provision of financial services, affecting TFP in two ways. First, the more developed a country's economic structure is, the more saving mobilization is promoted and the higher the investments. Secondly, a better-developed financial sector ensures efficient utilization of the disseminated financial information on investment, as Bethelemy and Chauvin (2002) highlighted. The variable was measured using broad Money Supply as a proportion of GDP. Data was obtained from the World Development Indicators (2021).

3.6 Estimation Technique.

The model was estimated after carrying out the diagnostic tests of the regression model presented in equation 3.4.6. The study used time-series data and employed an ARDL-ECT model in estimating the model coefficients. The study used STATA to carry out pre-estimation tests and model estimation.

3.7 Diagnostic Tests.

The study performed diagnostic tests to determine the validity, effectiveness and accuracy of the regression results.

3.7.1 Unit Root Test for Stationarity.

In analysing time series data, there is a need to perform a unit root test as the initial step to test whether the variables are stationary, and this was done by the use of the Augmented Dickey-Fuller Test, and confirmed using the Phillips-Perron test. Differencing technique will be used to transform the non-stationary variables.

3.7.2 Co-integration Test.

Co-integration arises when variables in the data set tend to have a long-run equilibrium relationship. The presence of co-integration is a critical consideration for the model choice. The study adopted the Peasaran, Shin, and Smith (2001)-ARDL Bound test. The ARDL bound test takes care of the variables that are of mixed orders, therefore, overcoming the shortcoming of the Johasen Co integration test, which is limited to a series of the same order.

3.7.3 Optimal Lag Length Test.

A key aspect of the regression analysis for an ARDL model is determining the optimal lag length to assess the effect of each variable on its past variable. Akaike Information Criteria, Bayesian Information Criteria, Schwartz Information criteria, Hannah- Quin Information criteria, Modified likelihood Ratio, and Final Prediction Error were used to determine lag optimality. The decision criterion was guided by considering the smallest value of the information criteria.

3.7.4 Normality test.

The test will determine whether the data is well-modelled by a normal distribution. Data that is not normally distributed makes it difficult to make accurate and reliable inferences. If a

variable fails the normality test, examining a histogram and the normal probability graph is essential to determine whether a set or a small subset of outliers causes non-normality.

3.7.5 Heteroscedasticity.

Heteroscedasticity arises when variations of the error term differ across observations. In such a case, the model is inefficient for drawing inferences since, with heteroscedasticity, the standard errors of estimates become biased, and therefore the t statistic or F statistics may not be used. Breusch Pagan's test for heteroscedasticity was utilized in this study.

3.7.6 Autocorrelation.

This condition occurs when data of a given time series is affected by lagged values between consecutive time intervals. Autocorrelation violates the property of minimum variance, which may result in serious underestimation of the variances of the random term, and the use of *t* and *f* statistics will be invalid.

3.8 Data Type and Sources.

Annual time series secondary data from 1996-2020 was used. The period has been chosen based on the available data on the variables under consideration. Data were collected from official World Bank and World Economic Forum database. The World Governance Indicators is the single most comprehensive and reliable database for governance indicators which includes the Rule of Law. The database is updated annually since its inception in 1996. Similarly, the World Development Indicators that are published by the World Bank are the most reliable dataset on different development indicators across the world. In conclusion, the data sources have been selected based on their credibility and reliability.

CHAPTER FOUR: EMPIRICAL FINDINGS.

4.1. Introduction.

The chapter presents the research results and outcome and is divided into two sections. The first part relates to the first objective which was to determine the trend of TFP. The section captures the growth accounting framework results and a comparative analysis. The second part relates to the second objective which was to establish the effect of Rule of Law on TFP. The section presents the descriptive statistics, diagnostic tests, regressions results, and a detailed discussion of the findings.

4.2 TFP trend.

The section provides results for the research objective one achieved using a growth accounting framework to carry out the computations. The results are presented in Table 4.1 below, including the existing TFP estimates growth rate provided by World Penn Tables for comparative purposes.

Table 4. 1 ; Comparative growth estimates in % for the computed TFP and World Penn Tables estimates.

Year	***Computed TFP Estimates in %***	***Existing TFP Estimates according to Penn World Tables in %***
1997	-0.6749	-4.6838
1998	-0.6218	-5.1597
1999	-0.7558	-4.4041
2000	-0.7508	-0.2710
2001	-0.4558	2.1739
2002	-0.8774	-5.5851
2003	-0.3850	-2.8169
2004	0.2162	3.1884
2005	0.5264	3.6517
2006	0.8375	5.1491
2007	1.1413	1.5464
2008	0.4374	-1.5228
2009	0.7779	-3.3505
2010	0.8569	-4.2667
2011	0.0078	2.7855
2012	0.2690	-0.5420
2013	0.3864	-2.1798
2014	0.3476	-2.7855
2015	0.2046	-1.7192
2016	0.7003	-0.8746
2017	0.0980	-0.8824
2018	0.3176	4.4510
2019	0.6005	-0.8523
2020	-0.6916	-3.1519
Average	**0.1041**	**-0.9209**

Source; Constructed from study data and World Penn Tables.

The computed TFP growth estimates were also presented graphically as shown below.

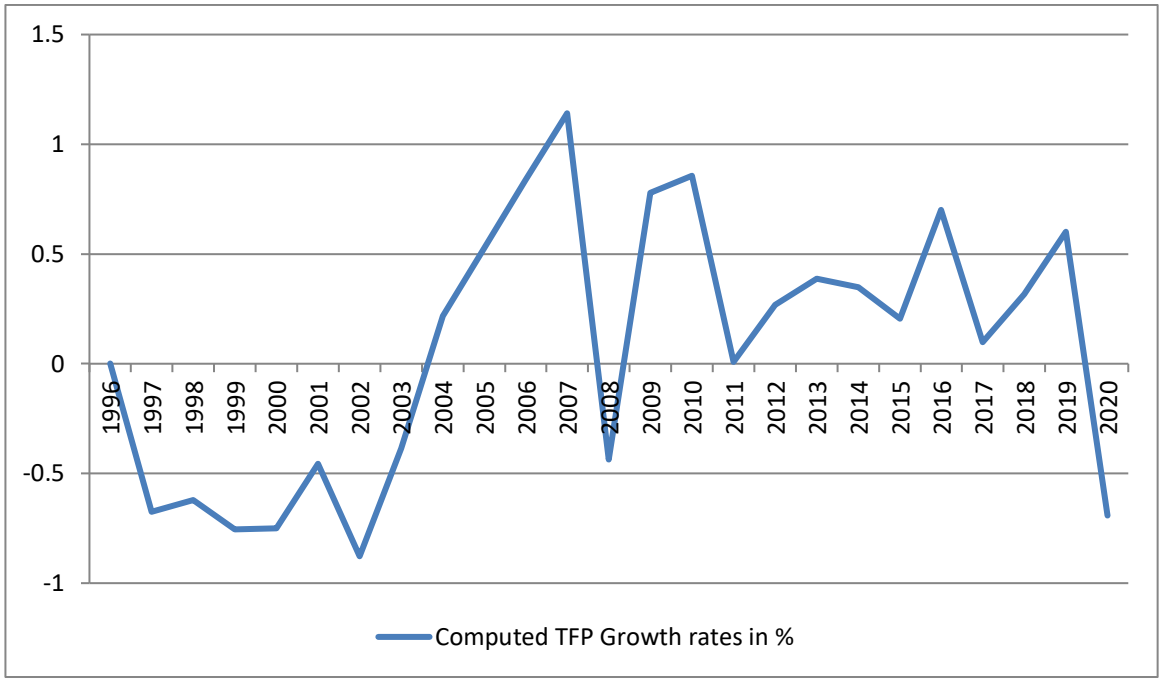

Figure 4. 1 Trends in Computed TFP Growth rates in % from 1996-2020

Source: Constructed from study data.

Figure 4.1 shows the trend of the computed TFP growth rate estimates having factored in improvements in labor quality due to educational attainment, which was a significant methodological gap in this study.

The TFP growth estimates depict a decreasing trend from 1997 to 2002, an increasing trend from 2003 to 2017 with a slump in 2008 and 2011, and finally, a decreasing trend. The decreasing trend from the year 1997 to 2002 can be attributed to the deteriorating state of the economy during that period. The Kenya economy during this period was marred by endless embezzlement of public resources, mismanagement of the economy, nepotism, and cronyism, which contributed to the decline of Kenya's economy. It's paramount to note that the decline coincides with the Structural Adjustments Programs (SAPs) imposed as part of efforts to revive the Economy.

The increasing trend observed from 2003 to 2017 can be explained by the fact that, during this period, the country underwent massive reforms under the new regime of the NARC

government after the end of the KANU regime in 2002. This period was characterized by increased government expenditure through programs such ERS and the Vision 2030 MTP.

Moreover, promulgating the new constitution improved the governance structure which positively affected TFP growth. During this period, Kenya's economy recorded significant growth rates as high as seven percent. Consequently, TFP also recorded a considerable growth rate of 1.143 percent during the entire period under review. It can be noted that regime change contributed positively to the growth in TFP as factor inputs were efficiently utilized. Therefore, it can be deduced that reforms instituted created a good environment for the factor inputs to thrive well, as sharply contrasted with the period 1996 to 2002,which had a decreasing trend in TFP growth rates. However, the rising trend suffered a major dip in 2008 due to post-election violence witnessed and global financial crises experienced. This again underlines the need to have a stable environment for production to take place.

The downward trend in 2011 can be attributed to the slow recovery rate from the 2009 financial crisis, which extended to 2011. From 2012 to 2017, an upward trend was observed, which can be explained by factors such as relative calm and stability, regime change inspiring new confidence, and increased government expenditure due to infrastructural developments. The increasing trend was again cut short due to campaigns and elections in 2017. After the 2017 general elections, TFP growth registered an upward trend up to 2019. A sharp decline was registered due to the Covid pandemic, which greatly affected human capital and used a lot of resources to manage. Overall, the growth of TFP has been sluggish, with an average growth of 0.1041 percent against a target of 2.5 percent for the attainment of Vision 2030 and SDGs. The relatively low growth of TFP can be explained by both domestic and international factors, which was worsened by natural calamities such as draught and floods. The graphical representation of TFP growth estimates obtained from the Penn World Tables is as follows;

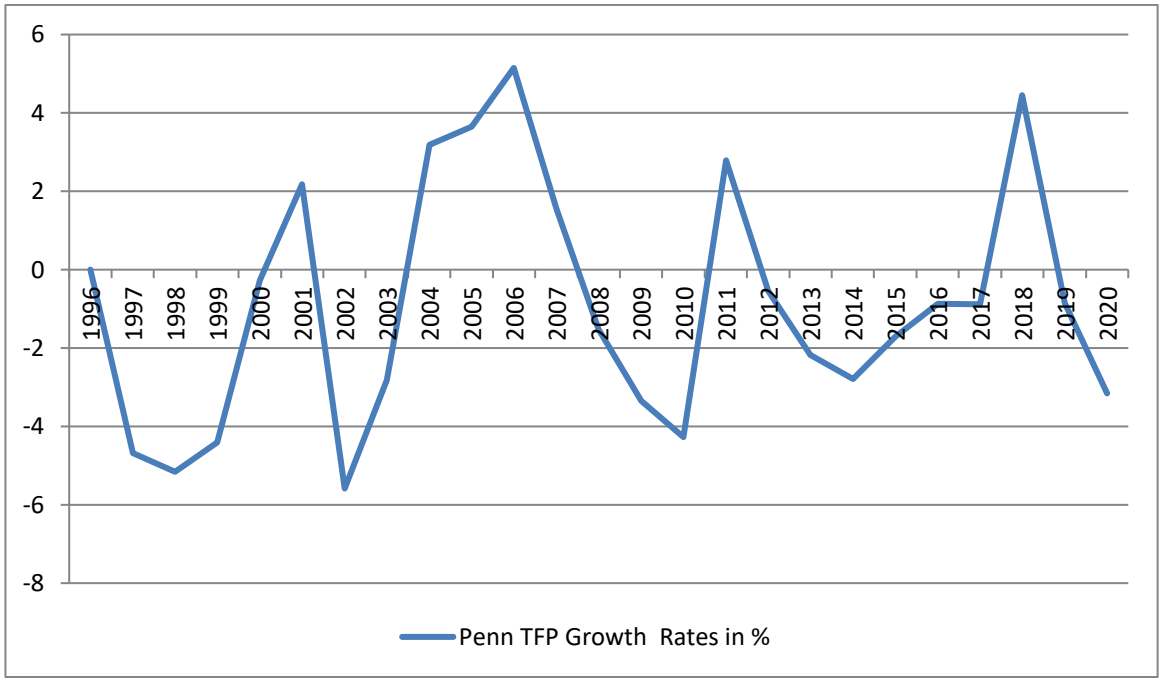

Figure 4. 2 Trends in TFP Growth rates from World Penn Tables.

Source: Penn World Data, 2020.

Figure 4.2 shows the TFP growth estimates to provide a comparative basis with the computed TFP growth estimates provided in Figure 4.1. As pointed out previously, TFP estimates provided by the Penn World tables didn't factor in improvements in labor quality due to education attainment. The estimates show a very fragile and unpredictable trend with a negative 5.5821 percent to 5.1491 percent range. As shown below in figure 4.2, the trend shows sharp variation in the annual TFP growth rates. This can be attributed to the failure to acknowledge that education is crucial in enhancing labor quality, which interacts with physical capital in the production process.

It can be observed that the inclusion of education attainment has brought about a big change in determining the growth rates of TFP. Inclusion of labor improvements gives a 0.1041 average growth rate of TFP, while non-exclusion gives an average growth rate of -0.9209 which is a sharp contrast. This probably explains why Penn world tables revised their formula for computing TFP. It's paramount to note that the differences between the computed TFP

estimates and the World Penn Tables estimates can be attributed to methodological differences in computation of the TFP estimates.

4.3. Descriptive statistics.

Descriptive statistics are used to present variables' major characteristics and include the mean, median, standard deviation, maximum, and minimum as shown below.

Table 4. 2 ; Descriptive Statistics

Variable	Obs.	Mean	Std.Deviation	Minimum	Maximum
Year	25	2008	7.3598	1996	2020
Total Factor Productivity	25	0.3666	0.0225	0.3370	0.4270
Rule of Law Estimate	25	25.3276	7.9048	16.3500	38.4600
Adjusted Human Capital	25	21.9271	0.2415	21.5369	22.3133
Gross Fixed Capital Formation	25	8.49	6.32	1.93	1.95
Trade Openness	25	46.7420	8.2726	27.2303	60.4487
Financial Deepening	25	37.6035	2.56698	31.8736	42.8193

Source: Constructed from study data.

The descriptive studies presented in Table 4.2 show an average of 0.366 for TFP with a deviation of 0.0225. The Minimum and the maximum scores are 0.3370 and 0.4270, respectively. Rule of Law estimate has a mean of 25.3328 and deviates from its mean with 7.9049 with a minimum score of 16.35 and a maximum score of 38.46 for the period under review. Adjusted human capital has a mean score of 21.9271 and deviates from its mean with a score of 0.2415, a minimum of 21.5369, and a maximum of 22.3133. Gross fixed capital formation, a proxy measure for physical capital, has an average of US$ 8.49 billion and a standard deviation of US$ 6.32 billion, with a minimum score of US$ 1.93 billion and a maximum score of US$ 1.95 billion. Trade openness has an average of 46.742, deviating from its mean with 8.2725, a minimum score of 27.2303, and a maximum score of 60.4487. Lastly, Financial Deepening has a mean score of 37.6035 and a standard deviation of 2.5669. The minimum score for financial deepening is 31.8736, and the maximum score is 42.8194. The standard deviations for all the variables were adequately dispersed inviting further statistical analysis. There were no outliers observed.

4.3 Diagnostic Tests.

The following diagnostics tests were performed; unit root test for stationarity, co-integration test, and optimal lag length. The diagnostic tests were performed on the basis of the type of data and the model adopted. The study utilized a time series dataset which is known to suffer from non-stationarity, hence the need to test for presence or otherwise of unit root. Co-integration and determining the number of optimal lags are fundamental aspects for the application of an ARDL model, hence their inclusion.

4.3.1. Unit root test for stationarity.

Augmented Dickey-Fuller test (1979) was used to test the null hypothesis of presence of unit root. Phillips-Perron unit root test was also utilized to verify the accuracy of the ADF test. Both the ADF Test and the Phillips-Perron test yielded similar results for all the variables. Variables were found to be of mixed series, meaning that variables were integrated of different orders. Only Adjusted Human Capital and Gross Fixed Capital Formation were stationery at level. Total Factor Productivity, Rule of Law, Trade Openness, and Financial Deepening were not stationary at level. Series that were found to have a unit root were transformed to make them stationery by differencing. Upon differencing, all four variables become stationary at first order. In conclusion, the variables were a mixed series where AHC and GFCF were *I (*0), while TFP, RofLEST, TO, while FD were *I* (1) as shown below.

Table 4. 3 ; Unit Root Test Results for the Variables

Variable	ADF Test unit root test		Phillip Perron Unit root test		Comment
	Test Statistic	*Critical value at 5%*	*Test Statistic*	*Critical value at 5%*	
lnTFP	0.659	-1.950	1.138	-1.950	***Non Stationery at Level***
lnRofLEST	0.780	-1.950	0.941	-1.950	***Non Stationery at Level***
lnAHC	6.183	-1.950	10.978	-1.950	***Stationery at Level***
lnTO	-0.898	-1.950	-1.082	-1.950	***Non Stationery at Level***
LnFD	0.246	-1.950	0.549	-1.950	***Non-stationery at Level***
LnGFCF	2.261	-1.950	3.430	-1.950	***Stationery at Level***

Source; Constructed from Study Data.

Table 4. 4 ; Unit Root Tests Results after First Difference

Variable	ADF Test unit root test		Phillip Perron Unit root test		Comment
	Test Statistic	*Critical value at 5%*	*Test Statistic*	*Critical value at 5%*	
dlnTFp	-3.692	-1.950	-3.123	-1.950	***Stationery at 1st Difference***
dlnRofLEST	-2.859	-1.950	-3.062	-1.950	***Stationery at 1st Difference***
dlnTO	-2.708	-1.950	-2.849	-1.950	***Stationery at 1st Difference***
dLnFD	-4.111	-1.950	-5.573	-1.950	***Stationery at 1st Difference***

Source; Constructed from Study Data.

4.3.2. Co-integration Test.

The study tested for co-integration relationships among the variables using the ARDL Bound test. The ARDL Bound test for Co-integration has several advantages, namely; (i) it can be used when series are of mixed orders, (ii) the method permits different lag length for each variable, and (iii) the method is appropriate where the number of observations is small. ARDL Bound test assumes that some variables are of *I* (0) and others are *I* (1) and consequently assigns both upper and lower limits upon which the computed F statistic is tested and an inference made. The decision criteria is that if the computed F- Statistics is below the lower bound, the series is *I*(0); therefore no co integration. If the F-Statistic exceeds the upper bound, there exists co-integration. If the computed F-Statistic is between

the lower and upper bound, the co-integration test is deemed inconclusive. The ARDL bound test results for co-integration based on the F-Statistic are presented below.

Table 4. 5; Peasaran/Shin/Smith (2001) ARDL Bounds Test (F-Statistic)

Peasarn/Shin/Smith ARDL Bound Test t=-3.386				**F=11.348**			
	L.L U.L	L.L	U.L	L.L	U.L	L.L	U.L
	2.26 3.35	2.62	3.79	2.96	4.18	3.14	4.68

NB; LL -Lower limit & UL - Upper limit

Source; Constructed from Study Data

The results show that the computed F-Statistic is greater than the upper limit, as presented in Table 4.5; therefore, the null hypothesis of no levels of relationships is rejected, confirming the existence of co integration relationship. Consequently, an ARDL model with an adjustment parameter, the error correction term, was used. ARDL model was employed since it's more suitable with variables integrated of mixed order compared to a VECM model. Additionally, an ARDL model gives more accurate results when few observations are under consideration hence its adoption.

4.3.3 Optimal Lag Length.

The study employed various information decision criteria to ascertain the number of lags to be considered. The various information criteria used are Akaike Information Criteria (AIC), Bayesian Information Criteria (BIC), Schwartz Information Criteria (SIC), and Final Prediction Error (FPE).The decision criteria is guided by considering the information criteria that produces the least value. Table 4.6 captures the results of each criteria.

Table 4. 6; Results for Optimal Lag Length Selection Order Criteria

lag	LL	LR	df	FPE	AIC	HQIC	SBIC
0	118.305			9.1e-13	-10.6957	-10.6309	10.3973
1	239.169	241.73	36	3.3e-16	-18.778	-18.3246	16.6889
2	318.448	158.56	36	1.6e-17	-22.8999*****	-22.0579*****	19.0202*****
3	1906.4	3175.9	36	3.6e-79*****	-170.705	-169.474	165.034
4	3923.19	4033.6*****	36	.	-361.637	-360.277	-355.37

Source; Constructed from Study Data.

AIC, HQIC, and SBIC give the optimal number of lags as two, while FPE gives three as the optimal number of lags. LR, however, yields four as the optimal number of lag to be considered. The study adopted the AIC, HQIC, and SBIC information criteria, which gives two optimal lags.

In conclusion, the pre estimation diagnostics tested permitted the use of the ARDL model with two lags as given by the AIC, HQIC and SBIC information criteria.

4.4 ARDL Model Regression Results.

After carrying out the pre-estimation diagnostic tests, which validated the use of an ARDL model, regression analysis was done. The natural log of TFP estimate was the dependent variable, as presented in Table 4.7.

Table 4. 7; ARDL Regression Results

Variable			Coefficient	Standard error	P-value
Constant					
ADJ	dLnTFP		-0.8679***	0.1924	0.006
LR	dLnRofLEst		0.2243**	0.0839	0.044
	LnAHC		0.3433**	0.0940	0.015
	dLnTO		1.098**	0.3179	0.018
	dLnFD		-0.4782**	0.1228	0.014
	LnGFCF		-0.0367**	0.0139	0.047
SR	dLnTFP		-0.8911*******	0.1768	0.004
	dLnRoLEST	(D1)	-0.1672***	0.0367	0.010
		(D2)	-0.1296******	0.0339	0.019
	LnAHC	(D1)	-0.9032*******	0.1486	0.004
		(D2)	-0.8602*******	0.1542	0.005
	dLnTO	(D1)	-0.4667***	0.1007	0.010
		(D2)	0.0433	0.0415	0.356
	dLnFD	(D1)	-0.0217	0.0859	0.813
		(D2)	-0.3264**	0.0912	0.024
	LnGFCF	(D1)	-0.0688	0.0513	0.251
		(D2)	0.0011	0.0368	0.978
Constant			**-5.7591*****	**0.9236**	**0.003**
R-Squared			**0.9899**		
Adjusted R-Squared			**0.9472**		

NB *** Significance at 1%, ** Significance at 5%, *Significance at 10%

Source; Constructed from Study data.

The ARDL regression model yields both the long run coefficients and the short run coefficients as shown in Table 4.7. The Error Correction Term is represented by the

Adjustment term which is abbreviated as ADJ. The long run coefficients are the ones which doesn't have the lagged variables, while the short run coefficients consist of the lagged variables. The lagged variables are denoted by (D1) and (D2) where (D1) represent the first lag while (D2) represents the second lag. The lags used are two as provided by the optimal lag length test.

The ARDL model results as presented in Table 4.7 includes, the adjustment parameter which is also called the Error Correction Term (ECT), the long run, and the short run coefficients. The goodness of fit, as shown by the R Squared, indicates that 98.99 percent of the changes in TFP are jointly explained by the explanatory variables considered in this study indicating a high explanatory power of the model. The adjustment parameter is abbreviated as ADJ. The adjustment parameter must possess a negative coefficient and be statistically significant to indicate the convergence of the model. Failure to have a negative sign means that the model is explosive; that is, there is no convergence to the equilibrium. The ECT has a coefficient of negative 0.8679 and a p-value of 0.006, meaning it's statistically significant at a one percent level of significance. This means that the ECT term satisfies the two conditions of negativity and significance. A coefficient of -0.8679 means that the system corrects the deviations of the previous period at a speed of 86.79 percent in the current year; that is, 86.79 percent of previous period movements into disequilibrium are corrected within one period in the current year.

The long run coefficients obtained exhibited long-run relationship with the dependent variable, TFP. The key variable of interest, Rule of Law estimate, exhibited a positive long-run relationship with TFP, which is consistent with the existing theory. A unit change in the Rule of Law was found to cause a positive change in TFP by 0.2243 percent. The results are consistent with the findings of Roth (2022), Shitero (2016), Oraye and Mose (2016), Udah and Ayara (2014), De (2010), Gehlbach and Earle (2010), and Kaufmann and Kraay (1999),

who found that there exists a positive relationship between the rule of law and TFP. However, the results contradicted the findings of Aloui (2019), Son et al. (2007), and Gerring et al. (2005). The divergence in results can be attributed to different approaches used in the regression. Furthermore, since the research was done in different regions, the findings of one region may not be applicable to the other region.

Equally, Adjusted Human Capital and Trade Openness were significant at a five percent level of significance. A unit change in Adjusted Human Capital was found to cause a 0.3433 percent increase on TFP, while a unit change in Trade Openness was found to cause a 1.0898 percent positive change on TFP in the long run ceteris paribus. A long-run positive effect of Adjusted Human Capital can be attributed to the acquisition of more skills and experience, which contribute positively to TFP in the long run. Again, in the long run, education attainment promotes creativity and innovation, enabling graduates to fully engage in income-generating ventures and be productive in the economy. Trade Openness which measures a country's involvement in the global economy, leads to wider markets transfer of knowledge, skills, capital, and technology, which promotes TFP growth of the recipient country. Therefore, the more a country is open to global interactions, the more the transfers, as supported by Muwau (2019).

Financial Deepening and Physical Capital were found to affect TFP in the long run at five percent negatively. A unit change in Financial Deepening was found to have a 0.4782 percent decline in TFP, while a unit change in Physical Capital contributes to a 0.0367 percent decline on TFP in the long run, holding all other factors constant. A negative effect of Physical Capital on TFP can be attributed to the cost of projects with concern about inflated costs due to corruption and increased bureaucracy. As a result, the contribution of such capital projects is outweighed by the costs incurred therefore diluting the productive capacity of such projects meant to stimulate TFP growth positively. Exaggerated costs of projects have

been a concern not only in Kenya but in most developing nations, as observed by Kenny (2010), where costs escalate up to 25 percent. As a result, the value of money is never obtained.

The negative relationship between TFP and financial deepening contradicts the expected theoretical explanation because improvements in the financial sector are a catalyst of TFP growth. The results, however, concur with the empirical works of Hammouda et al. (2010), Odour and Khainga (2010), and Opondo (2020). The authors noted that the unexpected negative relationship could be explained by the inadequate capacity of the financial sector to allocate resources only to the productive sectors. Furthermore, the negative relationship can be as a result of misuse of loans and credit facilities where the resources end up in consumption purposes than investment.

In the short run, the first lag of TFP is significant at one percent level of significance where a unit change in the previous year's TFP growth rate causes a 0.8911 percent decline on the current year's TFP growth rate, ceteris paribus. The finding conforms to the expectations that a poor growth rate in yester year will lead to a sluggish growth in the next year. Both the first and second lag of the Rule of Law variable was significant at one percent significance level. A unit change in the Rule of Law had a negative effect of 0.1672 percent and 0.1296 percent on TFP both in the first and second lag. The inverse relationship between the Rule of Law and TFP in the short run can be explained by the fact that Rule of Law, as previously captured, creates a conducive environment for other factor inputs to thrive well. The conducive environment is dependent on institutional reforms, which may take time before the benefits are realized hence the negative interaction in the short run.

Similarly, Adjusted Human Capital exhibited a negative effect on TFP in the short run, where both the first and the second lag were significant at one percent level of significance. In the

first lag, a unit change in Adjusted Human Capital had a 0.9032 percent negative effect on TFP. In the second lag, a unit change caused a 0.8602 percent decline in TFP, ceteris paribus. An array of factors can explain the negative effect of human capital on Total Factor Productivity. First, according to Omollo (2013), is the mismatch between the education system and the labor market, where education institutions offer irrelevant or redundant skills to the economy, resulting in a large pool of educated population lacking key skills, ingenuity, and creativity. Secondly, the concerns of half-baked graduates where the quality of education is questionable and as a result, graduates lack the ability to relate and translate theory to practice.

Thirdly, high unemployment rates in Kenya render the effect of investment in human capital through education attainment negative in the short run, before graduates are absorbed in the job market and be productive. Only the first lag of Trade openness was significant, where a unit change in Trade openness had a negative influence on TFP of 0.4667 at a one percent level of significance. The negative relationship is due to, in the short run, gains from international trade may not have been fully realized. As a result, a country may be experiencing unfavorable terms of trade. The second lag of financial deepening was found to be significant at one percent levels of significance. In contrast, a unit change in financial deepening caused a 0.3264 percent in TFP.

In conclusion, the Rule of Law, which was the variable of interest, exhibited both a long-run relationship and a short-run relationship with TFP. However, there is a positive relationship in the long run, while in the short run, the relationship is negative.

4.5 Diagnostic tests.

Jarque-Bera test for normality, Breusch Pagan test for heteroscedasticity, and Breusch-Pagan-Godfrey LM test for serial correlation were carried out. The normality test determines whether data is well modeled. Normality of data is important in ensuring accurate and

reliable inferences are made. On the other hand, heteroscedasticity test is employed to determine if the error term varies across the observation. This is important because, if the error term is not constant, both the *t* and *f* statistic cannot be used since standard errors will be biased. Lastly, autocorrelation violates the property of minimum variance making *t* and *f* statistics invalid. The results are presented in Table 4.8 below;

Table 4. 8; ARDL Model results for diagnostic tests.

Test	Statistics	P-value
Jarque-Bera Normality Test	0.2841	0.8676
Breusch Pagan Godfrey Heteroscedasticity Test	2.82	0.0933
Breusch-Godfrey LM Test for Serial Correlation	2.824	0.2239

Source; Constructed from study data.

As shown in Table 4.8, the Jarque-Bera statistic obtained was not significant at a five percent significance level indicating normality of the residuals obtained. Similarly, the null hypothesis for the heteroscedasticity test and the LM test for serial correlation was not rejected at a five percent significance level since the p-values obtained were greater than 0.05, confirming that the model was homoscedastic and autocorrelation-free. Heteroscedasticity interferes with the validity of hypothesis testing while autocorrelation leads to model misspecification.

Additionally, the study employed the cumulative test for parameter stability to test for model stability and adequacy. Table 4.9 presents the results obtained.

Table 4. 9 ; Cumulative sum test results for model stability

Test Statistic	1% critical value	5% critical value	10 % critical value
0.2532	1.1430	0.9479	0.850

Source; Constructed from study data.

At all levels of significance, the test statistic is less than the critical values; hence we fail to reject the null hypothesis of no structural break, which affirms the model stability. Structural breaks help us to determine if the coefficients are stable over time especially in time series

regression. Presence of structural breaks is indicative that the time series changes abruptly hence making the model to be unpredictable.

CHAPTER FIVE: SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS.

5.1 Introduction.

The chapter presents the summary, conclusions, recommendations, contribution to knowledge and suggestions for further research.

5.2 Summary of the findings.

The nexus between the rule of law and total factor productivity remains contentious over time, and there has been no convergence of results. Previous studies have produced differing results on the connection between the two. On one hand, the proponents posit that the Rule of Law is important as it creates an enabling environment for other factors that determines the productivity levels and growth to thrive and drive economic growth. Moreover, Rule of law improves the productive capacity of a country through promoting respect for property rights, ensuring the stability of a country, and ensuring resources are well utilized by entrenching the principles of accountability and transparency.

On the other hand, it has been argued that the Rule of Law has no effect or negligible effect, if any, on Total Factor Productivity. The mechanism through which the Rule of Law impacts productivity has also been a matter of debate, and consequently, Rule of Law has been disregarded as a determinant of TFP. It has been argued that the Rule of Law alone cannot affect productivity levels unless considered in the wider governance matrix. The study sought to achieve two objective namely; i) to determine the trend of TFP in Kenya and, ii) to establish the effect of the Rule of Law on Total Factor Productivity in Kenya .

Objective one was achieved through a growth accounting framework to compute TFP growth estimates. Improvements in labor quality due to education attainment were factored in, which was a major methodological gap. The computed TFP growth estimates were compared to the existing TFP growth estimates provided by Penn World Tables. The computed TFP

estimates registered the highest growth in 2007 with a score of 1.1413 percent, while the lowest growth rate was registered in 2002 with a score of negative 0.8774 percent. The highest score observed for the existing TFP estimates was in 2007, with a score of 5.1491 percent and the biggest decline was in 2002 with a negative 5.5851 percent. The average growth rate for the computed TFP estimates was 0.1041, while the average growth of existing TFP estimates was -0.9209

The second objective was achieved using an ARDL model and the results showed that, Rule of Law had a direct positive relationship with TFP in the long term and an inverse relationship with TFP in Kenya in the short term. With respect to other variables explored in conjunction with the Rule of Law, the variables exhibited a long-run relationship with TFP where Adjusted Human Capital and Trade Openness had a positive relationship, while financial deepening and Physical Capital yielded a negative relationship.

In the short run, the first and second lag of adjusted human capital and the second lag of Trade Openness were found to have a negative effect. The second lag of TFP had a negative relationship with itself. Similarly, the second lag of financial deepening was found to have an asymmetrical effect on TFP. The ECT term showed 87.19 % of the divergences are corrected in one period.

5.3 Conclusions.

The study concluded that the Rule of Law positively affects TFP in the long term. Therefore, investment in institutions that promote entrenchment, upholding, and adherence of the rule of law should be encouraged. Additionally, the long-term growth of TFP can be enhanced by investments in Human capital and adopting policies geared towards improving trade Openness. Another conclusion that can be made is on labor improvements. Educational attainment improves the quality of labor; therefore it is a vital component to be considered in

TFP computations as it yields more accurate TFP estimates. The inclusion of labor improvements through education attainment causes a positive average growth of TFP, while its exclusion leads to negative average growth.

5.4 Policy Implications.

Parliament, which is the legal institution mandated to oversee the distribution of resources, should support institutions that promote the rule of law with budgetary allocations for them to carry out their mandate effectively. Secondly, the education system should incorporate lessons on the rule of law, institutions, and the wider topic of governance to increase awareness amongst the citizens on the important role of the Rule of Law in the prosperity of a nation.

The government should endeavor to emphasize on improvements in human capital through educational attainment. To this end, provision of education as a merit good should continue. The government should also ensure that going into the future; graduates' skills and educational qualifications are desirable and applicable to the labor market to realize the benefits of improved labor quality. To this end, the government, through the Ministry of Education should continue implementing Competence Based Curriculum that is meant to address the disconnect between the education system and the labor market. More importantly, the Kenya National Qualifications Authority should be vigilant in safeguarding the quality and integrity of the qualifications conferred.

Secondly, the government should continue improving physical Capital to boost the economy's productive capacity. However, the concern about inflated costs should be addressed to ensure that such investments pay off and obtain the value for the resources committed. The government should also embrace an open-door policy to increase interactions on the global stage.

Lastly, the government should revise the methodology in the computation of TFP estimates if we have to keep track of the attainment of Vision 2030, which is pegged on a TFP growth rate of 2.5 percent. This is because the current TFP estimates indicate a high TFP growth rate of five percent, which is problematic and misleading. The estimates are misleading since a wrong growth rate of TFP will reduce the efforts since the target has been achieved. Furthermore, a wrong TFP growth rate will not yield the expected results; consequently policy makers will seek to provide other interventions, which will be a case of wrong diagnosis and wrong treatment.

The National Productivity Competitive Centre (NPCC) should seek to provide an accurate methodology.

5.5 Contribution to Knowledge.

The study is an additional to existing literature on the nexus between the two variables in Kenya for further research to be carried out. Furthermore, the study elicits discussion on the importance of institutions in affecting TFP. Lastly, the study debates the methodology adopted in the computations of TFP estimates where inclusion of labor improvements as a result of education attainment yields different results. Improvements in human capital, not only due to education attainment, but also due to improvement in health care, should be considered in TFP computations.

5.6 Areas for Further Research.

The study established the relationship between rule of law and Total Factor productivity. Rule of Law is amongst the six governance indicators provided by World Governance Indicators. Further research is needed to establish the nexus between the other five individual governance indicators and Total Factor Productivity. Additionally, the study can be re-looked at using another proxy measure of the Rule of Law and covering a longer duration of more

than fifty years. This will help to have more observations which was a limitation of this study.

REFERENCES.

Acemoglu, D., Johnson, S., & Robinson, J. A. (2005). Institutions as a fundamental cause of long-run growth. *Handbook of economic growth*, *1*, 385-472.

Anderson, W. P., Chatterjee, L., & Lakshmanan, T. R. (2003). E‐commerce, transportation, and economic geography. *Growth and change*, *34*(4), 415-432.

Aloui, Z. (2019). The impact of governance on poverty reduction: Are there regional differences in Sub-Saharan Africa? *The Indian Economic Journal*, *42*(3), 743-751

Aresty, J. & Bridgesmith, L. (2019). World Justice Forum VI: Insights and Takeaways. *IJODR*, *6*, 3.

Baier, S. L., Dwyer Jr, G. P., & Tamura, R. (2006). How important are capital and total factor productivity for economic growth? *Economic Inquiry*, *44*(1), 23-49.

Barbier, E. B., & Burgess, J. C. (2021). Institutional quality, Governance, and Progress towards the SDGs. *Sustainability*, *13*(21), 11798.

Barro, R. J., & Lee, J. W. (2013). A new data set of educational attainment in the world, 1950–2010. *Journal of development economics*, *104*, 184-198

Ben Hammouda, H., Karingi, S. N., Njuguna, A. E., & Sadni Jallab, M. (2010). Growth, productivity, and diversification in Africa. *Journal of Productivity Analysis*, *33*, 125-146.

Bose, N., Haque, M. E., & Osborn, D. R. (2007). Public expenditure and economic growth: A disaggregated analysis for developing countries. *The Manchester School*, *75*(5), 533-556.

Cavalcanti, T. V., Magalhães, A. M., & Tavares, J. A. (2008). Institutions and economic development in Brazil. *The Quarterly Review of Economics and Finance*, *48*(2), 412-432.

Cuenca-García, E., Sánchez, A., & Navarro-Pabsdorf, M. (2019). Assessing the performance of the least developed countries in terms of the Millennium Development Goals. *Evaluation and program planning*, *72*, 54-66.

Dima, B., & Cuzman, I. (2010). New empirical evidence on the linkages between governance and growth. *Stefana Maria, New Empirical Evidences on the Linkages between Governance and Growth (December 5, 2010*

Eichengreen, B., Park, D., & Shin, K. (2012). When fast-growing economies slow down: International evidence and implications for China. *Asian Economic Papers*, *11*(1), 42-87

Feenstra, R. C., Inklaar, R., & Timmer, M. P. (2017). The next generation of the Penn World Table. *American economic review*, *105*(10), 3150-82.

Feng, Y. (1997). Democracy, political stability, and economic growth. *British Journal of Political Science*, *27*(3), 391-418.

Gachanja, P., Were, N., & Etyang, M. (2013). Total Factor Productivity Change in the Kenyan Manufacturing Sector

Gehlbach, S., & Earle, J. S. (2010). The Institutional Basis of Successful Economic Reform: Privatization Effectiveness and Regime Change after Ukraine's Orange Revolution.

G. & Jamil, M. (2018). Testing the Governance-Productivity Nexus for Emerging Asian Countries. *The Lahore Journal of Economics*, *23*(1), 143-169

Hall, R. E., & Jones, C. I. (1999). Why do some countries produce so much more output per worker than others? *The quarterly journal of Economics*, *114*(1), 83-116. Schneider, H. (1999). Participatory Governance.

Hussien, A. (2016). Understanding the Total Factor Productivity Shortfall in Sub-Saharan Africa. The Horn Economic and Social Policy Institute (HESPI) Working Paper 02/16

Isaksson, A. (2007). Determinants of total factor productivity: a literature review. *Research and Statistics Branch, UNIDO*, *1*, 101.

Orayo, J. A & Mose, N. G (2016). A Comparative Study on Contribution of Governance on Economic Growth Countries in the East African Community.

Kalio, A. M., Mutenyo, J., & Owuor, G. (2012). Analysis of economic growth in Kenya: Growth accounting and total factor productivity. *Journal of Business Management and Applied Economics*, *6*, 1-22.

Kaufmann, D., & Kraay, A. (2003). Governance and Growth: Causality Which Way? Evidence from the World, in brief. Manuscript. World Bank publication. Retrieved from http://siteresources.worldbank.org/intwbigovantcor/Resources/growthgov.pdf

Kithinji, E. M., & Onono, P. A. (2020). Effect of electronic commerce on output and total factor productivity in Kenya. *Journal of Economics and Political Economy*, *7*(2), 101-130

Kenny, C. (2010). Publishing construction contracts and outcome details. *World Bank Policy Research Working Paper*, (5247).

Laouij, H. (2017). Governance and Economic Growth in Developing Economies: A Comparative, (2724). Retrieved from https://thekeep.eiu.edu/theses/2724

Lübker, M., Smith, G., & Weeks, J. (2002). Growth and the poor: A comment on Dollar and Kraay. *Journal of International Development*, *14*(5), 555-571.

Muwau, E. (2019). *Economic growth and trade openness: evidence from Zambia* (Doctoral dissertation, The University of Zambia).

Ndegwa, A. W. (2019). *Total Factor Productivity and Kenya's Economic Growth* (Doctoral dissertation, University of Nairobi).

North, D. (1990). Institutions, Institutional Change, and Economic Performance. Cambridge: Cambridge University Press.

Oduor, J. & Khainga, D. (2010). *Economic Policy and Total Factor Productivity in Kenya.* Discussion Paper No.33. Kenya Institute for Public Policy Research and Analysis.

Okinade. S & Adebayo, R. O. (2021) Modelling Structural Breaks in Social Cash Transfers Effects on Poverty and Inequality Reduction in Africa: A Case of Nigeria. *Available at SSRN 4589238*.

Omolo, J. (2013). Employment Challenges in Kenya. *African Journal of Economic Review.* 1(1)

Opondo, M. A. (2020). *Effect of the Size of the informal sector on economic growth, total factor Productivity, and poverty alleviation in Kenya* (Doctoral dissertation, Kenyatta University)

Park, J. (2010). Projection of long-term total factor productivity growth for 12 Asian economies. *Asian Development Bank Economics Working Paper Series*, (227).

Phillips, P. C., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, *75*(2), 335-346.

Shitero, P. S. (2016). *Corruption, Institutions and Economic Development* (Doctoral dissertation, University Of Nairobi).

Rodrik, D. (2004). Institutions and economic performance-getting institutions right. *Journal of Business Management and Applied Economics*, (2), 10-15.

The Republic of Kenya. (2003). *Economic Recovery Strategy for Wealth and Employment Creation 2003-2007*. Nairobi: Government Printers.

The Republic of Kenya. (2008a). *The Kenya Vision 2030: First Medium Term Plan (2008-2012)*. Nairobi: Government Printers.

Rivera-Batiz, F. L. (2002). Democracy, governance, and economic growth: theory and evidence. *Review of Development Economics*, *6*(2), 225-247.

Romer, P. M. (1994). The origins of endogenous growth. *Journal of Economic perspectives*, *8*(1), 3-22.

Roth, F. (2022). The Rule of Law and Labor Productivity Growth by Businesses: Evidence for the EU, 1998–2005. In *Intangible Capital and Growth: Essays on Labor Productivity, Monetary Economics, and Political Economy, Vol. 1* (pp. 43-72).

Samarasinghe, T. (2018). Impact of governance on economic growth.

Solow, R. M. (1988), Technical Change and the Aggregate Production Function, *Review of Economics and Statistics*, 39: 312-20

Tran, T. T. (2013). Productivity spillovers from foreign direct investment: what if productivity is no longer a black box? *The Southeast Asian Journal of Management*, 1-18.

Udah, E. B., & Ayara, N. (2014). Institutions, governance structure, and economic performance nexus in Nigeria. *Journal of Economics and Sustainable Development*, *5*(3).

Van der Eng, P. (2009). Total factor productivity and economic growth in Indonesia. *The Australian National University Working Papers in Trade and Development, Working Paper*, (2009/01).

Zhao, X. (2015). Study on the relationship of quality governance and economic diversification in developing countries. *Journal of Grey System*, *27*(3), 165.

`