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Impact of Urbanization, Development Level, and Openness on Institutions in Bangladesh: An ARDL Investigation Using Two Measures of Institutional Quality

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ABSTRACT

Future development policies require a better understanding of the various factors that affect the quality of institutions in Bangladesh. In this paper, we estimate empirical ARDL models to investigate the roles of urbanization, openness, and the level of development as determinants of institutional quality. We use two measures of institutional quality, both derived from the World Bank's Worldwide Governance Indicators (WGIs). The first proxy, INQ, is a composite index developed from the six WGIs using Principal Component Analysis (PCA). The second indicator, AvgINQ, is the average of the six WGIs. For each indicator of institutional quality, three models were estimated, resulting in six models in total. The impact of urbanization on institutional quality is consistent in terms of sign and significance across all six models, a claim that cannot be made for the other variables in the model. The error correction term reflects dampening convergence to equilibrium for the first proxy for institutional quality but regular convergence when the second proxy is used. In terms of ARDL diagnostics, models with AvgINQ as the dependent variable perform better. The Johansen cointegration test confirms the existence of a long-term relationship among the variables in all the models. Pairwise Granger causality tests are also conducted. The findings emphasize the importance of managing urbanization pressure for better institutional quality.

KEYWORDS

urbanization; openness; ARDL; Bangladesh; institutional quality

INTRODUCTION

A significant body of research highlights the importance of understanding the factors influencing institutional change. This knowledge is crucial for formulating effective policies and reforms (Kaufman et al., 2006; World Bank, 2019). High institutional quality promotes inclusive economic growth, efficient resource allocation, a favorable business environment, a positive investment climate, social stability, trust, and a country's overall standing in the global arena (Acemoglu et al., 2001; Kaufman et al., 2006; Porta et al., 2008; Putnam, 1994; Rothstein & Uslaner, 2005).

Many studies have identified historical and geographical factors as determinants of institutional quality (Acemoglu et al., 2001; Alesina et al., 2003; Chong & Zanforlin, 2000; Easterly & Levine, 1997, 2003; Engerman & Sokoloff, 2002; Gallup et al., 1998; Glaeser & Shleifer, 2002, 2003; La Porta et al., 1998, 1999; Lin, 2009; Panizza, 2001; Sachs & Warner, 1997; Treisman, 2000), while others provide evidence that recent factors significantly influence institutional quality (Alonso et al., 2020; Alonso & Garcimartín, 2013; Burke &

Leigh, 2010; Jones & Olken, 2009). In Bangladesh, existing studies have primarily focused on the current status of institutions or the impacts of institutions (Alam & Teicher, 2012; Askvik & Jamil, 2013; Bhandari & Bhattarai, 2017; Das et al., 2021; M. M. Islam et al., 2022; Md. M. Islam et al., 2021; Jamil & Askvik, 2015; Raihan & Bourguignon, n.d.; Roy, 2005). This has generated a research gap, underscoring the need for an analysis of the factors affecting Bangladesh's institutional quality.

Straub (2000) shows bureaucratic incentives having the strongest impact on institutional quality. This finding is not robust against endogeneity and the ultimate results are inconclusive. Siba (2007) measures institutional quality by the six WGIs separately and find that aid, political constraint, state legitimacy and press freedom affect institutions significantly. Islam et al. (2002) use a cross-country datasets to find that openness affect institutional quality positively. The study uses multiple measures of institutional quality where one set of measures are three of the six WGIs.

Kandil (2009) uses the six WGIs for the Middle East and North Africa (MENA) region, and finds per capita income and openness among the key determinants. Openness impacted two indicators positively and significantly while income per capita affected 4 indicators significantly and negatively. Using the same proxy for institutional quality, Kalonda-Kanyama (2012) found per capita income and openness exerting significant impacts. Alonso & Garcimartín (2013) and Alonso et al. (2020), using static and dynamic econometric approaches respectively, emphasized the roles of the level of development, openness, human capital (education), among other factors. In a study of IMF member countries, Javed (2016) also underscores the importance of openness (proxied by the KOF Index of Globalization), and education. Levchenko (2011) used one of the WGIs, namely, the rule of law; find that openness can affect institutions negatively. The role of openness was also emphasized by Khalid (2011) and Bergh et al., (2014). However, Zahra et al. (2012) did not find openness to be a primary factor.

Fabro and Aixalá (2013) used the average of the WGIs to indicate institutional quality. Their findings underscore the importance of life expectancy at birth. Khan (2014) finds that natural resource rent has negative impact on institutions while openness has positive impacts. The importance of natural resource rent and education are also registered in Grabowski & Self (2020, 2021).

In this backdrop, this paper examines how the level of development, openness, urbanization, natural resource rents, and human capital – some factors that can be influenced by policies, affect the quality of institutions. Because of income per capita's close association with economic growth, living standards, human development indicators, and development policies (Barro & Lee, 2013; Conceição, 2020; World Bank, 2019), it is the most-often used indicator of a country's level of development. Studies have documented that higher income often promotes stability, lawfulness, transparency, reforms and overall governance in a country (Acemoglu et al., 2001; Besley & Persson, 2011; Huntington, 2006; Kaufman et al., 2006). Openness, measured by the KOF Trade Globalization Index, reflects a country's trade patterns and integration into the global economy (Dreher et al., 2008). Urbanization pressure, indicated by urban population growth, brings institutional challenges and affects development policies and resource allocation (United Nations, 2018; World Bank, 2008, 2014). Numerous studies have documented that better human capital promotes democracy, accountability, growth, social stability, institutional capacity, and innovation (Acemoglu & Robinson, 2012; Barro, 2001; Bloom et al., 2004; Ostry et al., 2014). Due to the lack of annual data on literacy rates, life expectancy at birth is used as a proxy for human capital, as it correlates with health and educational outcomes and investments (Bloom et al., 2004; Cutler & Lleras-Muney, 2006; Leridon, 2001). Adverse impacts of natural resource rents

have been illustrated by several studies (Auty, 2002; Beblawi & Luciani, 2015; Corden & Neary, 1982). Conversely, regulatory transparency and revenue accountability can aid in effective natural resource management (World Bank, 2016).

This research contributes to the existing body of knowledge in several ways:

1. It shows how income per capita, trade globalization, urban population growth, natural resource rents, and life expectancy at birth affect institutional quality in Bangladesh.
2. The impact of urbanization on institutional quality received little or no attention in the existing literature which has been highlighted here.
3. We use two proxies for institutional quality in Bangladesh and apply the ARDL approach along with other cointegration and causality tests.

All these make the study unique, especially in the context of Bangladesh. The study can provide fresh policy insights to the policy makers.

RESEARCH METHODS

Variables and data source

Table 1 provides descriptions of the variables and their data sources. The data on all the variables except openness come from the World Development Indicators. The data on openness come from the KOF Economic Research Center.

Table 1. Variable descriptions

Variable	Proxy/Indicator	Representation	Description
Institutional Quality	Index created from WGIs	lnINQ	Index created using PCA from the WGIs from 1996-2022
Institutional Quality	Average of the WGIs		Unweighted average of WGIs for 1996-2022
Level of development	Per capita income	lnPCI	GNI per capita, PPP (current international $)
Openness	KOF trade globalization Index	lnKOFTRGI	KOF trade globalization Index
Urbanization Pressure	Growth of urban population	lnUPG	Urban population growth (annual %)
Natural Resource Rent		lnTNR	Total natural resources rents (% of GDP)
Human Capital	Life expectancy at birth	lnLEB	Life expectancy at birth, total (years)

Measuring Institutional Quality

Various indicators have been used to denote institutional quality, with the World Bank's Worldwide Governance Indicators (WGIs) being the most widely used proxy. In this paper, we utilize two measures of institutional quality, both derived from the WGIs, which have been available since 1996. The first measure, denoted as INQ, is an index computed from the WGIs using Principal Component Analysis (PCA).

Table 2. Principal Component Analysis

Component	Eigenvalue	Difference	Proportion	Cumulative
PC 1	2.50689	.225572	0.4178	0.4178
PC 2	2.28132	1.60388	0.3802	0.7980
PC 3	.677433	.391466	0.1129	0.9109
PC 4	.285967	.123821	0.0477	0.9586
PC 5	.162146	.0758963	0.0270	0.9856
PC 6	.0862495		0.0144	1.0000

Principal components (eigenvectors)						
Variable	**PC 1**	**PC 2**	**PC 3**	**PC 4**	**PC 5**	**PC 6**
CC	0.5612	-0.0742	0.1790	-0.7759	0.0171	-0.2125
GE	0.4529	0.3993	-0.1479	0.2575	-0.7367	-0.0674
PS	0.3251	0.4418	-0.5840	0.0844	0.5904	-0.0487
RQ	0.4466	-0.3695	0.3306	0.5578	0.2423	-0.4299
RL	0.3944	-0.4815	-0.2137	0.0766	-0.0174	0.7488
VA	0.1385	0.5211	0.6709	0.0868	0.2221	0.4498
Diagnostics						
Determinant of the correlation matrix				0.015		
Bartlett test of sphericity				Chi-square=96.542, df=15		
H_0: variables are not intercorrelated				p-value = 0.000		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy				0.568		

Table 2 presents the results of the PCA. The determinant of the correlation matrix is less than 1 implying that all correlations are not equal to zero. According to the Bartlett test of sphericity, variables are intercorrelated and the non-zero correlations in the sample matrix are not due to sampling error. The KMO measure of sample adequacy suggests that a PCA of the variables is acceptable. Following the PCA, the first component, Component 1, is the composite index of institutional quality.

Table 3. Descriptive statistics

Variable	Mean	Median	Std. Dev.	Minimum	Maximum
lnINQ	4.059748	4.337617	.9141387	0	4.61512
lnAvgINQ	.1215131	.1339874	.1150877	-.1549037	.3239098
lnPCI	7.997155	7.982758	.5392252	7.200425	8.947676
lnLEB	4.22144	4.21069	.0500739	4.085842	4.287798
lnOPN	3.322838	3.401197	.2324356	2.890372	3.637586
lnTNR	-.0764713	-.0502102	.3751802	-.6710769	.4836072
lnUPG	1.282477	1.270874	.1015465	1.105274	1.517373

The second measure, denoted as AvgINQ, is the simple average of the WGIs. Table 3 presents the summary statistics of the variables used in this paper, all of which are in their natural log forms. For each variable, five summary statistics are reported: mean, median, standard deviation, minimum, and maximum values. For lnINQ, the mean is 4.059 and the median is 4.337. The values range from 0 to 4.615, with a standard deviation of 0.914. The statistics for the other variables can be interpreted in a similar fashion.

Unit root tests

To determine the stationarity of the time series variables, we use five different unit root testing procedures: the Augmented Dickey-Fuller (ADF) test, the Phillips-Perron (P-P) test, the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test, the modified Dickey-Fuller (DF-GLS) test, and the Zivot-Andrews (ZA) test.

ARDL Model

The ARDL model can be applied when the time series variables are either I(0), I(1), or a mix of both. This technique offers several advantages, well-documented in the literature (Ghatak & Siddiki, 2001; Harris & Sollis, 2003; Muhammad & Abdullahi, 2020; Narayan, 2005; Ozturk & Acaravci, 2011; Pesaran et al., 2001; Rahman & Kashem, 2017; Salahuddin et al., 2018). These advantages include its ability to accommodate variables with different orders of integration, its efficiency with small samples, the estimation of optimal lags, its ability to

address issues such as omitted variable bias and autocorrelation and its capacity to yield unbiased estimates and valid statistics even in the presence of endogeneity.

In this paper, we estimate six ARDL models, delineated in the equations below. Due to sample size limitations and the need for a sufficient number of observations relative to the number of coefficients, it is not feasible to include all explanatory variables in a single model. We begin with Model 1, where current institutional quality is driven by past institutional quality, income per capita, openness, and urbanization pressure. Model 2 builds on this by incorporating total natural resource rent. Model 3 extends Model 1 by adding human capital. In Models 4, 5, and 6, we replicate Models 1, 2, and 3, respectively, but use our second indicator for institutional quality, the average of the six WGIs, denoted as AvgINQ.

Model 1:
$$lnINQ_t = \beta_0 + \sum_{i=1}^{p} \beta_i \, lnINQ_{t-1} + \sum_{i=0}^{k} \gamma_i \, lnPCI_{t-i} + \sum_{i=0}^{k} \rho_i \, lnOPN_{t-i} + + \sum_{i=0}^{k} \upsilon_i \, lnUPG_{t-i} + \varepsilon_t \quad (1)$$

Model 2:
$$lnINQ_t = \beta_0 + \sum_{i=1}^{p} \beta_i \, lnINQ_{t-1} + \sum_{i=0}^{k} \gamma_i \, lnPCI_{t-i} + \sum_{i=0}^{k} \rho_i \, lnOPN_{t-i} + \sum_{i=0}^{k} \tau_i \, lnTNR_{t-i} + \sum_{i=0}^{k} \upsilon_i \, lnUPG_{t-i} + \varepsilon_t \quad (2)$$

Model 3:
$$lnINQ_t = \beta_0 + \sum_{i=1}^{p} \beta_i \, lnINQ_{t-1} + \sum_{i=0}^{k} \gamma_i \, lnPCI_{t-i} + \sum_{i=0}^{k} \delta_i \, lnLEB_{t-i} + \sum_{i=0}^{k} \rho_i \, lnOPN_{t-i} + \sum_{i=0}^{k} \upsilon_i \, lnUPG_{t-i} + \varepsilon_t \quad (3)$$

Model 4:
$$lnAvgINQ_t = \beta_0 + \sum_{i=1}^{p} \beta_i \, lnAvgINQ_{t-1} + \sum_{i=0}^{k} \gamma_i \, lnPCI_{t-i} + \sum_{i=0}^{k} \rho_i \, lnOPN_{t-i} + + \sum_{i=0}^{k} \upsilon_i \, lnUPG_{t-i} + \varepsilon_t \quad (4)$$

Model 5:
$$lnAvgINQ_t = \beta_0 + \sum_{i=1}^{p} \beta_i \, lnAvgINQ_{t-1} + \sum_{i=0}^{k} \gamma_i \, lnPCI_{t-i} + \sum_{i=0}^{k} \rho_i \, lnOPN_{t-i} + \sum_{i=0}^{k} \tau_i \, lnTNR_{t-i} + \sum_{i=0}^{k} \upsilon_i \, lnUPG_{t-i} + \varepsilon_t \quad (5)$$

Model 6:
$$lnAvgINQ_t = \beta_0 + \sum_{i=1}^{p} \beta_i \, lnAvgINQ_{t-1} + \sum_{i=0}^{k} \gamma_i \, lnPCI_{t-i} + \sum_{i=0}^{k} \delta_i \, lnLEB_{t-i} + \sum_{i=0}^{k} \rho_i \, lnOPN_{t-i} + \sum_{i=0}^{k} \upsilon_i \, lnUPG_{t-i} + \varepsilon_t \quad (6)$$

p = maximum number of lags for the regressand,
k = maximum number of lags for the regressors

We conduct the ARDL bounds test for each of six model above. The ARDL bounds test, for instance for model 1, assumes the following form:

$$\Delta lnINQ_t = \beta_0 + \sum_{i=1}^{p} \beta_i \, \Delta lnINQ_{t-1} + \sum_{i=0}^{k} \gamma_i \, \Delta lnPCI_{t-i} + \sum_{i=0}^{k} \rho_i \, \Delta lnOPN_{t-i} + + \sum_{i=0}^{k} \upsilon_i \, \Delta lnUPG_{t-i} + \lambda_1 lnINQ_{t-1} + \lambda_2 lnPCI_{t-i} + \lambda_3 lnOPN_{t-i} + \lambda_4 lnUPG_{t-i} + \varepsilon_t \quad (7)$$

Δ is the first difference operator, t represents the time subscript, i indicates the lag, and ε represents the error term assumed to have standard independent and identically distributed (i.i.d.) properties. The null hypothesis posits no co-integration. The alternative hypothesis suggests the presence of co-integration.

$$H_0: \lambda_1 = \lambda_2 = \lambda_3 = \lambda_4$$
$$H_1: \lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \quad (8)$$

We also conduct several diagnostic tests, including the White test, the Ramsey RESET test, the Breusch-Godfrey LM test, Durbin's alternative test, the Jarque-Bera test, and tests for skewness and kurtosis. Additionally, we perform the CUSUM tests.

Johansen cointegration test and pairwise Granger causality test:

Johansen cointegration test and pairwise Granger causality test are also conducted. In conducting the later test, we apply small-sample degrees-of-freedom adjustments and calculate small-sample t and F statistics.

RESULTS AND DISCUSSION

To check whether the variables are stationary, five tests are conducted: ADF, P-P, KPSS, DF-GLS, and ZA. The results are reported in Table 5. lnINQ and lnLEB are stationary at the level in four tests and stationary at the first difference in one test. lnAvegINQ and lnOPN are stationary at the level in two tests and at the first difference in three tests. All tests identify lnPCI as stationary at the first difference. Both lnTNR and lnUPG are stationary at the level in one test, while four tests suggest they are stationary at the first difference. Hence, all the variables are either I(0) or I(1), and none of them are integrated of a higher order. This makes the data suitable for the ARDL model.

Table 4. Unit root tests

	ADF		P-P		KPSS		DF-GLS		ZA		I(?)
	Level	*First Diff.*	*Level*	*First Diff.*	*Level*	*First Diff.*	*Level*	*First Diff.*	*Level*	*First Diff.*	
lnINQ	-2.673***			-5.995***	.094		-16.521***		-5.342**		I(0), I(1)
lnAvgINQ		-2.936***		-2.995***	.118		-3.777***			-5.372**	I(0), I(1)
lnPCI		-3.220***		-3.752**		.0792		-2.452**		-4.296*	I(1)
lnLEB	-4.842***		-4.636***		.091			-2.617**	-6.111***		I(0), I(1)
lnOPN	-1.938**			-4.836***		.093		-2.943***	-5.215**		I(0), I(1)
lnTNR		-3.437***		-3.512***		.088		-2.635**	-5.162**		I(0), I(1)
lnUPG		-2.820***		-2.831***	.112			-3.330**		-6.146**	I(0), I(1)

To determine the lag order of the variables in the ARDL models, we examine the Akaike Information Criterion (AIC), the Schwarz Information Criterion (SIC), and the Hannan-Quinn Information Criterion (HQIC). All these criteria unanimously suggest the same number of lags for each variable.

In Table 6, we estimate six ARDL models: three with lnINQ as the dependent variable and three with lnAvgINQ as the dependent variable. When examining the long-run impacts, per capita income exerts significant negative effects in three models, though two of these are only significant at the 10% level. Life expectancy at birth and natural resource rent are not significant in any of the two models where they were included. Openness is positive and significant in two models, both of which have lnINQ as the dependent variable. Urbanization pressure negatively and significantly affects institutional quality in all six models.

Table 5. ARDL estimation

	Long Run (Y = lnINQ)			Long Run (Y = lnAvgINQ)		
Variable	***Model 1 (1 1 1 2)***	***Model 2 (1 1 1 2 2)***	***Model 3 (1 1 1 1 2)***	***Model 4 (2 1 1 2)***	***Model 5 (2 1 1 2 2)***	***Model 6 (2 1 1 1 2)***
lnPCI	-.758*	-.874*	-.500	-.115	-.178**	.009
lnLEB			-2.815			-1.197
lnOPN	1.625**	-.662	1.551*	.067	-.075	.099
lnTNR		1.021			.074	
lnUPG	-9.791***	-13.882**	-9.604***	-1.303***	-1.740*	-1.135**
	Short Run (Y = lnINQ)			Short Run (Y = lnAvgINQ)		
Δ lnAvgINQ				.238	.043	.117
Δ lnPCI	-5.314	.959	-5.521	.507	.174	-.512
Δ lnLEB			.502			1.354
Δ lnOPN	.499	3.116	.599	.118	.126	.020
Δ lnTNR		-4.257**			-.177	
Δ lnTNR(-1)		-.971			-.163*	
Δ lnUPG	7.871**	12.760***	7.824*	.304	.647*	.305
Δ lnUPG(-1)	9.085**	15.347***	9.057*	.408	.593	.188
Constant	22.036***	42.226**	34.186	.817	2.44*	3.448
.ECT(-1)	-1.251***	-1.352***	-1.244***	-.561**	-.608**	-.550*

In the short-run dynamics, natural resource rent is significant in Model 2 and Model 5. Urbanization is significant in the first three models, but this time the impact is positive. For the other three models, one of the urbanization coefficients in Model 5 is significant at the 10% level. All other variables fail to register any important short-run impact.

In models 1-3, the ECT term is highly statistically significant and lies between -1 and -2, implying that the error-correction process oscillates around the long-term equilibrium in a damped manner before ultimately reaching equilibrium. Additionally, all three ECT terms are closer to -1, indicating a faster pace of convergence. For models 4-6, the ECT term is significant (with the last one being significant only at the 10% level) and lies between 0 and -1. These ECTs reflect convergence to equilibrium.

The outcomes of the ARDL bounds test, reported in Table 6, indicate that the null hypothesis can be rejected in the first three models. Similarly, for Models 4 and 6, the null hypothesis can also be rejected. However, for Model 5, the test could not be conducted due to an insufficient number of observations relative to the number of coefficients. Therefore, only the models with lnINQ as the dependent variable demonstrate a long-run relationship among the variables.

Table 6. ARDL bounds test and diagnostics

	Y = lnINQ			**Y = lnAvgINQ**		
	Model 1	***Model 2***	***Model 3***	***Model 4***	***Model 5***	***Model 6***
. Bounds test H_0: no level relationship	Reject H_0 at 5%, 1%	Reject H_0 at 5%, 1%	Reject H_0 at 5%	Do not reject H_0	-	Do not reject H_0
. R-squared	0.7060	0.8303	0.7067	0.613	0.747	0.655
. Adj R-squared	0.5590	0.6868	0.4972	0.381	0.494	0.363
. Breusch-Pagan test Ho: Constant variance	9.88**	5.19**	9.67**	0.37	5.89**	1.71
. White's test Ho: homoskedasticity	25.00	25.00	25.00	25.00	25.00	25.00
. Ramsey RESET test Ho: model has no omitted variables	90.59***	39.89***	88.45***	6.11***	0.44	1.61
. Breusch-Godfrey LM test Ho: no serial correlation	3.172*	0.006	3.471*	0.226	0.285	0.072
. Durbin's alternative test Ho: no serial correlation	2.180	0.003	2.096	0.128	0.127	0.035
. Jarque-Bera test Ho: normality	31.24***	24.17***	29.73***	1.142	.554	.591
. Skewness and kurtosis tests for normality	14.12***	10.25***	13.83***	1.54	0.42	0.53
. CUSUM (Recursive, OLS) Ho: No structural break	0.615, 0.413	0.556, 0.415	0.796, 0.393	0.531, 0.388	0.817, 0.377	0.607, 0.403

Examining the R-squared and adjusted R-squared values, it can be concluded that none of the models exhibit weak explanatory power. Although the Breusch-Pagan test rejects the null hypothesis of constant variance in four models, White's test confirms that all models are homoskedastic. The Ramsey RESET test indicates that Models 1-4 suffer from omitted variable bias. Encouragingly, none of the models suffer from serial correlation. The CUSUM tests confirm that the estimated parameters of all the models are stable.

Table 7. Results of the Johansen cointegration test

	Y = lnINQ			Y = lnAvgINQ		
	Model 1	***Model 2***	***Model 3***	***Model 4***	***Model 5***	***Model 6***
Trace statistic	13.176 (16.31)(2)	9.632 (16.31)(3)	28.721 (29.75)(2)	-	10.421 (16.31)(3)	-
Max statistic	9.325 (15.69)(2)	8.783 (15.69)(3)	21.350 (22.99)(2)	-	21.830 (22.99)(2)	-
SBIC	-5.483(2)	-7.924(3)	-12.589(3)	-11.784 (3)	-13.007(4)	-81.02(4)
HQIC	-7.808(3)	-10.561(4)	-15.150(3)	-14.112 (3)	-15.675(4)	-84.68(4)

The results of the Johansen cointegration test are presented in Table 7. For the Trace and Max statistics rows, each cell displays the statistic first, followed by the 1% critical value, and the corresponding maximum rank in two successive parentheses. A consistent estimator of the number of cointegrating equations can be obtained by selecting the number that minimizes either the SBIC or the HQIC (Aznar & Salvador, 2002; Gonzalo & Pitarakis, 1998). In the SBIC and HQIC rows, the test statistic is accompanied by the maximum rank in parentheses. In models 1-3 and 5, all four criteria suggest that the variables are cointegrated in the long run. For models 4 and 6, although the Trace and Max statistics do not provide an answer, both SBIC and HQIC indicate the existence of long-run cointegration among the variables.

Table 8. Granger causality Wald tests

Causality	**Y = lnINQ F(Pr)**			**Y = lnAvgINQ F(Pr)**		
	Model 1	***Model 2***	***Model 3***	***Model 4***	***Model 5***	***Model 6***
lnPCI→lnINQ	1.672	.104	.197	.8751	.4678	.7626
lnINQ→lnPCI	2.014	.900	1.590	.7079	.1341	.4432
lnLEB→lnINQ			.275			1.463
lnINQ→lnLEB			.427			.7375
lnOPN→lnINQ	1.266	.215	1.305	.0209	1.988	.1502
lnINQ→lnOPN	16.075***	6.444**	18.66***	4.659**	1.643	6.769***
lnTNR→lnINQ		.559			4.047**	
lnINQ→lnTNR		3.951**			4.215**	
lnUPG→lnINQ	10.105**	6.339**	7.259***	3.025*	5.690**	2.331
lnINQ→lnUPG	.439	3.551*	1.004	2.453	2.767*	1.482

Table 8 presents the results of the Granger causality Wald test. The findings indicate no Granger causality between institutional quality and per capita income or between institutional quality and human capital. Institutional quality Granger-causes openness in five of the six models, but the reverse is not true in any model. In the two models that include natural resource rent, institutional quality Granger-causes natural resource rent in both, whereas the reverse is true in one model. Urbanization Granger-causes institutional quality in five of the models, while the reverse holds true in two models, albeit at the 10% significance level.

CONCLUSION

This research aims to ascertain the impact of urbanization, openness and the level of development on the quality of institutions in Bangladesh. The study is unique in the context of Bangladesh as because of three reasons mainly: a. it tries to explain income per capita, trade globalization, urban population growth, natural resource rents, and life expectancy at birth affect institutional quality; b. the role of urbanization received little or no attention in previous studies; 3. It employs two indicators for institutional quality.

The data come from the WDI and the WGIs. The first indicator is a composite indicator, INQ, derived from the WGIs using PCA whereas the second indicator, AvgINQ, is the average of the six WGIs. Since the WGIs became available in 1996, the time span considered is 1996-2022. We estimate six ARDL models, Models 1 – 3 with INQ and Models 4 – 6 with AvgINQ. The results vary across models. If long-term impacts are considered, per capita income's impact is significant and negative in three models, openness's impact is significantly positive in two models whereas urbanization's impact is negative and significant and negative in all six models. Some of these models controlled for additional factors such as life expectancy at birth and total natural resource rent. The ARDL bounds test indicates long run relationship among the variables in Models 1 – 3. The Johansen cointegration test suggests the existence of long-term relationship in all models.

To our knowledge, this is the first study that highlights the importance of urbanization pressure on institutional quality in Bangladesh. This research may pave the way for further research in this area.

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All data used in this study are publicly available.

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