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Institutional Quality, Trade Openness and Economic Growth in South Asian Economies: Some New Insights from a Panel Data Analysis

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ABSTRACT

The main aim of the present study is to empirically investigate into the question whether the Institutional Quality (IQ) and Trade Openness (TO) are competitors or complements in Economic Growth (EG) in case of sample South Asia Economies; "India, Bangladesh, Pakistan, and Sri Lanka". The panel data for the period of 1984-2018 has been utilized. The Fixed Effects Model (FEM) estimation technique has been applied for empirical investigation. The empirical results of FEM confirm the positive and statically significant impact of IQ and Interaction Term on Economic Growth in sample countries. The positive significant results strongly supported the hypothesis of this study, the IQ and TO are complements in EG in the case of sample SAE. The IQ measure has also established positive and significant effects on EG while the TO has a negative impact. Based on empirical findings, this study recommends that the policymakers of sample countries should make policies that strengthen the IQ, in order to improve trade and, consequently, the EG.

Keywords: **Institutions, Trade Openness, Economic Growth & Panel Data Model**
JEL Classification Codes: O43, F13, C23,

Introduction

This research work provides new insight into the relationship between Institutional Quality (IQ), Trade Openness (TO), and Economic Growth (EG) in the case of sample South Asian Economies (SAE) viz "Bangladesh, India, Pakistan, and Sri Lanka". More precisely speaking, this study analyzes whether TO and IQ are complements or competitors in EG. This study considers the definition of institutions proposed by (Douglass C North, 1990):

> *"*Institutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction. In consequence they structure incentives in human exchange, whether political, social, or economic."

Hence, IQ has a multidimensional effect: for instance, firstly it quantifies the standard of formal rules, such as rule of law, property rights, government stability, governance, and democracy; secondly, it measures the informal norms like, code of conducts, conventions, trusts and religious affairs; and last but not the least, it checks the effects of the formal and informal rules on TO and EG of economies.

The Economists, for instance, (Douglass C North, 1990; Douglass C North & Thomas, 1973) discuss the impact of IQ on EG while a large number of studies establish the empirical relationship between trade openness, IQ, and EG, and confirm the positive and significant linkages between institutions and EG (Acemoglu & Johnson, 2005; Acemoglu, Johnson, Robinson, & Thaicharoen, 2003; Acemoglu, Johnson, & Robinson, 2001, 2002; Dollar, 1992; Dollar & Kraay, 2002, 2003; Frankel & Romer, 1999; Hodgson, 2006; Rodrik, 1999, 2000; Rodrik, Rodrik, Subramanian, & Trebbi, 2002).

There are two main classifications of IQ, (i) political institutions (Democracy) and (ii) economic institutions (Property rights). Both types of institutions are crucial for EG. Human capital (HC) and Physical Capital (PC) are considered to be very important for EG. Strong economic institutions, like property rights, are helpful in attracting investments in HC and PC. (Jones, 1981; Douglass Cecil North, 1981; Douglass C North & Thomas, 1973) indicate low per capita income as the result of absence of safeguards in property rights in most of the poor nations. Whereas, political institutions like democracy have established rules for the security of private property rights and investment in human and physical capital. Political institutions also legislate different types of constraints (punishment) or incentives for human interaction in exchange and production ((Douglass C North, 1990). Similarly, the studies of (Hall & Jones, 1999; Knack & Keefer, 1995; Mauro, 1995; Rodrik, 1999) find a highly significant and positive correlation between IQ and EG.

As far as other important determinants of EG are concerned, many empirical studies such as (Dollar & Kraay, 2004; Frankel & Romer, 1999; Hall & Jones, 1999; Sachs, Warner, Åslund, & Fischer, 1995) find the positive and statistically significant relationship between TO and EG. In the same lines, Dollar (1992) investigated an empirical relationship between TO and EG and confirm the positive and significant relationship in trade-growth nexus. Similarly, Frankel and Romer (1999) carried out an empirical study with a large sample of 150 countries. Their study provides strong evidence to conclude that trade integration doubles EG. Similarly Dollar and Kraay (2003) studied the openness measure and found that doubling the volume of international trade resulted in enhancing the EG by 2.5% per annum.

Despite the consensus of majority of the scholars on positive trade-growth nexus, some studies question the presumption that trade boosts EG. For instance, De Matteis (2004) mentions that trade integration leads to creation of external obstacles in the way of EG. Similarly Rodrik (1992) argues TO is the major source of volatility in macroeconomic variables.

Furthermore (Levine & Renelt, 1992) claim that TO hampers the growth of the local infant industry, hence it discourages internal investment. Lastly, (Batra & Slottje, 1993; Leamer, 1988) state that the low-income countries fall in recession due to trade integration.

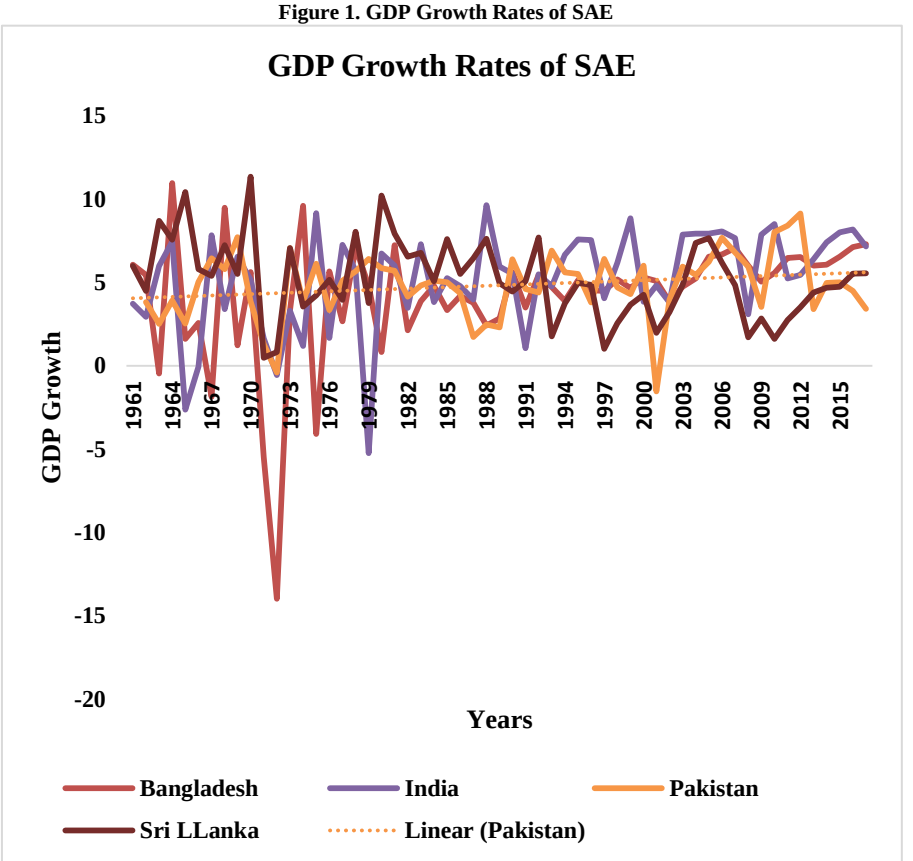
From the above discussion, this study concludes that most of the studies documented on trade, institutions, and EG investigate the partial impact of EG. The main contribution of present research work in the existing body of literature is that this study empirically examines the question whether IQ and EG are competitors or complements in the EG of selected SAE.

This study utilizes the panel dataset covering the period of 1984-2018. To differentiate the competitiveness or complementarity the researchers have introduced the interaction term[1]. The data on IQ variables has been extracted from the "International Country Risk Guide ICRG" dataset.

The remaining part of the paper is organized as follows: the section two is an in-depth analysis relevant to the subject matter, section three briefly explains the data and methodological framework, section four comprises data analysis and interpretation, section five presents the concluding remarks of this study.

[1] Interaction is the product of IQ and TO variables. The direct effect of the interaction term indicates the trade and institutions are complement in EG.

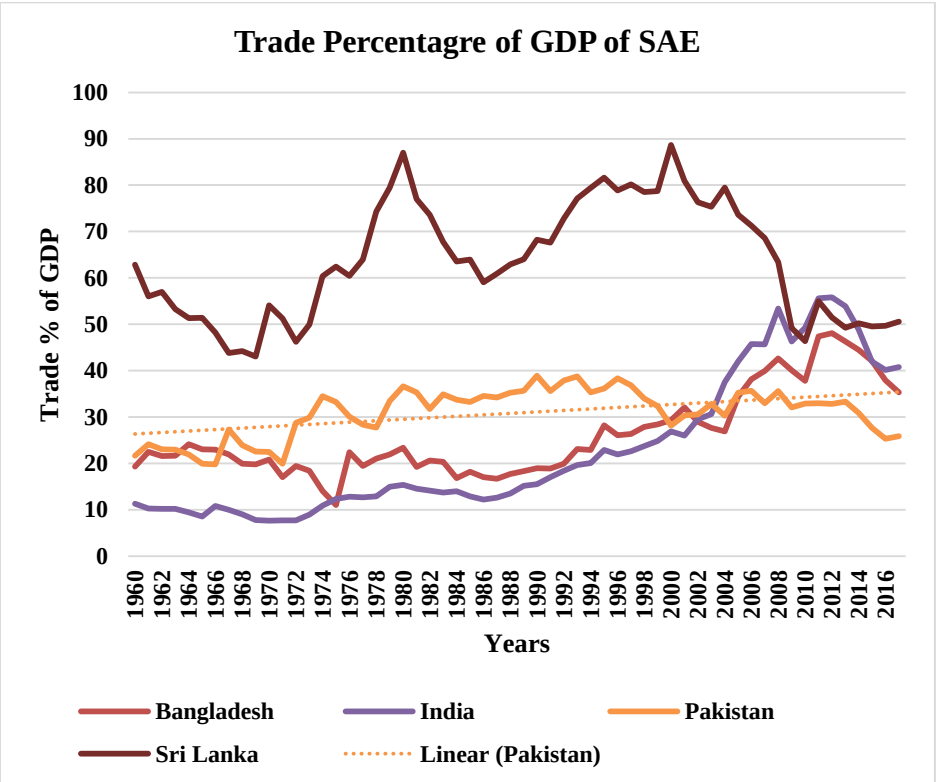
Figure 1. GDP Growth Rates of SAE



Data Source: WDI Dataset

Figure 1, exhibits the growth rates of GDP from 1961 through 2017. The negative growth rates during 1971-1973 indicate the political turmoil in Bangladesh and Pakistan. Bangladesh economy achieved highest growth 10.95% in 1965. While the economy of BNG facing negative growth with magnitude -13.97%, 1973. The highest growth rate of Pakistan is 11.35% in 1971. Whereas the lowest growth is 0.47% in 1972. Indian economy achieved highest score 9.62% in 1989 while its economy faced negative growth rate -5.23% in 1980. Similarly, the Sri Lanka maximum growth rate was 9.14%, and minimum growth rate was -1.54% in 2002. Pakistan ranked top with highest score 11.35%. BNG Placed second with 10.95%. IND and LKA on third and forth position with the scores 9.62% & 9.14% respectively.

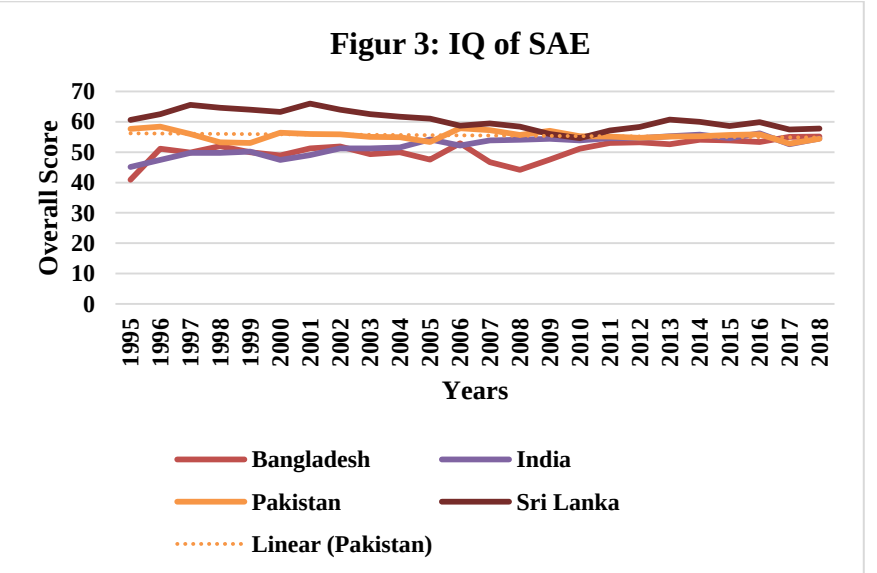
Figure 2. Trade Percentage of GDP for SAE



Data Source: WDI Dataset

Figure 2, shows the growth in Trade % of GDP over time for sample south Asian countries. The maximum trade of Bangladesh was 6.49% in 2008, while minimum value was1.97% in 1976.Similarly, India economy highest trade volume was 13.60% in 2006, and lowest volume was 2.1% in 1976. The highest trade score of Pakistan was 9.37% in 2005, whereas the lowest score was 4.23% in 2000. The Sri-Lankan economy achieved maximum 19.7% trade volume in 2001. And the minimum score was 4.89% in 1976. Sri-Lanka seems more open economy in terms of trade. Sri-Lanka ranked top subsequently, India, Pakistan, and then Bangladesh.

Figure 3. IQ of SAE



Dara Source: Heritage Foundation

Figure 3, depicts the average condition of IQ in SAE. Over-all score of institutional index, ranging from 0-100. Zero, means absence of IQ whereas score of nearly 100 countries is mostly free. Score 0 to below 50 means repressed, 50 to 60 un-free, while 65 and above indicate strong IQ. SAE falls in the average category. These nations have improved their IQ condition with the passage of time. In a nutshell, Sri Lanka is on top *with the highest* score 66, Pakistan is second with 58.4, India is third with 56.2, and Bangladesh is in the fourth position with overall score of 55.1.

Research objectives

This study focuses on the following Objectives:

- To empirically examine the relationship between Institutional Quality (IQ), Trade Openness (TO), and Economic Growth (EG)
- To examine whether IQ and, TO are competitors or complements in EG in SEA

Literature review

During the past three decades, a large number of research papers have documented the key drivers of EG. These studies (Acemoglu et al., 2001; Dollar & Kraay, 2003; Hall & Jones, 1999; Mankiw, Romer, & Weil, 1992; Douglass Cecil North,

1981; Romer, 1989; Solow, 1956; Swan, 1956) identify many important indicators of EG, for instance, technology, infrastructure, human capital, education, physical capital, innovation, geographical location of the country. The present research work explores the significant role of TO and IQ for the economy of sample countries.

Dollar (1992) investigated the link between EG and trade liberalization for the period 1976-1685. He has suggested two indices namely, exchange rate variability and exchange rate distortion index for measuring trade. This study concludes that the countries with international trade grew rapidly as compared to close economies. Further (Sachs et al., 1995) very comprehensively and empirically demonstrated the role of TO and EG. They reported the growth rates of open low income and high- income nations are 4.49% and 2.29% per annum individually. While the closed high income and low-income countries 0.74% and 0.69 % grew annually. Edwards (1998) to strengthen the proposition that is the trade enhances the EG, he studied the nexus between TO and total factor productivity (TFP) with a relatively new and large dataset of 93 countries. To check the robustness of estimates, this study uses 9 different alternative proxies. The empirical findings of this research work suggest that the economies were more open for international trade experienced rapid TFP growth. Whereas Frankel and Romer (1999) addressed the methodological and endogeneity problems related with the trade-growth association. They estimate the results with the instrumental variable approach and gravity model. Empirical findings surprisingly confirm the positive and statistically significant relationship between instrumental TO and actual trade volume.

Matthew and Adegboye (2014) probe linear association between TO, IQ, and EG in 30 sample sub-Saharan African countries. Cross-sectional time-series data over the period of 1985-2012 has been utilized. Least Square Dummy Variable LSDV, Pooed OLS, and Generalized Method of Moment GMM confirm the positive and statistically significant relationship between TO, IQ, & EG in case all sample countries. Based on empirical findings, this study recommends that the sample countries should adopt such procedures that strengthen the IQ and promote free trade, international and international trade to enhance the EG and development of the nations concerned.

Hadhek and Mrad (2015) analyzed the dynamic relationship between the policy of trade openness, institutions, and EG in the sample of 23 OECD countries. IQ is measured by voice and accountability, rule of law, regulatory quality, democratic accountability, political stability, control of corruption, and government effectiveness. The findings of this study confirm the positive effect of IQ on the relationship between trade openness, and EG in the sample countries.

George (2019) examined the nexus among EG, democracy, and TO in 56 countries selected form 4 regions, namely, “Africa, Latin America, Asia, and

Europe". Panel data over the period of 1996-2012 were utilized. The study divided the sample countries into two broad classifications *i.e.,* democratic regime and authoritarian regime. The three stage-least square 3SLS econometric model confirmed the direct negative impact on EG while an indirect positive effect of democratic institutions on EG through TO channel. Similarly Farooq, Chaudhary, and Nawaz (2019) looked at the long-run and short-run linkages between TO, IQ, and EG in the case of Pakistan. Their study applied a relatively new co-integration approach proposed by (Bayer & Hanck, 2013). It confirmed the long-run relationship between institutions, trade openness, and industrial GDP. IQ and openness had a positive and significant impact on industrial GDP in Pakistan.

Bonnal and Yaya (2015) investigated the strong positive trade openness, EG, and education. They compiled a large data set of 200 sample countries from all over the world. The findings of their study confirmed that political institutions did not hinder EG. Similarly, (Le, 2009) empirically evaluated the association among remittances, trade TO, IQ, and EG. This study included 123 sample counties with 30 time periods. He estimated association between both static and dynamic panel data models. The findings of this research work revealed that IQ and TO had a strong positive and statistically significant impact on the EG of sample economies while remittances had a comparatively lower effect. The policymakers of those nations advised to emphasize strengthening the IQ and trade in order to enhance the EG and development of their economies.

The main focus of the surveyed empirical literature was to estimate the partial impact of openness and institution in EG. This study tested the new insight in nexus between trade, institution, and EG of south economies. The next section briefly discusses the data and econometric methodology applied for the study.

Data and methodology

This section briefly explains the data sources, variables description, and econometric strategy for testing the hypothesis of this research work.

Data sources

To analyze the nexus between TO, IQ, and EG, this study uses the panel data from 1985 to 2018 in the case of sample countries. The data on variables of interest, like Real GDP, Exports imports have been collected from World Development Indicators (WDI) CD Room 2019 and Penn World Table 9.0 (PWT). The data on institutional variables, such as, "Government Stability, Socioeconomic Conditions, Investment Profile, Internal Conflict, External Conflict, Corruption, Military in Politics, Religious Tensions, Law and Order, Ethnic Tensions, Democratic Accountability, & Bureaucracy Quality has been taken from International Country Risk Guide (ICRG) Group."

Methodology

This section briefly explains the modeling framework used in this present manuscript. To explore the nexus between TO, IQ, and EG, the present study uses panel data modeling. Panel data is the special type of pooled data in which the homogeneous cross-section (individual, entities, or countries) is observed over a time at equal intervals. According to Hsiao (2007) Panel data also called longitudinal data has many benefits over time series or cross-sectional data. For instance, panel data overcomes the problem of data deficiency and it takes care of the problem of heterogeneity. Due to the combination of cross-section and time-series, it is more informative and also it has more variability. It overcomes the problem of co-linearity. It is more efficient as compared to cross-sectional data or time-series data.

Modeling framework in panel data

Pooled data is the combination of the time series and cross-sectional data, whereas the panel data is the special type of pooled data in which the data on similar individual units, like firms, individuals, or countries have collected over time. In the case of panel data, the three types of models are estimated, for instance Pooled OLS or Constant Coefficient Model, Fixed Effects Model (FEM), and Random Effects Model (REM). The model choice depends upon the different diagnostic tests. For instance, F Test or Redundant Fixed Effects Test is estimated for choice between Pooled OLS or FEM. The null hypothesis of this test is the pooled OLS is appropriate while alternatively the FEM. The second test is the Housman Specification Test proposed by Housman (1978). The null hypothesis is FEM while the alternate hypothesis is REM is a more suitable model. The third test is the Lagrange Multiplier LM test used to apt between REM and FEM. The null hypothesis is in the favor of REM model (Greene, 2003; Gujarati, 2009; Wooldridge, 2002).

Model Specification

To explore the impact of TO and institutional variables on EG, the several functional forms had been experimented, however, the best is given below,

$$\boldsymbol{lrgdppc = f(lto, literm_0,\ lip,\ \ lmp,\ \ lrt,\ \ lda,\ \ lemp,\ \ lrnna)} \ldots\ldots\ldots\ldots\ldots\ldots (\mathbf{1})$$

The econometric model of the above-mentioned functional form is given below;

$$\boldsymbol{lrgdppc_{it} = f(Y_0 + Y_1 lto_{it} + Y_2 literm\_0_{it} + Y_3 lip_{it} + Y_3 lmp_{it} + Y_3 lrt_{it} + Y_3 lda_{it} + Y_3 lemp_{it} + Y_3 lrnna_{it} + \varepsilon_{it})} \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where
L= natural log

$lrgdppc_{it}$= Real GDP per capita the proxy of EG

lto_{it}= trade volume the proxy of TO, it is the sum of exports plus imports divided by GDP.

$literm\_0_{it}$= it is an interaction term. The interaction term is the product of trade volume and institutions.

lip_{it}= log of investment profile

lmp_{it}= log of the military in politics

lrt_{it}= log of religious tension

lda_{it}= log of democratic accountability

Intercept of term = Y_0,

it = subscripts I indicate the cross-sectional units while t uses for numbers of times

ε_{it}= epsilon is the white noise error term

Fixed effects model (FEM)

FEM estimation technique has been applied to look at the link between TO, IQ, and EG. FEM is also called the Least Square Dummy Variable Model (LSDV). The special feature of fixed effects regression, it incorporates the separate intercept for each cross-section to control the time-invariant unobserved individual characteristics that may be associated with the observed explanatory variables. The phrase "fixed effects" is used in the econometric literature due to the following reason. The intercept of each entity varies across cross-sectional unit but does not change across time *i. e.,* time-invariant (Baltagi, 2008; Greene, 2003; Gujarati, 2009).

Let's consider the following Panel data model:

$$\boldsymbol{Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 Z_i + \varepsilon_{it}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Where:

Z_i = (include the country-specific unobserved effects).

$i \quad = 1 \ldots\ldots\ldots n,$ (indicate the cross-sectional units),

Here our objective is to compute β_1 that is the average change in Y_{it} due to change in X_{1it}. To do this, let's consider:

$\boldsymbol{\alpha_i = \beta_0 + \beta_2 Z_i}$, substituting in model (3) to obtain:

$$\boldsymbol{Y_{it} = \alpha_i + \beta_1 X_{1it} + \varepsilon_{it}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

The general form of the fixed effects estimator is as follow:

$$\boldsymbol{Y_{it} = \alpha_i + \beta_1 X_{1it} + \cdots \ldots \ldots + \beta_k X_{kit} + \varepsilon_{it}} \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots . (\mathbf{5})$$

The above model is called the Fixed Effects Regression, $where\ \alpha_i$ is the intercept, the subscript *i* on intercept term indicates that each cross-sectional unit varies across countries *i. e.*, time-invariant but does not do so across the time.

F-Test

In panel data modeling, F-test is used for efficient model selection between Pooled OLS and FEM. Under the null hypothesis pooled OLS is suitable whereas alternatively FEM is efficient (Baltagi, 2008; Greene, 2003; Hsiao, 1979). The test statistic of F-test is as follows:

$$\boldsymbol{F_{N-1,\ NT-N-K}} = \frac{\frac{R^2_{LSDV} - R^2_{Pooled}}{N-1}}{\frac{1-R^2_{LSDV}}{NT-N-K}} \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots . . (\mathbf{6})$$

$$\boldsymbol{H_0 = Pooled\ OLS}$$
$$\boldsymbol{H_1 = Fixed\ Effects}$$

Empirical results and interpretation

The previous section in detail discussed the data, data sources, variables, panel data modeling framework, model specification, and diagnostic tests that were apt to examine the hypotheses of current research work. This section consists of tables, graphs, and panel data, estimated model (Fixed Effect Model) and their interpretation (Wathen, Marchal, & Lind, 2017).

Descriptive statistics

In statistics, Descriptive statistics usually consist of central tendencies and measures of dispersion. The main objective of descriptive statistics is to provide the summary statistics for series or variables included in this research work.

Table 1. Descriptive statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
Lrgdppc	140	6.876	.564	5.956	8.278
Lto	140	3.592	.47	2.503	4.485
Lip	140	1.835	.26	.882	2.286
Lmp	133	.818	.662	-2.079	1.749
Lrt	140	.753	.489	0	1.609
Lda	138	1.249	.447	0	1.792
Lemp	136	3.81	1.54	1.474	6.288
Lrnna	137	13.823	1.507	11.764	17.214
literm_0	140	5.016	.554	3.776	6.047

Source: Author's own estimation

Table 1 shows the descriptive statistics of the variables included in this study. Summary statistics include the total number of observations, mean, standard deviation, minimum, and maximum values in the datasets. The overall mean score of lrgdppc is 6.876, while the std. dev. is 0.564. The max score of lrgdppc 8.728 and min is 5.956. The average scores of institutional variables are 1.835, 0.818, 0.753, & 1.249, respectively. while the std. dev. of institutional measures is 0.26, 0.662, 0.489, & 0. 447.The central value of the interaction term is 5.016 and the std. dev. is 0.554. Similarly, the mean score of lto is 3.592 and std. dev. is 0.47. The minimum value of lto is 2.503 while maximum score is 4.485. The average score of lemp 3.81 and std. dev. is 1.54. The max and min values of lemp are 6.288 and 1.474 respectively. The mean score of lrnna is 13.823 whereas the std. dev. is 1.507. The max and min scores of lrnna are 17.2 and 11.7 respectively. These results confirmed that there is no outlier in the given data sets.

Table 2. Cross-Correlation

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) lrgdppc	1.000								
(2) lto	0.764	1.000							
(3) lip	0.555	0.360	1.000						
(4) lmp	0.172	0.146	0.217	1.000					
(5) lrt	-0.004	0.275	-0.106	0.497	1.000				
(6) lda	0.276	0.230	0.368	0.652	0.375	1.000			
(7) lemp	-0.384	-0.584	0.131	0.262	-0.210	0.248	1.000		
(8) lrnna	0.146	-0.185	0.396	0.366	-0.313	0.378	0.819	1.000	
(9) literm_0	0.793	0.941	0.543	0.251	0.243	0.393	-0.404	-0.002	1.000

Source: Author's own estimation

Table 2 presents the results of cross-correlation among the variables. The estimated results of correlation coefficients show the lto, lip, and iterm_0 have strong positive correlation with lrgdppc with the correlation coefficients of 0.76, 0.56, & 0.79 respectively. While the institutional variables like, lmp and lda have weak positive correlation with lrgdppc. The correlation between lemp and lrgdppc is -0.38 while lrnna positively correlated with lrgdppc with the magnitude of 0.14.

Fixed effects models (FEM) (1-4) dependent variable log real gdp per capita (LRGDPPC)

This section is specifically designed to test the hypothesis whether TO and IQ are competitors or complement in economic development. Theory suggests that IQ and trade are complements if the estimated interaction term coefficient is positive. On the other hand, both trade and institutions are competitors if the interaction term is negative (Bhattacharyya, 2012; Bhattacharyya, Dowrick, & Golley, 2009)

Table 3. fixed effects models (FEM) (1-4) dependent variable log real gdp per capita (LRGDPPC)

Variables	(1) Fixed Effect Model 1	(2) Fixed Effect Model 2	(3) Fixed Effect Model 3	(4) Fixed Effect Model 4
Lto	-0.135***	-0.201***	-0.134***	-0.187***
	(0.0377)	(0.0349)	(0.0366)	(0.0368)
Lip	0.0847***			
	(0.0255)			
Lemp	-0.447***	-0.336***	-0.408***	-0.412***
	(0.0492)	(0.0488)	(0.0468)	(0.0492)
Lrnna	0.941***	0.906***	0.911***	0.941***
	(0.0240)	(0.0245)	(0.0244)	(0.0247)
literm_0	0.0122	0.0889***	0.0582**	0.0709**
	(0.0315)	(0.0277)	(0.0283)	(0.0304)
Lmp		-0.0387***		
		(0.0109)		
Lrt			-0.0832***	
			(0.0206)	
Lda				-0.0210
				(0.0152)
Constant	-4.184***	-4.066***	-3.936***	-4.228***
	(0.165)	(0.160)	(0.176)	(0.167)
Fixed Effect Test that all u_i=0:	679.63***	872.16***	783.68***	736.75 ***
Observations	136	129	136	134
R-squared	0.980	0.984	0.981	0.980
Number of id	4	4	4	4

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3 summarize the empirical results of Fixed-Effect models (1-4). In this table, columns present the different regression models. Whereas the rows reported

the repressors and diagnostic tests. The dependent variable is lrgdppc while the independent variables are trade % of GDP (lto), interaction term (literm_0), employed labor force (lemp), real physical capital (lrnna), and institutional variables, investment profile (lip), military in politics (lmp), religious tension (lrt), & democratic accountability (da). All variables are in the log form.

Column 1 reported the estimated results of FE model 1. Trade openness is negatively associated with lrgdppc. It is statistical significant at one percent level of significance. One percent change in lto, hamper the lrgdppc by 0.15 percent. Investment profile lip positively associated with lrgdppc. One percent increase in lip, the lrgdppc rises by 0.085 percent. Labor and capital are considering the important drivers of economic growth and production function (Mankiw et al., 1992; Solow, 1956; Swan, 1956). The labor force has a negative while physical capital positive impact on lrgdppc. One percent change in labor force, hinder the lrgdppc by 0.45 percent. Whereas one percent change in lrnna, the lrgdppc increases by 0.94 percent. Interaction term capture the combine effect of trade and institutions. The literm_0 positively associated with the lrgdppc. These findings similar to (Bhattacharyya, 2012; Gries & Redlin, 2012; Rodrik, Subramanian, & Trebbi, 2002).

Column 2 exhibits results of FE model 2, similar to previous specification, the lto has negative and significant impact on lrgdppc. One rises the lto, reduces the lrgdp by 0.20 percent during the period 1984-2018. Institutional quality was measured by military in politics lmp. lmp negatively connected with lrgdppc. One percent increase in the interventions in government, hamper the lrgdppc by 0.039 percent. These results in the line with the literature (Abdullah, Habibullah, & Baharumshah, 2020; Acemoglu et al., 2002; Acemoglu, Johnson, & Robinson, 2005; Akpan & Atan, 2016; Bhattacharyya et al., 2009; Rodrik, Subramanian, & Trebbi, 2004). Similar to previous specification, labor force negatively associated with lrgdppc, while capital positively affected the lrgdppc. the literm_0 has positive and significant impact on lrgdppc.

Column 3 summarize the findings of FE model 3, likewise previous two specifications, the results of trade and institutions consistent with this specification as well. In this specification, institutions were measured by religious tension lrt. Alternatively, by mitigating the lrt, accelerate the lrgdppc. The lto and lrt negatively correlated with lrgdppc. one percent increase in lto and lrt, decreases the lrgdppc by 0.13 & 0.083 percent respectively. Similarly, labor force has negative and significant impact on lrgdppc. one changes the labor force reduces the lrgdppc by 0.41 percent. On the other hand, capital shows the direct linkages with lrgdppc. one percent increase in capital, lrgdppc stimulated by 0.91 percent. Like previous models, literm_0 positively correlated with economic growth in sample countries. The combine positive effect of trade and IQ has confirmed that TO and IQ complement with each other.

Column 4 presented the results of FE model 4, like last three models, the results of TO and IQ analogous. The TO and democratic accountability da the proxy of institutions have negative and significant impact on economic growth. One percent enhance the lto, lrgdppc reduces by 0.19 percent. While one percent increases the da, hamper the lrgdppc by 0.021 percent in sample countries. Similar to previous regressions, the labor force has negative whereas capital positively correlated with lrgdppc. one percent increase in the labor force, lrgdppc decreases by 0.41 percent. While one percent increases the capital, lrgdppc rises by 0.94 percent. These findings consistent with (Lucas, 1988; Mankiw et al., 1992; Solow, 1956; Swan, 1956) in the literature. Similarly, literm_0 positively associated with lrgdppc. one percent increase in literm_0, intensifies the lrgdppc by 0.071. The positive and significant results of literm_0 support the hypothesis of this study, TO and IQ are complements in EG. The results of this study also support and similar to (Bhattacharyya et al., 2009). To verify the robustness of the empirical results of this study has used `the different measures of IQ. Our results are consistent with all specifications. The interaction term has a positive and statistically significant impact on lrgdppc in all specifications (1-4). Trade openness appear negative. These results support the (Batra & Slottje, 1993; Leamer, 1988; Levine & Renelt, 1992; Rigobon & Rodrik, 2005) studies in the literature. They investigated the effects of democracy, rule of law and TO on EG and found a negative association between openness on EG and opposite to (Dollar & Kraay, 2003; Frankel & Romer, 1999; Lee & Kim, 2009). The results of the F-test for all four models, $p<0.05=679.63$***, $p<0.05=872.16$***, $p<0.05=783.68$***, & $p<0.05=736.75$ *** rejected the H0= pooled OLS model that is FEM is appropriate. This study also estimated the Pooled OLS and Random Effect Models[2]. The R-square is the ratio of explained variation to total variation. It is the model selection criterion. The range of R^2 between 0-1. The coefficient of R^2 near one implies that the model is good. The estimated R^2 =0.98, in all four models. It implies that the explained variation is approximately 98%. The number of id represent the cross-sections. While total number of observations are 136.

Conclusion and recommendations

The key focus of the present research work is on analyzing whether the IQ and TO are competitors or compliments in EG in the case of SAE countries. The longitudinal data for the duration of 1984-2018 has been utilized. EG is measured by lrgdppc. TO is measured by trade % of GDP. It is calculated by summing up "exports of goods and services plus imports of goods and services divided by current GDP". The IQ variables have been taken from the International Country Risk Guide (ICRG). To check the robustness, this study includes four different institutional variables in the regression model, namely, "Investment Profile,

[2] For Pooled OLS & REM, See Appendix 2-3.

democratic accountability, Military in Politics, and Religious Tensions." To analyze the hypothesis, current research, introduced the interaction term in the regression model. The TO negatively associated with lrgdppc. While the IQ positively correlated with lrgdppc. These findings similar to (Gries & Redlin, 2012; Jawaid, 2014; Umer, 2014). the combine effect of TO and IQ positively associated with lrgdppc. these results are consistent with all four estimations. The positive and statistically significant impact of literm_0 on lrgdppc has confirmed that IQ and TO are complements in the economic development. These results support the hypothesis of this study that IQ and TO are complements in the economic development of sample countries. These findings similar to studies of (Bhattacharyya, 2012; Bhattacharyya et al., 2009; Rigobon & Rodrik, 2005) in the literature. Similarly, lemp negatively associated while lrnna positively connected with largppc. These results analogous to (Mankiw et al., 1992; Robert, 1988; Solow, 1956; Swan, 1956). Based on empirical findings, this study recommends that the government and policymaker of these countries should make such policies which established the strong institutional framework to improve the living standards of the masses of sample countries. Although the integration negatively correlated with lrgdppc, but the combine effect of trade and institutions are positive. This implies that institutions and trade are complement in economic growth, and trade has a potential to accelerate lrgdppc. The policymaker of sample countries should formulate such policies which encourage trade, especially export oriented growth policies. The labor force appeared negative, the government should introduce the labor reforms to increase the labor productivity for positive contribution in output per capita. Similarly, real capital has positive impact on lrgdppc. the policymaker should apt steps to improve infrastructure for accelerate growth.

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Appendices

Appendix Table 1: List of Sample Countries

Sr. No	Country Name	Abbreviation	Region
1	Bangladesh	BGD	South Asia
2	India	IND	South Asia
3	Pakistan	PAK	South Asia
4	Sri Lanka	LKA	South Asia

Appendix Table 2: Pooled OLS Models (1-4) Dependent Variable Log Real GDP Per Capita

(LRGDPPC)

VARIABLES	(1) Pooled OLS Model 1	(2) Pooled OLS Model 2	(3) Pooled OLS Model 3	(4) Pooled OLS Model 4
Lto	-0.0813	-0.266*	-0.306**	-0.271*
	(0.152)	(0.160)	(0.150)	(0.152)
Lip	0.373***			
	(0.0971)			
Lemp	-0.407***	-0.417***	-0.427***	-0.420***
	(0.0313)	(0.0344)	(0.0363)	(0.0340)
Lrnna	0.365***	0.386***	0.397***	0.383***
	(0.0263)	(0.0283)	(0.0318)	(0.0277)
literm_0	0.320**	0.541***	0.556***	0.531***
	(0.125)	(0.122)	(0.112)	(0.121)
Lmp		0.00206		
		(0.0328)		
Lrt			0.0540	
			(0.0460)	
Lda				0.0491
				(0.0524)
Constant	1.360***	1.368***	1.269***	1.412***
	(0.238)	(0.266)	(0.259)	(0.258)
Observations	136	129	136	134
R-squared	0.866	0.854	0.853	0.854

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix Table 3: Random Effects Models (1-9) Dependent Variable Log Real GDP Per Capita (LRGDPPC)

Variables	(1) Random Effect Model 1	(2) Random Effect Model 2	(3) Random Effect Model 3	(4) Random Effect Model 4
Lto	-0.0813	-0.266*	-0.306**	-0.271*
	(0.152)	(0.160)	(0.150)	(0.152)
Lip	0.373***			
	(0.0971)			
Lemp	-0.407***	-0.417***	-0.427***	-0.420***
	(0.0313)	(0.0344)	(0.0363)	(0.0340)
Lrnna	0.365***	0.386***	0.397***	0.383***
	(0.0263)	(0.0283)	(0.0318)	(0.0277)
literm_0	0.320**	0.541***	0.556***	0.531***
	(0.125)	(0.122)	(0.112)	(0.121)
Lmp		0.00206		
		(0.0328)		
Lrt			0.0540	
			(0.0460)	
Lda				0.0491
				(0.0524)
Constant	1.360***	1.368***	1.269***	1.412***
	(0.238)	(0.266)	(0.259)	(0.258)
Observations	136	129	136	134
Number of id	4	4	4	4

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0