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Institutional Quality and Economic Growth in Tanzania

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Abstract

In this paper, we use the ARDL method to find the Impact of institutional quality on economic growth in Tanzania from 1990 to 2021. The ARDL technique frees variables from residual correlation as all variables are assumed to be endogenous. They distinguish between dependent and explanatory variables in any long-run relationship, identify the co-integrating vectors with multiple co-integrating vectors, and derive the Error Correction Model (ECM) or Error Correction Model (ECM) Vector Error Correction Model (VECM) by integrating short-run adjustments with long-run equilibrium without losing extended-run information. Our results show all adjustment terms in the respective models that have a long-run relationship have correct (negative) signs and are more than one, implying there is convergence in the long run; that is, the models returned to their long-run equilibrium; the rate (or speed) at which this happened ranged between 15% to 106.6% annually. Institutional quality has a significant affirmative (0.047) causal long-run effect on economic growth.

Keywords: institutional quality, economic growth, the rule of law, market liberalization

JEL Classification: O19; O47; O55; F63.

1. Introduction

Countries with broad-based institutions are significantly more likely to achieve sustained growth in the long run, Hartmann and Spurk (2021) as supported by empirical evidence, which is covered below in the literature review section (from Abubakar, 2020 to Yilmakuday, 2022). This calls for improvement of institutions also, as noted in the literature review section below that institutions are instrumental in influencing or enhancing economic development/growth (North, 1991; Iheonu *et al.*, 2017; OECD, 2001; Thorbecke, 2013 cited in Iheonu *et al.*, 2021; Hassan and Meyer 2021). It should, however, be cautioned that for this to happen, the improvement should be much more in the productive sectors (Yildirim & Gokalp, 2016, cited in Abubakar, 2020). Tanzania made massive efforts to make economic reforms and improve its institutions. Despite lingering structural constraints and deficiencies, these measures have impacted economic growth. Table 1 below shows that Tanzania's economic growth increased from an average of 1.8% between 1991 and 1995, peaking from 2001 to 2005 before levelling between 2006 and 2020.

It should be noted that on top of institutional improvement there also was a surge in production in the mining sector. Using data on Tanzania from 1990 to 2021, this paper applies an autoregressive distributive lag (ARDL) to establish whether institutional quality generates synergies in boosting economic growth and whether economic growth (expressed as the annual growth rate of the real GDP per capita). The rest of the paper is organized as follows; section 2 will review the literature, and section 3 will discuss the methodology and data used. We discuss the results in section 4, and the section concludes.

Table 1: Tanzania's Economic growth rate (5 year % average)

1991-1995	1.80
1996-2000	4.23
2001-2005	6.96
2006-2010	6.12
2011-2015	6.37
2016-2020	5.38

Source; compiled by the author from World Bank Indicators at 2015 prices

2. Literature Review

The endogenous growth approach based on growth models developed by Lucas (1988), Romer (1986, 1990) and Grossman and Helpman (1991) focuses on the long run and on the internal forces of the economy, particularly those that provide opportunities and incentives to create technological knowledge (Durham, 2004; Dada and Abanikanda, 2022). It augments the first approach as it also addresses gross capital formation. Its premise is that the role¹ played by foreign direct investment (Borensztein *et al.*, 1998; de Mello, 1999; Durham, 2004; Tang and Tan, 2018; al Faisal and Islam, 2022) will depend on the absorptive capacity of the host economy. The absorptive capacity enables an economy to benefit from foreign direct investment (Borensztein *et al.*, 1998; de Mello, 1999; Durham, 2004); in addition, a country with strong (weak) absorptive capacity, according to Dada and Abanikanda, 2022 will benefit maximally (minimally) from the growth effect of foreign direct investment.²

Another is the institutional quality approach, which incorporates a complex component of institutions that consist of both informal constraints (sanctions, taboos, customs, traditions, and codes of conduct) and formal rules (constitutions, laws, property rights) (North, 1991; Hassan and Meyer, 2021); the rule of the game in a society or more formally the humanly devised constraints that shape human interaction (Iheonu *et al.*, 2017 citing North, 1981; Islam and Shindiani 2021 citing North 1991; Emara and Rebolledo, 2021; Hartmann and Spruk, 2020). They are instrumental in influencing or enhancing economic development/growth (North, 1991; Iheonu *et al.*, 2017; OECD, 2001; Thorbecke, 2013 cited in Iheonu *et al.*, 2021; Hassan and Meyer 2021) by boosting the confidence of investors (local and foreign), promoting fairness and equitable distribution of resources (North, 1991), providing a suitable environment for growth-enhancing activities like investment, entrepreneurship and innovation stimulating synergies between foreign direct investment and domestic firms, promoting productivity spill over, inducing complementarities between foreign and domestic investment (Jude and Levieuge 2015; Brahim and Rachdi 2014; Hayat (2019), all quoted in Dada and Abanikanda, 2021), enhancing the finance-growth nexus by providing an enabling environment for the juice of economic prosperity to trickle down to the poorer segments of society (Thorbecke, 2013 cited in Iheonu *et al.*, 2021), and contributing to improved firm performance (Matashu and Musvoto, 2020). A country with strong (weak) quality institutions like OECD/APAC will maximally (minimally) experience economic growth (Azman-Saini, 2010).

Empirical findings primarily show the presence of an institutional quality-economic growth nexus. Abubakar's (2020) results show that economic growth responds to institutional quality contract-intensive money and the effective governance index; however, the Impact of the effective governance index is insignificant. Agyei and Idan (2022) assess the moderating role of institutions in the trade openness and inclusive growth nexus in 39 Sub-Saharan Africa (SSA) countries for 1996 to 2017 data and find that institutions strengthen the positive relationship between trade openness and inclusive growth in SSA. Da Veiga *et al.* (2022) assess which economic, social, and institutional determinants of economic development are essential to the development of African

¹This includes directly increasing capital accumulation and indirectly increasing the stock of knowledge and fostering technological growth of a technologically inferior recipient economy.

² Absorptive capacity includes the level of development of infrastructure (research and development, innovation, the levels of domestic investment) (Bekana, 2016; Naanwaab and Diarrassouba, 2016), the level of institutional development (Alfaro *et al.*, 2004; Benassy-Quere *et al.*, 2007; Farla *et al.*, 2016; Fatima 2016) especially concerning financial markets (Alfaro *et al.* 2004), the level of human capital development (Borensztein *et al.*, 1998; Fahinde *et al.*, 2015; Bbale and Nyanzi 2016; Pegkas and Tsamadias, 2016), environmental quality and the degree of openness of the economy (Dada and Abanikanada, 2022).

countries for the years 1996 and 2014. They find a positive association amongst institutional, economic, and social determinants of development, which means that countries that exhibit a reliable performance in institutional indicators also have a satisfactory performance in economic and social indicators, and *vice-versa*. However, the results are not as precise for 2014 as for 1996. Dada and Abanikanda (2022) investigate the moderating role institutional quality plays in Nigeria's foreign direct investment-led growth hypothesis from 1984 to 2018 using the autoregressive distributed lag estimation technique. The findings reveal that the interactive effect of institutional indicators with foreign direct investment significantly impacts economic growth in most models, implying that institutions serve as a vital absorptive capacity. They conclude that good institutional quality matters for Nigeria's foreign direct investment and growth. Emara and Rebolledo (2021) investigate the relationship between economic freedom (the size of government, property rights, monetary policy, access to international trade, and regulation of credit labour and businesses) and economic performance in the APAC and OECD countries for the period 1980-2017 and find that economic freedom positively affects economic performance in the selected countries.

Hartmann and Spurk (2020) examine the contribution of de jure and de facto institutional instability to long-run growth and development for a large panel of countries in the period 1820–2016. The evidence suggests that greater de jure and de facto institutional instability has a strong negative impact on income and growth, whereas de facto instability is more important than de jure instability. Hassan and Meyer (2021) explore the moderating effect of institutional quality on the external debt-economic growth nexus in highly indebted developing countries (HIPC) and find that institutional quality (institutional quality index, government stability, government effectiveness, and law and order) mitigate the negative impact of external debt on economic growth. Iheanou *et al.* (2021) assess the impact of institutional quality (control of corruption, government effectiveness, regulatory quality, and the rule of law as institutional quality indicators) on economic performance in 12 West African countries from 1996 to 2015 and find that all the indicators of institutional quality employed in the study have a positive and significant impact on economic performance in West Africa.

Islam and Shindaini (2021) examine the impact of institutional quality (INQ) on economic growth (EG) linkage in Bangladesh for 1990–2019 and find that INQ affects long-run EG positively. Matashu and Musvoto (2020) examine connections between institutional quality (corporate governance, macroeconomic fundamentals, the institutional environment) and economic growth in Sub Saharan African Countries and find that aggregated composite; corporate governance, macroeconomic fundamentals, and the institutional environment have a statistically significant solid relationship with economic growth. Matallah and Benlahcene (2021) investigate the impact of public service quality on economic growth in 15 MENA countries over the period 1996-2018 and find that the government effectiveness index exerts a significant positive impact on economic growth in 15 MENA countries.

However, government spending (freedom from the government) exhibits a statistically insignificant positive effect on economic growth in the selected countries. Sarac and Yaglikara (2022) evaluate the developmental differences between countries in the core, semi-periphery, and periphery countries according to institutional quality differences and find the effect of economic freedom on development in all subgroups of core, semi-periphery, and peripheral countries. In addition, while the effect of democracy on development has an increasing effect in core and semi-periphery country groups, the results in peripheral countries are found statistically insignificant. Utile *et al.* (2021) examine the influence of institutional quality on the development of the Nigerian economy in the 21st century using annual time series data covering 2001 to 2019 and find that Institutional Quality (INSQ) exerts a significant negative influence on economic growth. Yilmakuday (2022) investigates the effects of inflation on per capita income growth for thirty-six developed and developing countries and finds heterogeneity of such effects across countries that are shown to be further connected to the strength of their institutions. While the effects of inflation on growth are adverse and significant in countries with more vital institutions, they are positive and significant in countries with weaker institutions.

3. Methodology and data

3.1. Model specification

In this paper, we use the ARDL method to find the impact of institutional quality on economic growth in Tanzania from 1990 to 2021. Nkoro & Uko (2016) have shown that the ARDL technique frees variables from residual correlation as all variables are assumed to be endogenous. Their model distinguished between dependent and explanatory variables in any long-run relationship, identified the co-integrating vectors with multiple co-integrating vectors, and derived the Error Correction Model (ECM) by integrating short-run adjustments with long-run equilibrium without losing extended-run information. Additionally, by excluding non-stationary variables from the analysis through unit root tests, the technique paves away problems associated with violations of assumptions of

constant mean and variances that would, among other things, lead to misleading estimates (Nkoro and Uko, 2016). ARDL also is appropriate in dealing with variables that are stationarity: at the level $I(0)$ and at the difference $I(1)$; and by use of the Pesaran-Shin bounds co-integration technique (Pesaran and Shin, 1999, and Pesaran *et al.*, 2001 as cited in Nkoro and Uko, 2016) the technique distinguishes between long run and short models. Utile *et al.*, 2021 citing Solow, 1956; Mankiw *et al.*, 1992; & Lucas, 1988 start with the primary neo-classical production function we adopt for our specification.

$$Y = f(K, L) \quad (1)$$

where Y depicts economic growth as a function of capital (K) and labour (L). Utile *et al.*, 2021 continue to include the adjustments of Romer (1986, 1990 as cited in Nkoro and Uko, 2016), where human capital (H as shown in specification 2 below) is also considered to be the primary determinant of economic growth in endogenous growth specification 1 above takes the form of

$$Y = f(K, L, H) \quad (2)$$

Utile *et al.*, 2021 then introduce institutional quality (INSQ, which we have substituted for as lnq shown in specification 3 below) (suggested by Feder 1983; Grossman and Helpman 199; & Ram 1996) cited in Nkoro and Uko 2016) to come up with.

$$Y = f(K, L, H, inq) \quad (3)$$

We proceed from here to show that given that capital formation (K) consists of both domestic gross fixed capital formation (GFCF) and foreign direct investment (FDI), these details are added to have specification 4, where K is substituted with gross capital formation ($gfcf$) and L and H are merged and re-written as human).

$$Y_t = f(inq, gfcf, fdi, human) \quad (4)$$

Y_t is the annual GDP growth rate per capita, inq stands for institutional quality, $gfcf$ is gross capital formation, fdi is foreign direct investment net stock inflows, and $human$ is human capital, proxied by secondary school enrolment. These variables are obtained from the following sources

- a) Worldwide Governance Indicators: Institutional quality is an index that has been estimated using principal component analysis from six variables (voice and accountability, political stability, government effectiveness, regulatory quality, the rule of law, and control of corruption)
- b) World Development Indicators:
 - a. The annual growth rate of per capita GDP is a proxy for economic growth obtained from
 - b. FDI inflows as a percentage of GDP
 - c. Gross capital formation as a percentage of GDP
- c) UNDP Human Development Report: percentage of secondary Schooling enrolment as a proxy for human capital.

Specification 4 is expressed in a long-run form as

$$Y_t = \beta_0 + \beta_1 inq + \beta_2 gfcf + \beta_3 fdi + \beta_4 human + \varepsilon_{it} \quad (5)$$

Where Y_t is economic growth, β_1 through β_4 are parameters to be estimated, β_0 is the intercept and ε is the error term.

$$\text{As for ARDL its generalised form is } Y_t = \gamma_0 + \sum_{i=1}^p \delta Y_{t-1} + \sum_{j=0}^q \beta_j X_{t-1} + \varepsilon_{it} \quad (6)$$

Where Y_t is a dependent variable, (X'_t) is a $k \times 1$ vector that is allowed to be purely $I(0)$ or $I(1)$ or co-integrated, δ is the coefficient of the lagged dependent variable called scalar, β_j are $k \times 1$ vectors; p, q are optimal lag orders; ε_t is the stochastic error term.

3.2. Descriptive statistics

Economic growth, as proxied by the log of growth rate per capita, averaged 0.384, ranging from -0.233 to 0.658 (Table 1). Growth has been slow compared to other developing countries (Dada and Abanikanda, 2022).

Institutional quality (inq), not presented in logs, averaged 1.33, ranging from -0.5.282 to 2.580. We use the ratio of standard deviation to the mean, also called coefficient of variation (CV), to check the size of the standard deviation and, therefore, the relative level of variability. As a rule of thumb, a $CV > 1$ shows a higher variability, and a $CV < 1$ indicates a lower variability. From CV, then gfcf (0.091), FDI (0.162), human per capita (0.240) and economic growth (0,609) have lower variability compared with the rest. Only institutional quality (1.228) has a broader variability. So, variability is not a problem for almost all variables.

Table 2. Summary statistics

variable	Mean	Std.	Dev.	Min	Max	CV
Y	32	0.384	0.234	-0.233	0.658	0.609
inq	32	1.365	1.633	-5.282	2.580	1.228
gfcf	32	1.439	0.131	1.173	1.613	0091
fdi	32	3.557	0.575	2.589	4.210	0.162
human	32	1.183	0.284	0.723	1.500	0.240

Source: Estimations by author.

Given that computations are made using logs, correlations of logs are presented in Table 3. They indicate a moderate correlation with one another (save fdi, which is highly correlated with human capital), as they are below the benchmark of 0.8, implying an absence of multicollinearity among the variables (Dada and Abanikanda, 2022). Institutional quality (inq) is of interest, with positive though low correlations with all variables, the highest (0.300) being economic growth. Economic growth (Y) also has low correlations with all other variables, the highest (0.317) being human capital.

Table 3. Correlation matrix

	Y	inq	gfcf	fdi	human
Y	1.000				
inq	0.300	1.000			
gfcf	0.161	0.299	1.000		
fdi	0.289	0.084	0.692	1.000	
human	0.317	0.117	0.722	0.947	1.000

Source: Estimations by author

4. Results and discussion

4.1. Optimal lags

Having obtained a functional form and knowing the variables we are using, we proceed to the next step of obtaining optimal lags for the variables we are using. Given that the economic processes id dynamic where a dependent variable takes time to respond to the effect of regressors (Scott Hacker and Hatemi, 2008; cited in Chikalipa and Okafor 2019), there is a need to capture all past information that could entail the estimation framework; failure to do this would result to misspecification. Using lags becomes essential and choosing the optimal lag length is vital. Choosing the optimal number of lags avoids losing degrees of freedom, multicollinearity, serial correlation, and misspecification errors. A rule of thumb is to have between 1 and 2 lags for annual data. We multiply the lags across periods by 4 or 12, i.e., between 4 and 8 for quarterly data and between 12 and 24 for monthly data. However, econometric packages (Akaike's Information Criterion (AIC), Hannan and Quinn Information Criterion (HQIC) and Schwarz's Bayesian Information Criterion (SBIC)) are available and are extremely useful in estimating the appropriate (optimal) number of lags. These are employed here to choose the optimal lag length for our series, and the results are presented below. Because of the detailed output of each variable, the details are not shown here; for illustrative purposes, the output for Y is displayed in Table 4. Five criteria have produced an optimal lag of one. Similar tables could show how lag levels arrived at 2, 1, 1 and 2, respectively, inq, gfcf, fdi and human.

Table 4. Lag-order selection criteria for Y

Sample: 1994 through 2021

Number of obs = 28

Lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	0.578289				0.060342	0.030122	0.044668	0.077701
1	5.07318	8.9898*	1	0.003	.047022*	-.219513*	-.190422*	-.124355*
2	5.87766	1.609	1	0.205	0.047711	-0.20555	-0.16191	-0.06281
3	5.99022	0.22513	1	0.635	0.050891	-0.14216	-0.08398	0.048156
4	6.82229	1.6641	1	0.197	0.051603	-0.13016	-0.05744	0.10773

Notes: * optimal lag Endogenous: Y Exogenous: _cons
Source: Estimations by author.

4.2. Stationarity test

Our next step is to check for the stationarity of variables (Mongale *et al.*, 2018) to sieve away non-stationary series, that is, those that have a non-constant mean, a non-constant variance, and a non-constant autocorrelation over time (Yuan *et al.*, 2007 cited in Akinwale and Grobler, 2019; Asteriou and Hall, 2011 cited in Mongale *et al.*, 2018). If we fit regressions that use such series, our results will be spurious, and their outcomes cannot be used for forecasting or prediction (Granger and Newbold, 1974; cited in Akinwale and Grobler, 2019). We are keeping the stationary series. They have non-seasonality, a constant mean, and a constant autocorrelation structure and tend to return to the long-term trend following a shock. Several tests, including the Augmented Dickey-Fuller (ADF), Phillips-Perron, DFGLS, Levin-Lin-Chu and Im-Pesaran-Shin, are used for testing stationarity, also called unit root tests. The ADF test used in our study is an extension of the Dickey-Fuller test, which includes extra lagged terms of the endogenous variable to remove autocorrelation in the error term by adding the lagged difference terms of the regressand (Pradhan, 2016 and Makhoba *et al.*, 2019). According to Gujarati and Porter 2009; as cited in Ilesanmi and Tewari, 2017; the ADF test involves estimating the following specification:

$$\Delta y_t = \alpha + (\rho - 1) y_{t-1} + \sum_{\rho=1}^m \delta_i \Delta y_{t-\rho+1} + u_t \quad (7)$$

Where α is a constant, ρ is an autoregressive coefficient for the series, y_t is the variable in period t , u_t is the error term with mean zero and variance one; t the linear time trend and m is the lag order. Two hypotheses are assessed:

H_0 : $\rho = 1$ (contain unit, the data is not stationary).

H_a : $\rho < 1$ (do not contain a unit root, the data is stationary).

The results of the stationarity test are presented in Table 5 below. The criterion is that the test statistic must be greater than the critical value of 5%. All variables are not stationary at the level since their test statistics (Column 2) are lower than the critical values at 5% (Column 3), also confirmed by non-significant probabilities. We have differenced them to make them stationary at order 1 (Column 4 are higher than the critical values at 5% (Column 5), also confirmed by significant probabilities. It is noted that fdi at the difference, although significant, is not stationary at 5%. However, it is stationary at 10%, where its statistic of 2.912 is higher than the critical value of 2.626. At this step then, all variables are proven to be stationary.

Table 5: Results of Augmented Dickey-Fuller test

1	2	3	4	5
variable	Test statistics at level	Critical value at 5%	Test statistics at the difference	Critical value at 5%
Y	-1.498	-2.986	-4.498***	-2.989
inq	-1.677	-2.986	-5.306***	-2.989
gfcf	-0.759	-2.989	-3.351**	-2.992
fdi	-1.750	-2.989	-2.912**	-2.992
human	-0.805	-2.989	-4.078***	-2.992

Source: Estimations by author.

Notes: Percentages are levels for critical values; *** and ** represent a MacKinnon approximate p-value for Z(t) p-value showing the significance level, respectively, at 1% and 5%.

4.3. Bounds co-integration test

A bounds co-integration test, our next step, establishes whether a long-run relationship exists between variables. The relationship indicates that time series move together eventually and that the error term resulting from the linear combination of time series quantifies the deviation of the time series from their typical long-run relationship, which can be used to predict their future values. In this case, the test is used to determine the long-run relationship between institutional quality and economic growth in Tanzania (Pesaran and Shin, 1995; Pesaran *et al.*, 2001, cited in Islam and Shindaini, 2021). We first estimate the lag structure for each variable used in estimating the bounds co-integration test. (See Appendix A for mathematical formulation). Because of the substantial number of estimates of lag structure we made, we will not display them here, only two for illustration. For instance, when Y is taken as a dependent variable while inq, gfcf, fdi and human as regressors, the lag structure is 1, 0, 1, 1 and 0, respectively, for Y, inq, gfcf, fdi and human.

Similarly, when human is taken as a dependent variable while Y, inq, gfcf and fdi as regressors, the lag structure is 1, 0, 0, 0 and 0, respectively for human, Y, inq, gfcf and fdi. These lags help estimate bounds co-integration tests. We use them to estimate the bounds co-integration test.

Table 6. Pesaran/Shin/Smith (2001) ARDL Bounds Test criteria

H0: no levels of relationship

Levels	I(0)-0.1	I(1)-0.1	I(0)-0.05	I(1)-0.05	I(0)-0.025	I(1)-0.025	I(0)-0.01	I(1)-0.01
Critical vl	2.24	3.35	2.86	4.01	3.25	4.49	3.74	5.06

Ho: accept if $F < \text{critical value for } I(0) \text{ regressors}$

Ho: reject if $F > \text{critical value for } I(1) \text{ regressors}$

Source: Estimations by author.

Notes: I(0)-0.1 is lower bound at 10%, I(0)-0.05 is lower bound at 5%, I(0)-0.025 is the lower bound at 2.5%, and I(0)-0.01 is the lower bound at 1%. Similarly, I(1)-0.1 is a higher bound at 10%, I(1)-0.05 is a higher bound at 5%, I(1)-0.025 is a higher bound at 2.5%, and I(1)-0.01 is higher bound at 1%.

Table 7. Pesaran/Shin/Smith (2001) ARDL Bounds Test results

	F statistic	I(0)-0.05	I(1)-0.05	co-integration
Y	7.127	2.86	4.01	Yes
inq	5.938	2.86	4.01	Yes
gfcf	2.277	2.86	4.01	No
fdi	8.707	2.86	4.01	Yes
Human	13.817	2.86	4.01	Yes

Source: Estimations by author.

Critical values at 5% of 2.86 at a lower bound and 4.01 at a higher bound displayed in Table 7 are to be read in conjunction with test criteria in Table 5. For illustration, in the model where Y is a dependent variable, the F statistic of 7.127 is higher than the critical value of 4.01 of the higher (I(1)) bound at 5%. Therefore, the null hypothesis of $F > \text{critical value for } I(1) \text{ regressors}$ cannot be rejected, implying co-integration in the model where Y is a dependent variable. This applies to models where inq, fdi and human are dependent variables. As for the model where gfcf, since the F statistic of 2.277 is lower than the critical value of 2.86 of the lower (I(0)) bound at 5%, the null hypothesis of $F < \text{critical value for } I(0) \text{ regressors}$ cannot be rejected, implying there is no co-integration in the model where gfcf is a dependent variable. If the estimated value of the F- statistic exceeds the critical value (Narayan's 2005, cited in Islam and Shindaini 2021, also see Table 4), a long-run association is validated; in this case, for all models where Y, inq, fdi and human are dependent variables.

4.4. Regression results

From the bounds co-integration test results, we proceed to estimate error correction models (ECM) for the four long-run models where in each case, Y, inq, fdi, and human are dependent variables (as displayed in Columns 3 through 6 in Table 8); and one short run model where gfcf is a dependent variable (Column 7). The extended (ECM) and short-run (ARDL) models are displayed in Appendix 2, and Stata outputs are shown below. The ECM counts for one period lag values of the error terms equation 18 (in Appendix C), 'its coefficient (λ) indicates the speed of correction to long-term stability from short-term imbalance and assimilates the short-run constants with long-run ones without sacrificing any long-run facts. A long-run association is validated if λ is negative, statistically significant, and smaller

than one, whilst significant values of regressors confirm the short-run coefficients' (Islam and Shindaini, 2021). erm

Table 8: Regression results

1	2	3	4	5	6	7
ECM/ARDL	variable	Y	inq	fdi	human	gfcf
ADJ	L1.	-0.987 (0.186) ***	-0.992 (0.213) ***	-0.150 (0.057) **	-1.066 (0.147) ***	
LR	Y		3.191 (1.601) *	-0.899 (0.54)	-0.016 (0.071)	
	inq	0.047 (-0.023) **		0.128 (0.078)	0.005 (0.010)	
	gfcf	-1.069 (0.471)	9.104 (3.311) **	-2.627 (1.426) *	0.10 (0.168)	
	fdi	0.154 (0.252)	-1.901 (2.405)		0.485 (0.042) ***	
	human	0.213 (0.495)	0.571 (4.636)	2.596 (0.474)		
SR	inq			-0.012 (0.006) *		
	gfcf D1.	2.028 (0.772)		0.635 (0.187) ***		
	fdi D1.	-1.945 (0.596)	8.378 (4.862) *			
ARDL	gfcf L1.					0.793 (0.091)
	fdist					0.008 (0.065)
	human					0.077 (0.122)
	Y					0.027(0.045) ***
	inq					0.008 (0.006)
	_cons	1.201 (0.599)	-8.520 (5.740)	0.733 (0.127) ***	-0.734 (0.222) ***	0.173 (0.126)
Durbin-Watson		1.8405	1.8029	2.2742	1.9472	1.6359
Breusch-Godfrey Ch ²		1.000	0.742	1.182	0.018	0.948
<i>p</i>		0.7516	0.3890	0.2770	0.8923	0.3301
White Ch ²		30.00	29.82	31.00	17.82	2035
<i>p</i>		0.4140	0.3224	0.4154	0.5992	0.4363
Normality Ch ²		1.70	8.52	0.45	5.81	0.47
<i>p</i>		0.4283	0.0141	0.7973	0.0548	0.7901

Note: *** **, * implies significant at 1%, 5% and 10% level; figures in parentheses are standard errors
Source: Estimations by author.

'The error correction term (ECT) counts for one-period lag values of the error terms; its coefficient [λ] indicates the speed of correction to long-run stability from any short-run imbalance and assimilates the short-run constants with long-run ones without sacrificing any long-run facts. A long-run association is validated if [λ] is negative, statistically significant, and smaller than one, whilst the significant values of regressors confirm the short-run coefficients' (Islam and Shindaini, 2021). Our results show all adjustment terms in the respective models that have a long-run relationship have correct (negative) signs and are more minor than one implying there is convergence in the long run; that is, the models returned to their long-run equilibrium; the rate (or speed) at which this happened ranged between 15% to 106.6% annually. Institutional quality has a significant affirmative (0.047) causal long-run effect on economic growth. Since the coefficient is positive and significant at the 5% level, it authenticates the distributive lag property of the ARDL approach that, in the long run, institutional quality exerts a significant affirmative impression on economic growth. This finding is supported by extensive coverage in the literature review section (Abubakar, 2020; Agyey and Idan, 2022; Da Viegua, 2022; Dada and Abanikanda, 2022; Emara and Rebolledo, 2021; Hartmann and Spurk, 2020; Iheanou *et al.*, 2021; Islam and Shindaini, 2021; Matallah and Benlahcene, 2021; and Utile *et al.*, 2021).

Economic growth and gross fixed capital formation have significant (respectively at 10% and 5%) affirmative (3.191 and 9.104) causal long-term effects on institutional quality. As seen above, there is much empirical evidence regarding unidirectional causality from institutional quality to economic growth. However, a few studies, like Kabede and Takyii, 2017 find economic growth to be an essential determinant of institutional quality in Sub-Saharan Africa; Dandume 2013 and Babasanya *et al.*, 2021; find bidirectional causality between institutional quality to economic growth in Nigeria. Gross fixed capital formation is estimated to have a significant (at a 10% level) negative (-2.627) causal effect on FDI in the long run. Kurniawati 2017; studied 69 countries from 1990 to 2015. The rate of capital formation also potentially influences FDI and economic growth. Developing economies with a slight initial degree of capital stock inherit more effective marginal rates of return (productivity) and growth rates if sufficient capital stock is injected based on the neoclassical growth model. In the empirical analysis, Barro (1991), Levine & Renault (1992), and Kormendi & Meguire (1985) exhibit that the rate of physical capital formation influences the rate of a country's economic growth. FDI's significant (at 1% level) and positive (0.485) causal long-run effect on Human capital are in line with literature where foreign direct investment plays the role of directly increasing capital accumulation and indirectly increasing the stock of knowledge and fostering technological growth of a technologically inferior recipient economy (Borensztein *et al.*, 1998; de Mello 1999; Durham 2004; Tang and Tan, 2018; al Faisal and Islam, 2022).

In the short run, FDI has a marginally significant (at a 10% level) effect (4.862) on institutional quality. Institutional quality has a marginally significant (at a 10% level) negative Impact (-0.012). These findings disagree with the findings by Hyun 2006 in his study on 62 developing countries covering the period 1984-2003, where he found no evidence in favour of short-run causality between FDI and institutional quality. Detailed coverage of the literature review by Belfiq *et al.*, 2021; citing Daude and Stein (2007), also raised the aspect of FDI becoming endogenous where foreign investors in host countries demand better institutions. Gross fixed capital formation has a highly significant (at 1% level) positive effect (0.635) on FDI. This indirectly agrees with Ullah *et al.*, 2014 in the study in Pakistan for the 1976 to 2010 period, where they find causality from domestic investment to economic growth and from economic growth to FDI. Economic growth has a positive (at 1% level) effect (0.027) on gross fixed capital formation. We approach this from the premise that domestic savings are invested in line with the findings of Sinha and Sinha (1998), Saltz (1999), Agrawal (2001), Anoruo and Ahmad (2001), and Narayan and Narayan (2006), all cited in Abu Al Foul (2010). In their literature review, Didelija, 2021 extensively showed causality between economic growth and savings. Some of the citations include Abu Al-Foul (2010), who finds a two-way link between savings and economic growth in Morocco; van Wyk and Kapingura (2021), who find a positive causality from economic to savings in South Africa; Tang (2008) finding a bi-directional link between savings and economic growth in Malaysia. So, by that savings will be invested, economic growth has leverage on gross domestic investment.

4.7. Diagnostic test

Our next step is to establish whether our results for every model (Y, inq, fdi and human) can be taken seriously.

Autocorrelation

We have established that our model has no autocorrelation, as the coefficients are significant at 5%. For Model 1, where Y is a dependent variable, the Durbin-Watson statistic is a clear 1.840452, supported by the Breusch-Godfrey test (*p*-value of 0.7156)

Heteroskedasticity

Our models are all homoskedastic. For Model 1, where Y is a dependent variable, White's test statistic is a

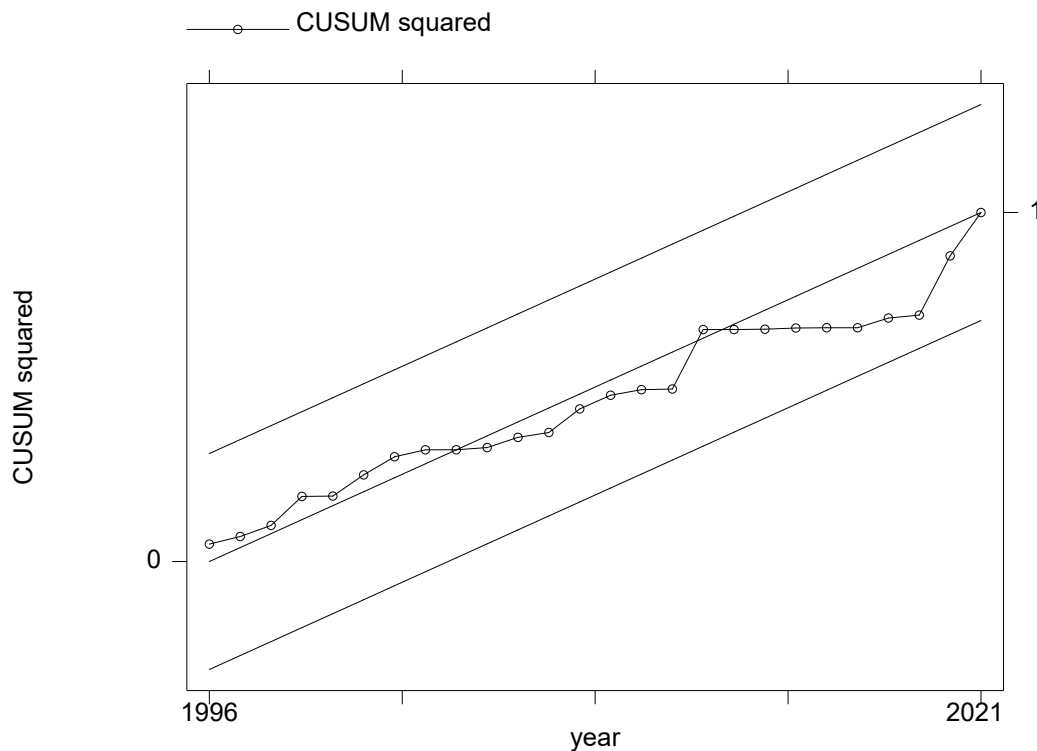
Normality

All our models, save the one with institutional quality and a dependent variable, passed the normality test where errors are typically distributed as the coefficients are significant at 5% for each equation or the overall model. With institutional quality as a dependent variable, the probability of the χ^2 statistic (0.0141) is insignificant.

Stability

We checked and found that all models are stable. For illustration, Fig 1 shows the results for the model where Y is the independent variable.

Fig. 1. Y stability test results



5. Conclusion.

In this paper, we use the ARDL method to find the Impact of institutional quality on economic growth in Tanzania from 1990 to 2021 by analyzing the Impact of institutions on economic growth and examining if the eventual Impact differs depending on the development degree. The results support the central hypothesis that institutional quality positively impacts economic growth. In addition, all adjustment terms in the respective models that have a long-run relationship have correct (negative) signs and are smaller than one implying there is convergence in the long run; that is, the models returned to their long-run equilibrium; the rate (or speed) at which this happened ranged between 15% to 106.6% annually. We contend that Institutional quality has a significant affirmative (0.047) causal long-run effect on economic growth. This finding is supported by extensive coverage in the literature review section (Abubakar, 2020; Agyey and Idan, 2022; Da Viegua, 2022; Dada and Abanikanda, 2022; Emara and Rebolledo, 2021; Hartmann and Spurk, 2020; Iheanou *et al.*, 2021; Islam and Shindaini, 2021; Matallah and Benlahcene, 2021; and Utile *et al.*, 2021).

Economic growth and gross fixed capital formation have long-term causal effects on institutional quality. However, it must be considered that all the empirical research investigating the relationship between institutions and economic growth still must face at least two kinds of problems upstream. The first difficulty is related to the determination of good institutional quality indicators: the impressive number of indicators elaborated by multilateral organizations, risk-rating agencies, academic institutions, and nongovernmental organizations present ambiguous results stemming from endogenous variables or collinearity between them, and they often lack a theoretical framework linking the indicator to previously defined institutional quality criteria. In addition, most of them refer to the socio-political sphere neglecting the administrative one due to the impossibility of declining variables about the various legal and juridical systems in a homogenous cross-country way.

The definition of growth itself then represents the second problem. Economic growth is currently associated with GDP per capita, a valuable tool to approximate growth trends easily comparable among countries and for these reasons, for a long time, worldwide accepted as an indicator for well-being and development too. Unfortunately, finding new tools is complex, and the debate is still ongoing. One thing is for sure: "we cannot face the challenges of the future with tools from the past.

Appendix A: Bounds co-integration test formulation

$$\Delta Y_t = \alpha_{10} + \beta_{11} \Delta Y_{t-1} + \beta_{21} \Delta \ln q_{t-1} + \beta_{31} \Delta \text{gfcf}_{t-1} + \beta_{41} \Delta \text{fdi}_{t-1} + \beta_{51} \Delta \text{human}_{t-1} + \sum_{i=1}^p \alpha_{1i} \Delta Y_{t-i} + \sum_{i=1}^{q_1} \alpha_{2i} \Delta \ln q_{t-i} +$$

$$\sum_{i=1}^{q2} \alpha_{3i} \Delta \text{gggfcf}_{t-i} + \sum_{i=1}^{q3} \alpha_{4i} \Delta \text{fdi}_{t-i} + \sum_{i=1}^{q4} \alpha_{5i} \Delta \text{human}_{t-i} + \varepsilon_{1t} \quad (8)$$

$$\Delta \text{inq}_t = \alpha_{20} + \beta_{12} \Delta Y_{t-i} + \beta_{22} \Delta \text{inq}_{t-i} + \beta_{32} \Delta \text{ggfcf}_{t-i} + \beta_{42} \Delta \text{fdi}_{t-i} + \beta_{52} \Delta \text{human}_{t-i} + \sum_{i=1}^p \alpha_{1i} \Delta \text{inq}_{t-i} +$$

$$\sum_{i=1}^{q1} \alpha_{2i} \Delta Y_{t-i} + \sum_{i=1}^{q2} \alpha_{3i} \Delta \text{gggfcf}_{t-i} + \sum_{i=1}^{q3} \alpha_{4i} \Delta \text{fdi}_{t-i} + \sum_{i=1}^{q4} \alpha_{5i} \Delta \text{human}_{t-i} + \varepsilon_{2t} \quad (9)$$

$$\Delta \text{fdi}_t = \alpha_{30} + \beta_{13} \Delta Y_{t-i} + \beta_{23} \Delta \text{inq}_{t-i} + \beta_{33} \Delta \text{ggfcf}_{t-i} + \beta_{43} \Delta \text{fdi}_{t-i} + \beta_{53} \Delta \text{human}_{t-i} + \sum_{i=1}^p \alpha_{1i} \Delta \text{fdi}_{t-i} +$$

$$\sum_{i=1}^{q1} \alpha_{2i} \Delta Y_{t-i} + \sum_{i=1}^{q2} \alpha_{3i} \Delta \text{inq}_{t-i} + \sum_{i=1}^{q3} \alpha_{4i} \Delta \text{gggfcf}_{t-i} + \sum_{i=1}^{q4} \alpha_{5i} \Delta \text{human}_{t-i} + \varepsilon_{3t} \quad (10)$$

$$\Delta \text{human}_t = \alpha_{40} + \beta_{14} \Delta Y_{t-i} + \beta_{24} \Delta \text{inq}_{t-i} + \beta_{34} \Delta \text{ggfcf}_{t-i} + \beta_{44} \Delta \text{fdi}_{t-i} + \beta_{54} \Delta \text{human}_{t-i} + \sum_{i=1}^p \alpha_{1i} \Delta \text{human}_{t-i} + \sum_{i=1}^{q1} \alpha_{2i} \Delta Y_{t-i} + \sum_{i=1}^{q2} \alpha_{3i} \Delta \text{inq}_{t-i} + \sum_{i=1}^{q3} \alpha_{4i} \Delta \text{gggfcf}_{t-i} + \sum_{i=1}^{q4} \alpha_{5i} \Delta \text{fdi}_{t-i} + \varepsilon_{4t} \quad (11)$$

Appendix B: The models (we need to be clear about which is a long run or a short-run model)

Error Correction Models

$$\Delta Y_t = \alpha_{10} + \sum_{i=1}^p \alpha_{1i} \Delta Y_{t-i} + \sum_{i=1}^q \alpha_{2i} \Delta \text{inq}_{t-i} + \sum_{i=1}^q \alpha_{3i} \Delta \text{ggfcf}_{t-i} + \sum_{i=1}^q \alpha_{4i} \Delta \text{fdi}_{t-i} + \sum_{i=1}^q \alpha_{5i} \Delta \text{human}_{t-i} + \lambda \text{ECT}_{t-i} + \varepsilon_{1t} \quad (12)$$

$$\Delta \text{inq}_t = \alpha_{20} + \sum_{i=1}^p \alpha_{1i} \Delta \text{inq}_{t-i} + \sum_{i=1}^q \alpha_{2i} \Delta Y_{t-i} + \sum_{i=1}^q \alpha_{3i} \Delta \text{ggfcf}_{t-i} + \sum_{i=1}^q \alpha_{4i} \Delta \text{fdi}_{t-i} + \sum_{i=1}^q \alpha_{5i} \Delta \text{human}_{t-i} + \lambda \text{ECT}_{t-i} + \varepsilon_{2t}$$

$$(13)$$

$$\Delta \text{fdi}_t = \alpha_{30} + \sum_{i=1}^p \alpha_{1i} \Delta \text{fdi}_{t-i} + \sum_{i=1}^q \alpha_{2i} \Delta Y_{t-i} + \sum_{i=1}^q \alpha_{3i} \Delta \text{inq}_{t-i} + \sum_{i=1}^q \alpha_{4i} \Delta \text{ggfcf}_{t-i} + \sum_{i=1}^q \alpha_{5i} \Delta \text{human}_{t-i} + \lambda \text{ECT}_{t-i} + \varepsilon_{3t}$$

$$(14)$$

$$\Delta \text{human}_t = \alpha_{40} + \sum_{i=1}^p \alpha_{1i} \Delta \text{human}_{t-i} + \sum_{i=1}^q \alpha_{2i} \Delta Y_{t-i} + \sum_{i=1}^q \alpha_{3i} \Delta \text{inq}_{t-i} + \sum_{i=1}^q \alpha_{4i} \Delta \text{ggfcf}_{t-i} + \sum_{i=1}^q \alpha_{5i} \Delta \text{fdi}_{t-i} + \lambda \text{ECT}_{t-i} + \varepsilon_{4t}$$

$$(15)$$

ARDL model

$$\Delta \text{ggfcf}_t = \alpha_{10} + \sum_{i=1}^p \alpha_{1i} \Delta \text{gggfcf}_{t-i} + \sum_{i=1}^q \alpha_{2i} \Delta Y_{t-i} + \sum_{i=1}^q \alpha_{3i} \Delta \text{inq}_{t-i} + \sum_{i=1}^q \alpha_{4i} \Delta \text{fdi}_{t-i} + \sum_{i=1}^q \alpha_{5i} \Delta \text{human}_{t-i} + \varepsilon_{4t}$$

$$(16)$$

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