



## BUSINESS REGULATORY REFORMS AND ECONOMIC GROWTH IN RWANDA

BY

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### ABSTRACT:

This study assessed the effects of business regulatory reforms on economic growth in Rwanda using annual time series data from 1996–2020 in order to achieve the main objective. The specific objectives were to determine effect of business regulatory reforms on economic growth in Rwanda, to ensure that regulation works effectively and is in the public interest and to provide recommendations for the improvement of business regulatory reforms on economic growth. This study used various time series techniques such as Augmented Dickey Fuller, Johansen–Cointegration test, VECM to find out the short-run and long-run equilibrium dynamics among the variables under consideration. The variables used in this study were Gross domestic products (GDP) as the dependent variable while Business regulatory Reforms (BRRs) is independent variable. Physical capital, Labour force rate and Trade openness (TOP) are considered to be control variables in the study. The findings revealed that there is long-run relationship between business regulatory reforms and economic growth where business regulatory reforms proxied by 4WGI (i.e., Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, and Control of Corruption) affect positively economic growth by approximately 0.62%, trade openness by approximately 2.06%, labour force by approximately 30.15%, and physical capital by approximately 0.78%. Based on the findings, its recommended to provide infrastructures that should reduce the production cost including shipping cost which are recognised to fluctuate market prices in Rwanda and enhancing human capital development in general for improving Total Factor Productivity. Also, it is recommended to conduct other researches in this sector as they are few.

**Keywords:** *Economic Growth and Business regulatory reforms*

### 1. INTRODUCTION

Economic growth is a universal challenge to policymakers, researchers, and academia as well. For more than a half-century, economists continue to search for drivers of economic growth. Haidar, J. (2012) argued that the level of income is functional of the existing regulatory framework while a change in level of income is determined by how regulatory framework changes and improves. Countries with strong

institutions with good business regulatory framework are rich today. Therefore, the quality of business regulation and enforcing institutions are vital in accelerating the economic growth of a country. This means that economic activities require good rules which establish and clarify property rights, rules that prevent disputes and reduce the cost of resolving them, rules that promote competitiveness on the market, and rules

that protect the rights of the consumers to mention few (CED, 2017).

Business regulation is believed to create a good business environment favoring competition, the creation of jobs, and entrepreneurship as economic growth factors. Recently, developing economies under the auspice of development partners such as the World Bank and regional banks, have undertaken a wide range of business regulation reforms in a bid to render the business environment to be competitive and attractive to new investors and favorable for expansion to existing enterprises.

The primary purpose of these reforms is to create a vibrant private sector, that is a private sector with firms making investments, creating jobs, and improving productivity and therefore promoting growth and expanding opportunities for poor people (World Bank, 2004). Cary postulated that regulations seek to make such improvements by changing individual or organizational behavior in ways that generate positive impacts in terms of solving societal and economic problems (Coglianese, 2012).

Numerous business regulatory reforms were done by the Government of Rwanda since 1990s toward achieving sustainable economic growth (K Steven, 2020). From post early Genocide against Tutsi, Rwanda undertook regulation reforms because the existing laws and regulations were outdated or not adapted to the market economy (RIEPA, 2006). Since then, privatization of state-owned companies and liberalization of the economy were initiated. The

## **2. Statement of the Problem**

Rwanda has implemented several political and economic reforms since 1995 for recovering social political and economic aspects of the country devastated in 1994 genocide against Tutsi. Those reforms include privatization of state-owned enterprises, financial and banking sector reforms, improved public financial management and civil service reform. Rwanda has also embarked on a programme to modernize its legislative and regulatory framework for trade and investment, with the aim of fostering a modern and competitive private sector. Ahead of these reforms, Rwanda aspires to become an

business regulatory framework was also revised whereby Rwanda Investment and Export Promotion Agency (RIEPA) was established in 1998 by Law 14/98.

Later in 2008, Rwanda Development Board (RDB) become a merger of 8 Government institutions including RIEPA (that is; the Office of Rwanda Tourism and National Parks (ORTPN), Rwanda Commercial Registration Services Agency (RCRSA), Rwanda Investment and Export Promotion Agency (RIEPA), Rwanda Information Technology Authority (RITA), Center for Support to Small and Medium Enterprise in Rwanda (CAPMER), Human Resource and Institutional Capacity Development Agency (HIDA) and the Privatization Secretariat) with the mandate to accelerate Rwanda's economic development by enabling private sector growth.

According to Sherillyn (2022) even though the majority of investors find Rwanda more attractive than Kenya, Tanzania and Uganda for its stability and regulatory environment as highlighted by the International Finance Corporation survey (2018), there are major challenges that hindering growth such as country's small market size, difficulties in accessing quality local labour, and high production costs related to airfreight, financing and electricity. More on that, the investors' perception survey (NBR, 2019) highlighted that there is good governance and mentioned that businesses are negatively affected by low domestic resources (e.g., local supplies and labour costs).

upper-middle income country by 2035 and a high-income country by 2050.

World Bank (2020), Rwanda needs to accelerate the economy by doubling its annual growth rate by more than 10 percent per capita income. The important area of focus includes increasing future investment and saving rates, human capital development, export orientation, technological innovation, and other forms of productivity improvements. Even though Rwanda has raised investment rate to 26 percent, it is needed to be raised to at least 35-40 percent.

Achieving this level of investment require a sharp increase in investment by the private sector,

because public investment is already at the limit set by the available financing options; a more than forty rise in the domestic savings rate; and even higher FDI. This implies evaluation of the current business regulations toward creating a conducive business environment. Currently, there

### 3. Objectives of the study

The purpose of this study was to assess the effects of business regulations on economic growth in Rwanda. Specifically, this research based on the following specific objectives:

- [1] To assess if business regulatory reforms is statistically significant to influence economic growth in Rwanda

### 4. Research Questions

To respond to the research objectives, the following research questions were set:

- [1] Are business regulatory reforms statistically significant to influence economic growth in Rwanda?
- [2] What is the contribution of trade openness on economic development of Rwanda?

### 5. Literature Review

#### Business Regulation

Djankov et al. (2006), and Haidar (2012) emphasized that institutional reforms are necessary for boosting wealth and growth of a country and that a country that has better political and economic institutions has a better economic performance. The fundamental principle of business regulations is to set good rules. In this context, the government of Rwanda has

#### Economic growth

Economic growth can be defined as the increase or improvement in the inflation-adjusted market value of the goods and services produced by an economy over a certain period of time. Statisticians conventionally measure such growth as the percent rate of increase in the real gross domestic product, or real GDP (Lustig, 2006). Growth is usually calculated in real terms (i.e., inflation-adjusted terms) to eliminate the distorting effect of inflation on the prices of goods produced.

are no studies highlighting the relationship between business regulatory reforms undertaken by the Government of Rwanda and economic growth. Therefore, this study examined the extent to which business reforms carried out in Rwanda contributed to the economic growth.

- [2] To investigate the contribution of trade openness on economic growth in Rwanda,
- [3] To provide recommendations for the improvement of business regulatory reforms on economic growth in Rwanda

- [3] What are the recommendations for the improvement of business regulatory reforms and total factor productivity on economic growth?

undertaken several reforms such as macroeconomic stabilization programs, price liberalization, privatization of public companies, and trade barriers reductions through joining Est African Community (EAC) in 2007, Common Market for Eastern and Southern Africa (COMESA) in 2009, and the African Continental Free Trade Area (AfCTA) in 2018.

## 6. Theoretical Review

### Business regulatory reforms and economic growth

Then, access to finance is paramount for stimulating investors. When investors fully have access to capital, it contributes to business development and economic growth as well. So, regulation of the financial market is key factor contributing to economic growth. More on that, it is generally known that infrastructure play a big role in trade and business development as it promotes competitiveness. Countries with developed infrastructures connect easily to the market, both regional and international which increase the potential of economic growth, distribution of income and reduction of poverty. Note that countries with less infrastructure are poor. Regulations undertaken for enhancing human capital are also very important. Improving the quality of education, providing professional trainings, enhanced health system increases the productivity.

Government should also protect employees from their employers through efficient contract. When there is a rigid labor regulation, the likelihood of firms to operate as informal increases and workers work under unfavorable conditions such as unjustified firing, lack of social benefits, low wages, etc. to mention few which affect negatively the economic growth. The efficiency of these regulations reform requires existence of good governance and intuitions implementing these regulations. Government plays a role in reducing bureaucracy, corruptions, building strong institutions able to reinforce law and accountability.

Acemoglu and Robinson (2012) clearly argue that the political institutions have an indirect effect on economic growth towards regulatory reforms. More specifically, regulations include economic integration and trade liberalization which have effects on economic growth. Through increased integration into world markets firms and production factors move into countries with more favorable regulation. The growth effect of regulation could depend on the country's level of economic integration. Regulations, especially business regulations, as part of a country's economic institutions, set the rules for firms and thus influence the number of firms in a market, as well as their productivity and competitiveness. If a

good regulatory framework allows firms to operate efficiently and improve their productivity, the result is higher growth. A regulatory framework that distorts the market mechanisms, on the other hand, impede economic development. (Koeniger, 2015).

Coyle (2018), emphasized that regulations minimize externalities in the economy through creating the same economic standards in one market which enable competition, provide opportunities to more and efficient companies in the market, and ensure the protection of the consumers. More on that Baldwin and Lodge (2010) introduced new statement of regulatory state which relate to economic policy where decision-makers should focus on macroeconomic stabilization, market stability and provision welfare.

According to Stiglitz (1998), countries focus on regulation or control of utilities (telecommunication, water, gas, electricity). Adoption of the neoclassic growth model pioneered by Solow help to model business regulatory reforms and economic growth. The model explained that other factors not explained by factor inputs (i.e., labour and capital) is the exogeneous variables which raise the economic growth in the long-run because accumulation of capital and labour inputs result in diminishing marginal return to scale in the long run (Barro and Sala-i-Martin (2004).

$$Y_t = A_0 e^{bt} K_t^\alpha L_t^{1-\alpha}$$

That is;

whereby  $t$  is a time index,  $Y$  is real GDP,  $K$  is real capital stock,  $L$  is total employment,  $\alpha$  is the contribution of capital to output,  $1-\alpha$  is the contribution of labor, and the expression  $A_0 e^{bt}$  is TFP. TFP refers to technological progress and other elements that affect the efficiency of the production process and measures the shift in the production function at given levels of capital and labor. The business regulatory reforms are one of the determinants of the technical change or total factor productivity (TFP), because it influences the productivity when other factors of production exhibits CRTS.

## 7. Empirical Review

Abdullah and Chowdhury (2020) also found that FDI affect TFP negatively. More specifically, the results indicate that foreign direct investment does not promote trade especially in developing countries. A pooled time series and cross-sectional study conducted in 34 sub-Saharan African countries investigated macroeconomic variables that affect TFP.

The findings argued that external debt, inflation rate, agriculture value-added as percentage of GDP, the lending rate and local price deviation from purchasing power parity are significantly and negatively related to total factor productivity. Other variables such as human capital, export-GDP ratio, credit to private sector as percentage of GDP, foreign direct investment as a percentage of the GDP and manufacturing value-added have a significant positive impact on total factor productivity. Concerning business regulation, most findings of the relevant empirical literature indicate that lower regulations in markets are positively associated with productivity growth.

## 8. Conceptual Framework

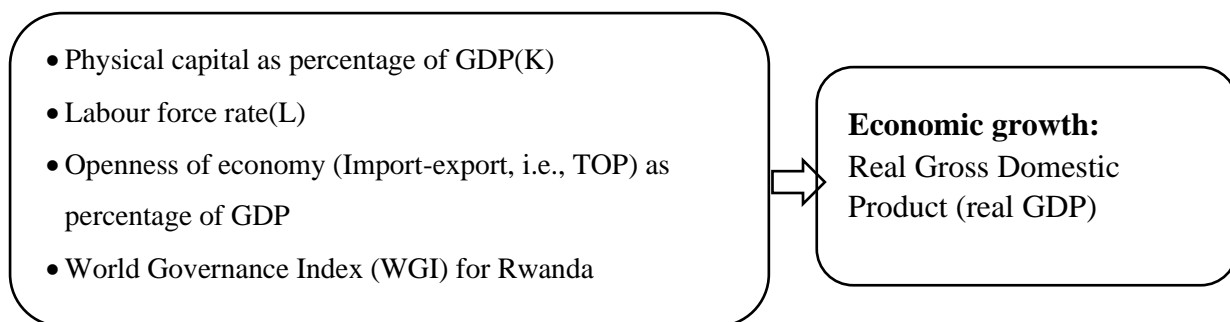
This study adopted a conceptual framework to describe the business regulatory reforms, total factor productivity and economic growth in Rwanda. Based on the above literature review, total factor productivity encompasses business regulation reforms undertaken by government for

OECD industry level evidence of Nicoletti and Scarpetta (2003) indicates that entry liberalization involves significant productivity gains in all countries, irrespective of their position vis-a-vis the technology frontier. However, when liberalization is interacted with the technology gap, productivity gains are higher in manufacturing industries of countries which are far from the technology frontier. Similarly, Aghion et al. (2004) show that more liberalized entry conditions have led to faster TFP growth of the UK firms and have improved aggregate productivity performance.

Behuria (2019), highlighted that Rwanda need to gain access to large market as a precondition for developing its manufacturing sector. Even though Rwanda is a signatory to the EAC Common Market and COMESA, local manufacturing company become exposed to severe competition from the region. An example was the local cement company, CIMERWA which largely depend on government subsidies and public procuring due to the competition from cement producers from Tanzania, Uganda and Kenya (P. Behuria, 2019).

promoting competitiveness on the market. Thus, this study used World Governance Index, openness of economy, capital and labour as independent variables to estimate the economic growth in Rwanda which is the dependent variable.

**Figure 1: Conceptual Framework**  
Independent variables



## 9. Materials and Methods

The study used the secondary data (time series) available at World Bank development indicators as open source. This means that the study used

documentation for answering the research questions of this study. The series were tested for serial correlation using the ADF. Then



cointegration test was performed for checking whether series are stationary in the first difference and exhibit the existence of the long-run equilibrium between business regulation and economic growth in Rwanda. The Johansen Cointegration test results was used and vector error correction model was used to estimate the OLS model. Finally, the model was diagnosed for making sure if the estimates are robust.

### Production function

The point of departure here is the standard Cobb-Douglas aggregate production function linking output to factor inputs (capital and labor) and productivity (along the lines of the neoclassical Solow-Swan model; see, for instance, Barro and Sala-i-Martin, 2004):

$$Y_t = A_0 e^{bt} K_t^\alpha L_t^{1-\alpha}, \text{ eq (2)}$$

where t is a time index, Y is real GDP, K is real capital stock, L is total employment,  $\alpha$  is the contribution of capital to output,  $1-\alpha$  is the contribution of labor, and the expression  $A_0 e^{bt}$  is TFP.

TFP refers to technological progress and other elements that affect the efficiency of the production process and measures the shift in the production function at given levels of capital and labor. The fixed component of TFP ( $A_0$ ) is assumed to grow at a rate b. Dividing by L and taking the natural logarithms of the left and right sides of equation (1) yields:

### Empirical Methodology

Empirical model testing starts following Solow and Swan (1956) while TFP is assessed through the remaining term in the production function.

$$Y(t) = F(K(t), L(t), A(t)), \text{ eq(3)}$$

Taking aggregate production function in neoclassical form to estimate the growth of TFP in growth accounting-framework is given as follows:

$$Y_t = F(K_t, L_t, t), \text{ eq(4)}$$

From the equation above, is output is capital and is labor input in physical units and t shows the time in production function. Constant returns to scale are assumed by the function F over time, technical changes shift the function in above model. In economics these changes are known as growth in total factor productivity (GTFP). This production function given in equation (2) now can be written in Hicks-neutral form as:

$$Y_t = A(t)F(K_t, L_t), \text{ eq (5)}$$

More inputs mean more output implying marginal product of labour (MPL) and the marginal product of capital (MPK) are both positive. While output (Y) depends on inputs and level of technology (A) in above equation. So, following baseline model will be used for estimating the relationship between business regulatory reforms and economic growth in Rwanda.

### Model Specification

The functional relationship between the dependent and the independent variables in this study was established as follows:

$$\text{Real GDP} = f(K, L, WGI, TOP), \text{ eq (6)}$$

Mathematically, the equation becomes: Real  $GDP_t = \alpha_1 + \alpha_2 K_t + \alpha_3 L_t + \alpha_4 WGI_T + \alpha_5 TOP_t + \mu_t$ , eq (7)

GDP = Economic growth (GDP)

$\alpha_1$  = the model intercept. It stands for technological change. More specifically, other variables that contribute to economic growth which are not explained by the model are represented by  $\alpha_1$ .  $\alpha_2 - \alpha_5$  = Coefficient of estimates

**K**= Physical capital

**L**= Labour force rate

**WGI**= Worldwide Governance Index. This index is composed of four indicators (Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, and Control of Corruption among others) for measuring the business regulatory reforms in Rwanda

**TOP** = Trade openness (TOP),

$\mu_t$  = Error Term,

Where, GDP as proxy of economic growth is the dependent variable, whereas Physical capital, World Governance index, and Trade openness are the explanatory variables at time.

### Measurement of Variables

In order to explain the change in the dependent variable of economic growth and independent variables such as: Business regulatory reforms represented by the sum of World Governance Index, TOP, Physical capital, and labour force participation rate were incorporated into Cobb-Dougllass model. These variables are defined in the following section.

## Data Sources and Data Transformation

The data are transformed in logarithm. To make the data stationary and to avoid the problem of heteroscedasticity from the fitted model, all endogenous variables were converted into natural log. In the case of missing data, interpolation was used.

## Data Analytics Methods

### Estimation Procedure

The study used time series data and ensuring that all data collected by annual basis, met all required of good characteristics of data quality were prioritized. All techniques expected to be used for running robust OLS were used for ensuring that the conclusion is appropriate. Therefore, parameters,  $\alpha_2$ ,  $\alpha_3$  and  $\alpha_5$  were estimated using the ordinary least Squares (OLS).

### Time Series Analysis

Econometric technique such as unit root test, cointegration test and other diagnostic test among others were performed for running robust model.

### Unit root test

The study used Augmented Dickey fuller test (ADF) to test stationarity of the series. The series were stationary of the order one, that is differenced on period I (1).

### Diagnostic Tests

To check the fitness and stability of the model we employed Breusch–Godfrey Serial Correlation LM Test and normality test. The results of Breusch–Godfrey Serial Correlation test which checks for the absence of autocorrelation in the model. The results having probability less than 0.05 indicate the absence of autocorrelation for the data used, and presence of autocorrelation otherwise.

### Optimum lag selection criteria

For this study, five lag order selection criterion such as Likelihood Ratio (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SC) and Hannan–Quinn Information Criterion (HQ) have been used to select the optimum lag, the lowest value of each criterion was selected as the optimum lag.

## Johansen's method of cointegration

We begin the test by considering  $H_0: r = 0$ . If it is rejected then we proceed to test whether  $H_0: r = 1$ . This process continued till the null hypothesis was accepted.

## Granger causality test

The co-integration test ignores the effect of the past values of one variable on the current value of the other variable. The Granger causality test was hence used to examine such possible instances. In this thesis we set hypotheses to find out the causal relationship between variables.

## Vector autoregression (VAR)

VAR models do not necessitate as much understanding of the forces that influence a variable as structural models with simultaneous equations. The only prerequisite knowledge is a list of variables that can be hypothesized to interact over time.

The VAR technique is a non-structural approach to modelling time series; it imposes little a priori structure. Indeed, by treating each endogenous variable in the model as a function of its lagged values and the lagged values of all other endogenous variables, the VAR technique allows us to estimate the relationships without using a structural model. The base equation is as follows:

$$Q_t = \alpha + \sum_{j=1}^k \sum_{i=1}^p \beta_{ji} x_{jt-i} + \sum_{i=1}^p \varphi_i Q_{t-i} + \varepsilon_t$$

Where, in the first equation of the VAR model,  $y_t$  represents the economic growth;  $x_t$  represents the vector of explanatory variables;  $\alpha_j$  and  $\beta_j$  are scalars and coefficient vectors, respectively.

## Impulse Response Checks

The study also employs an Impulse Response Function as an additional test which is normally used in conjunction with the VAR model. An Impulse Response analysis captures the marginal effects of resulting unexpected shocks to the regressor (s) on the variable(s) under observation over time or how a shock on one variable can affect another over time. In order to calculate the magnitude of this shock, a unit shock is applied to each variable to see its effect on the VAR system.

## 10. FINDINGS AND DISCUSSIONS

In econometrics, always testing stationarity of the series is mandatory as one of the assumptions of the Ordinary Least Squares (OLS) to avoid having spurious regression analysis. Therefore, GDP per capita, physical capital, labor force participation

rate, Business regulatory reforms (Political stability, regulatory Quality, Governance effectiveness, Control of corruption) and trade openness were tested for stationarity in their level using the Augmented Dickey Fuller (ADF) test.

**Table 1: Stationary test of the series in levels**

Ho: Series has Unit-Root.						
Variables	With trend					
	Test statistic	1% Critical Value	5% Critical Value	10% Critical Value	p-value	Decision-conclusion
lnGDP	-1.407	-3.750	-3.000	-2.630	0.5788	Unit root
lnK	-0.513	-3.750	-3.000	-2.630	0.8895	Unit root
lnLabor	0.834	-3.750	-3.000	-2.630	0.9922	Unit root
ln4WGI	-2.788	-3.750	-3.000	-2.630	0.0599	Unit root
lnToP	0.329	-3.750	-3.000	-2.630	0.9786	Unit root

Source: Author's calculation, 2022

Table 1 illustrates that time series are not stationary in their levels. The t-statistics are less than the t-critical and P-values are greater than 0.05

meaning that the series are non-stationary in the levels for all variables which imply that there is the unit root in other word as conclusion.

**Table 2: Stationarity test of the series in the first difference, i.e. I(1)**

Ho: Series has Unit-Root.						
Variables	Test statistic	1% Critical Value	5% Critical Value	10% Critical Value	p-value	Decision-conclusion
lnGDP	-3.701	-3.750	-3.000	-2.630	0.0041	No unit root
lnK	-4.635	-3.750	-3.000	-2.630	0.0001	No unit root
lnLabor(lag4)	-22.909	-3.750	-3.000	-2.630	0.0000	No unit root
ln4WGI	-5.115	-3.750	-3.000	-2.630	0.0000	No unit root
lnToP	-3.841	-3.750	-3.000	-2.630	0.0025	No unit root

Source: Author's calculation, September 2022

Table 2 shows that the null-hypothesis is rejected in favor of alternative as the t-computed is greater than t-critical for all series and p-values is significant. However, only labour force is stationary of the first difference with lag 4.

Going further, it is necessary to determine the optimal lag to use in the analysis. There are criteria set for selecting the maximum lag including the Akaike information criterion, the Hannan-Quinn information criterion and Bayesian information criterion among others. Table 3 presents the output for the optimal lag.

**Table 3: The maximum lags**

Selection-order criteria								
Sample: 2000 – 2020								
Number of obs = 21								
lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	153.276				5.1e-13	-14.1215	-14.0675	-13.8728
1	239.732	172.91	25	0.000	1.6e-15	-19.9745	-19.6506	-18.4823
2	269.677	59.89	25	0.000	1.6e-15	-20.4454	-19.8517	-17.7098



3	364.771	190.19	25	0.000	1.2e-17*	-27.1211	-26.2575	-23.142
4	3009.57	5289.6*	25	0.000		-276.626*	-275.492*	-271.403*
Endogenous: lnGDP lnK lnLabour ln4WGI lnToP Exogenous: _cons * Indicates selected lag at 1% critical value								
								maxlag (4)

**Source:** Author's calculations, 2022

The maximum lag for running the Cointegration test is 4 determined following the AIC, HQIC, SBIC and LR criteria.

### Results of the Cointegration test

Johansen Cointegration Test Hypothesis follows that:

- $H_0$  = No Cointegrating equation
- $H_1$  =  $H_0$  is not true i.e. There is Cointegrating equation.

The decision criteria are as follows:

- Reject the null hypothesis if the value of the Trace exceeds 5 % critical value, otherwise, fail to reject the null hypothesis

**Table 4: The Output of Johansen Cointegration test (Trace test)**

Cointegration Rank Test (Trace)					
<b>Trend:</b> constant			Number of obs = 23		
<b>Sample:</b> 1998 – 2020			Lags = 2		
maximum				trace	5% critical
rank	parms	LL	eigenvalue	statistic	value
0	30	237.08686		97.8371	68.52
1	39	261.67041	0.88207	48.6700	47.21
2	46	274.33121	0.66744	23.3484*	29.68
3	51	283.00509	0.52964	6.0006	15.41
4	54	285.98889	0.22853	0.0330	3.76
5	55	286.0054	0.00144		
There are 2 cointegrating equations (i.e., $r^*=2$ )					

**Source:** Author's calculations, 2022

The Johansen Cointegration test, Trace test showed that there are two cointegration vectors meaning that non-stationary series will move together in the long-run due that those endogenous vectors are

cointegrated. Thus, once there is a long-run relationship, Vector Error Correction model was used to estimate the long-run equilibrium of business regulatory reforms and economic growth in Rwanda.

### Vector Error Correction results

Business regulatory reforms affect the economic growth in Rwanda as it is part of the total factor productivity. According to endogenous growth model, TFP is the only one factor that explain disparities of countries in terms of economic

growth because inputs capital and labour recognize a diminishing marginal return to scale in the long-run. Therefore, VECM was performed for determining that relationship.

### The long-run relationship dynamics

**Table 5: Cointegrating equations**

equ	Coef.	Std. Err.	z	$P >  z $
lnGDP	1	-	-	-
ln4WGI	-.6270784	.1141778	-5.49	0.000
lnTOP	-2.067033	.1886748	-10.96	0.000
lnLabor	-30.15169	10.60077	-2.84	0.004

lnK	-.7849821	.1223256	-6.42	0.000
_cons	131.9424	-	-	-

**Source:** Author's calculations,2022

The  $ECT_{t-1} = 1.000 \log GDP_{t-1} - .6270784 \ln 4WGI_{t-1} - 2.067033 \ln ToP_{t-1} - 30.15169 \ln Labor - .7849821 \ln K + 131.9424$ , which means that Business regulatory reforms represented by  $\ln 4WGI$  increases the economic growth by 0.62%, trade openness increases the economic growth by 2.06%, labour force increases the economic growth by 30.15%, and physical capital increases the economic growth by 0.78% where there is 1% increase in output, which is the GDP per capita.

By emphasizing on the results: political stability, regulatory quality, Governance effectiveness, and control of corruption as the main factors of the business regulatory reforms (4WGI) influence positively the economic growth. This is consistent

with the findings of the study conducted by Phillip (2012) which concluded that human capital and government stability have positive and significant effects on total factor productivity which in return increase the economic growth. This study revealed that trade openness contributes approximately 2.06% on economic growth by a 1% increase in the GDP per capita. So, trade openness contributes more than double regardless of the external factors that regress the economic growth.

There is need of continuous improvement of efficient labor, attracting more foreign direct investment and reinforcing integration policy execution for enhancing trade openness highly affected by price volatility, lack of local raw materials, and landlock Ness of the country.

### Error Correction and short -run model dynamics

**Table 6: VECM estimates of the Business regulatory reforms and economic growth in Rwanda**

Dependent variable: lnGDP				
Regressors	Coef.	Std. Err.	z	P> z
$ECT_{t-1}$	.1720622	.11784	1.46	0.144
$\Delta \ln GDP$	.2230309	.2856426	0.78	0.435
$\Delta \ln 4WGI$	.1561335	.0933519	1.67	0.094
$\Delta \ln ToP$	.1279336	.2439461	0.52	0.600
$\Delta \ln Labor$	-8.778217	27.56298	-0.32	0.750
$\Delta \ln K$	.1368763	.1451398	0.94	0.346
_cons	.0348245	.0353444	0.99	0.324

**Source:** Author's calculations, 2022

Table 6 argues that business regulatory reforms take a longtime to affect the economic growth since

coefficients of the explanatory variables are positive but statistically insignificant.

### Diagnostic tests

For making sure that estimates are obtained from a robust model, the diagnostic test such as

homoscedasticity test, normality test and stability of the model were performed.

**Table 7: Lagrange-multiplier test output**

lags	chi2	df	Prob > chi2
1	30.5263	25	0.20519
2	27.8473	25	0.31493
H0: no autocorrelation at lag order			

**Source:** Author's calculations,2022

As shown in table 7, the Ho is accepted because p-values are greater than 0.05 critical value. This

implies that there is homogeneity in the error term which satisfy the condition of robust OLS.

**Table 8: Normality test output**

H0: vector is normally distributed			
Equation	chi2	df	Prob > chi2
D_lnGDP	1.605	2	0.44819
D_ln4WGI	1.741	2	0.41878
D_lnTOP	0.133	2	0.93546
D_lnLabor	4.932	2	0.08491
D_lnK	1.678	2	0.43218
ALL	10.090	10	0.43267

**Source: Author's calculations, 2022**

Table 8 clearly shows that the endogenous vectors are normally distributed, the p-values for all

vectors in 0.43 which is greater than 0.05 and implies to accept Ho.

**Table 9: Vectors stability test outputs**

Eigenvalue stability condition	
Eigenvalue	Modulus
2.303602	2.3036
1	1
1	1
1	1
1	1
.1834565 + .7394523i	.76187
.1834565 - .7394523i	.76187
.478649 + .1000394i	.488992
.478649 - .1000394i	.488992
.4099936	.409994
The VECM specification imposes 4-unit moduli.	

**Source: Author's calculations, 2022**

The model is considered to be stable since the null hypothesis is usually that the series are stable as presented in table 9.

### Conclusion

The aims of this study were to estimate the effect of Business regulatory reforms on economic growth in Rwanda. The time series data were analyzed using the OLS whereby explanatory variables were physical capital, labour force participation rate, trade openness, and proxy of business regulatory reforms which are political stability, regulatory quality, governance effectiveness, and reduction of corruption as the indicators that affect directly businesses. Interpolation and logarithm transformation of the series helped

analysis including test for stationarity and cointegration of vectors. The findings revealed that there is a long-run relationship between business regulatory reforms undertaken since 1996 and the economic growth. More specifically, Business regulatory reforms contributes approximately 62%, trade openness contribute approximately 206%, labour force contribute approximately 3015%, while physical capital contributes 78% on economic growth when there is change of 100% in the GDP per capita, ceteris paribus.

### Recommendations

Even though the study concluded that business regulatory reforms affect positively the economic growth in Rwanda, there are some challenges hindering the economic growth as revealed in the

literature review. Therefore, the researcher drawn twofold recommendations for enhancing the business regulatory reforms and economic growth in Rwanda.

For decision-makers, there is need to:

- Continue to promote services including ICT software's as the sector that do not require raw materials which are scary in Rwanda;
- Providing infrastructures that should reduce the production cost including shipping cost which recognized to fluctuate market price in Rwanda;
- Reinforce the implementation of the regional and international economic integration for enabling trade openness to contribute more on economic growth;
- Focusing on human capital enhancement as the driver of the total factor productivity
- Conduct research on business regulatory framework in order to make adjustment and

become the top service provider all over the world.

For academic scholars, they should:

- Conduct a study on the impact on foreign direct investment on economic growth in Rwanda,
- Carry out the study on Total Factor Productivity (TFP) and economic growth in Rwanda, because TFP encompass all factors not explained by inputs labour and capital,
- Assess the impact of economic integration on economic growth in Rwanda, especially EAC where Rwanda is member many years ago compared to other regional integration.

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