THE IMPACT OF CORRUPTION ON THE ECONOMIC GROWTH IN BANGLADESH, INDIA AND PAKISTAN: AN ARDL APPROACH

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ABSTRACT

Purpose of the study: Main purpose of the paper is to find out the impact of corruption on the economic growth of Bangladesh, India, and Pakistan. At the same time, our other objectives are to find the long and short-run effects of corruption on growth in these countries.

Methodology: For conducting the study, we have taken the data from Bangladesh, India, and Pakistan. For this study necessary secondary data have been collected from 1990 to 2016 based on countries like Bangladesh, India, and Pakistan. Data for economic growth (dependent) and trade (independent) are collected from World Development Bank and data for corruption are taken from International Country Risk published by the PRS Group. The study has used ECM ARDL Model and the Fixed Effect Model.

Findings: The result of the fixed effect model shows a 1percent increase in corruption decreases GDP by 0.07 units and shows a negative relationship with economic growth. Again if trade increases by 1 percent then growth will increase by 0.09 units on average and shows a positive relationship with economic growth. ECM ARDL Model shows the positive coefficient of corruption but not significant but trade has a long-run positive influence on economic growth. The error correction term indicating that the adjustment is corrected by 70% in these three countries.

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Contributions: This paper may be helpful for existing literature gap and also for further research. It will be helpful for policy makers to control corruption in three countries.

Keywords: Economic Growth, Corruption, Trade, Fixed Effect, Panel ARDL

1. INTRODUCTION

Mainly from the Latin word, we get "Corruption" which meaning is the decay of ethics, ill behavior, lack of morality, etc. Sometimes some people are bestowed with a higher position and they tried to involve in criminal activity to get contraband advantage or violation of power for one's private gain, which is regarded as corruption. All scales of development and on the progress of humankind, corruption is considered as an existing problem because of its antithetical impact. Not only powerful people are abusing power, but corruption also exists in every sector from the highest to the lowest level.

In the 2018 Corruption Perceptions Index reported by Transparency International, out of 175 countries, the position of Bangladesh is 149, which signified that Bangladesh is the least corrupt nation. Generally, the reasons for the corruption are a range of discretion; conflict; collusion between main decision-makers; enforcement of inadequate rules and regulations, laws, poor institutional capacities, lack of transparency, promotions, postings and transfers, lack of monitoring and control mechanism (Iftekharuzzaman, 2011).

Table 1 shows the GDP per capita of Bangladesh, India, and Pakistan. From the figure we see that GDP per capita is comparatively higher in India, then Pakistan, and lower in Bangladesh from the year 2010 to 2017.

Table 1: GDP per capita (constant 2010 US$) from 2010 to 2017

Year	GDP per capita in Bangladesh	GDP per capita in India	GDP per capita in Pakistan
2010	757.67	1345.77	987.41
2011	797.41	1416.40	992.88
2012	839.51	1474.97	1006.07
2013	879.58	1550.14	1028.44
2014	922.16	1645.33	1054.23
2015	971.64	1758.84	1081.29
2016	1029.58	1862.43	1117.52
2017	1093.05	1963.55	1155.36

Source: WDI, WB (2017)

Politicians and industrialists who are extremely corrupt, are playing a major role through providing false, wrong information, and news to the general public and they tried to control the Indian media. According to CPI in 2018, out of 180 countries, India ranked 78th place which showed the declining procedure is steady in the perception of corruption.

According to the 2018 Corruption perception Index, out of 175 countries, Pakistan is the 117 least corrupt nations, which is reported by Transparency International.

From 1995-2008, Pakistan averaged a corruption rank is 109.04. Pakistan is completely spoiled by corruption and is resulting in rising poverty, decreasing employment, hunger and is tarnished the image of the country, in which anticorruption has unfavorably failed to reduce the ongoing dishonesty and frauds. Figure 1 depict the trend of the corruption of Bangladesh, India, and Pakistan from 2005 to 2016. Compare to these three countries Bangladesh has higher corruption than India and Pakistan. Figure 1also reveals that India is in the second position of corruption among these three countries.
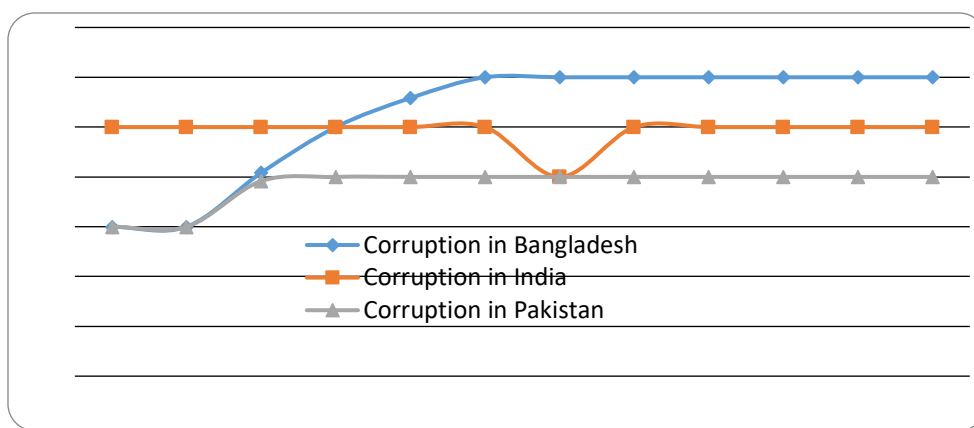

Figure 1: Trend of corruption in Bangladesh, India, and Pakistan from 2005 to 2016
Source: WB (2017)

Table 2 depicts the government effectiveness from 2015 to 2019 for Bangladesh, India and Pakistan collected from WGI, 2020. Negative value of government effectiveness indicates that Bangladesh and Pakistan have weak level of government effectiveness and India has comparatively well government effectiveness than Bangladesh and Pakistan; whereas the weak and strong government effectiveness ranges from -2.5 to 2.5.

Table 2: Government Effectiveness from 2015 to 2019.

Government Effectiveness					
Country	*2015*	*2016*	*2017*	*2018*	*2019*
Bangladesh	*-0.72*	*-0.68*	*-0.73*	*-0.75*	*-0.74*
India	*0.09*	*0.08*	*0.09*	*0.28*	*0.17*
Pakistan	*-0.67*	*-0.65*	*-0.60*	*-0.63*	*-0.68*

Source: Worldwide Governance Indicator (WGI), 2020.

Trade (% of GDP) was also included in this study as independent variables to find the impacts of corruption on it. Figure 2 below shows the trend of trade in these selected three countries.
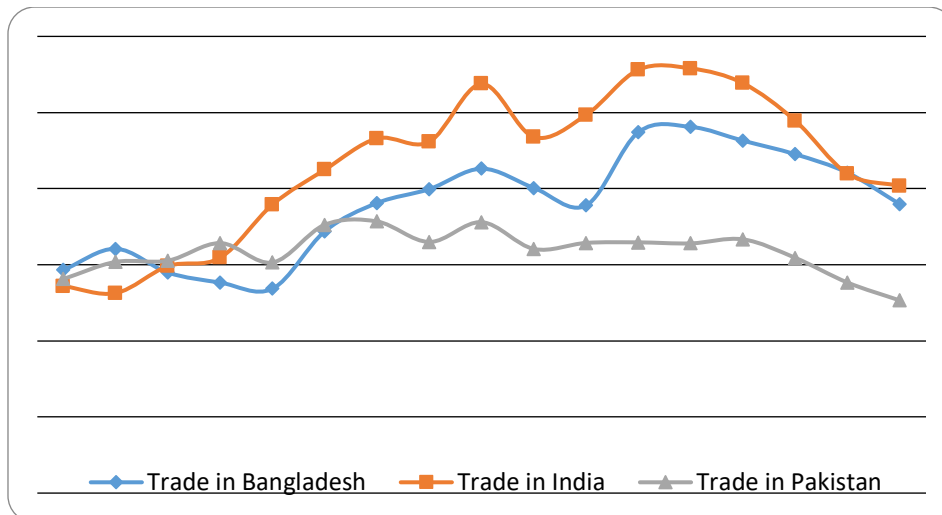
Figure 2: Trend of Trade in Bangladesh, India and Pakistan (% of GDP)
Source: WB (2017)

There are several research on this topic including both panel and time series analysis. We also investigate the impact of corruption on growth for three countries like Bangladesh, India, and Pakistan with the period 1990-2016 by using ECM ARDL Model and Fixed effect model.

1.1. Objectives of the Study

We have one main objective, which is to find corruption's impact on the economic growth of three South Asian countries (Bangladesh, India, and Pakistan). At the same time, our other objectives are to explore the long and short-run impact of corruption on growth in these countries.

1.2. Significance of the Study

To achieve certain personal goals and desires in dishonest or illegal ways, when people are trying to misuse their power with the help of money or some other way, then it is known as corruption. It is regarded as a constraint on development and growth. In this paper, one can able to know how the impact pattern of corruption among the three countries of Bangladesh, India, and Pakistan.

Corruptions have a direct impact on growth among these three countries. Here, it is also shown that other variable trade is indirectly impacted by corruption. Through this paper, we get to know the direct and indirect impact of corruption among these three countries is positive or negative. Moreover, it will also be acknowledged that corruption has long-run effects or not. With the help of this, the authority among these countries can think about it for anti-corruption.

In the study, the literature review is showed in part 2. Part 3 and 4 show methodology

and result discussion. Finally part 5 shows conclusion of the paper.

2. LITERATURE REVIEW

There are several studies including panel and time-series data analyses on this regard of corruption's impact on growth, some of these are summarized below.

Amin (2013) concludes corruption decreases the economic growth of Pakistan as corruption and economic growth has inverse relation in Pakistan and reduces the effectiveness of investment. Pulok (2012) shows in his paper the direct and indirect consequences on economic development, moreover the co-integration between them by the period of 1984-2008. He said economic growth in Bangladesh is adversely affected by corruption. In his paper, he showed that when corruption increases by 1%, it has an effect on GDP and causes a reduction of 10% per capita GDP.

Obamuyi and Olayiwola (2019), investigate corruption as an obstruction to growth in Nigeria and India for the period of 1980-2015. They also have some findings in which they believe corruption has a positive role in development. Based on 19 Asian countries, Thach *et al*. (2017) analyze that corruption negatively affect on growth but they also mentioned its positive impacts.

Their paper used data from 19 Asian countries from 2004 to 2015. For this reason, they used data from 2004-2015 of those countries and examined D-GMM and quantile regression. In Nigeria, corruption and growth have a causal relationship, Egunjobi (2013) show the direction by using data from 1980-2009. They can reveal that the rate of foreign private investment declined and educational expenditure also reduced due to corruption, at the same time it raises the capital expenditure.

Economic growth and corruption have a causal relationship between them that as shown by Wright and Craigwell (2013) in their paper. Based on 42 developing countries, they proved their analysis with the help of linear as well as non-linear panel data. For doing this whole, they used data from the period of 1998-2009 of those countries.

The economic growth of ECO member countries is impacted by administrative corruption. But in this paper, Afghanistan, Iraq, and Iran were not involved. Based on the panel data approach from 2003 to 2008 the paper of Taghavi *et al*. (2013*)* shows that administrative corruption and growth have reversed and significant effects. Mustapha (2014) investigates 20 countries and able to find out that, those countries' GDP per capita is strongly impacted by corruption on GDP per capita of 20 countries.

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He completed his study by using panel data ta approach that covers the period between 2003- 2011. Corruption has both negative and positive impacts on growth, which are captured in the paper of Dzhumashev (2009). He shows that corruptions have direct effects, at the same time, it also indirectly affects counts' economic situation. And this whole work is done by 141 countries from 2000-2007 time periods.

Monte and Papagni (2006), in their econometric data for Italy's 20regions from 1963 to 200l, tried to know the determinants of corruption. Swaleheen (2011) found corruption's has a significant direct impact on growth.

The main objective of Alfada (2019) was to estimate the corruption threshold by taking a nonlinear approach. His required data was from 19 provinces of Indonesia. By collecting data from the period of 2004 to 2015, he able to runs his analysis.

Aluchna *et al.*(2009) showed a negative impact of corruption on the economies and recommends strengthening accountability and bureaucratic quality. Anh *et al*. (2016) revealed negative relation between corruption and economic growth. Nwankwo (2014) showed Corruption negatively affects the economic growth of Nigeria and for faster economic growth in Nigeria zero tolerance in corruption is required. Also, recommend the anti-corruption agencies to stand strictly against corruption in Nigeria.

Aliyu and Elijah (2008) reveal the significant direct impact of corruption on economic growth and also should 20% of the government capital expenditure goes to private intersest. Ugur and Dasgupta, (2011) find corruption has an inverse association with per-capita GDP growth. Ndikumana, (2008) supports the view that corruption hampers economic growth and recommends improving the quality of governance. Corruption hampers economic growth in Pakistan but trade openness boosts economic growth is showed by Farooq et al. (2013). Monte and Papagni (2001) reveal the negative impact of corruption on growth in the case of Italy. Mo (2001) finds negative association between corruption growth.

Using EFI (Economic Freedom Index) Ertimi *et al*. (2016) showed negative impact of corruption on economic growth and negative impact of corruption is also ensured by Nageri *et al*. (2013). Shao *et al*. (2007) observe a negative correlation between corruption growth.

Farida *et al*. (2008) showed that corruption deters growth and suggest that corruption boost inefficiencies in various sector.

Huang (2016) found positive causality between corruption to economic growth in South Korea. Brempong (2002) also showed negative association with corruption and the growth

rates of GDP and per capita income. Anoruo and Braha (2005) reveal lower productivity, and restrict investment due to corruptions.

Grabova, (2014) also reveals negative association of corruption with economic growth. Egunjobi (2013) empirically investigates this topic in Nigeria and reveals that corruption exerts a negative influence on output of individual worker. Dridi (2013) also reveals inverse relation of corruption with growth.

Ghalwash, (2014) shows corruption is responsible for increased inefficiencies. Chamseddine (2016) finds a negative but statistically insignificant relationship between the observed countries' economic growth and the level of corruption. Berg and Schmidt (2006) found a positive relationship between trade and economic growth in Latin America. A long run co-integration is found among FDI, Trade Economic growth in Pakistan by Iqbal *et al.* (2010). Trade openness increases the initial per capita income in Brazilian states (Daumal, 2011).

Although there are enormous researches in this field, we are going to find the impact of corruption on these three countries as they are in the same geographical location. And also tries to find the impact of trade on economic growth in these countries.

3. METHODOLOGY

Study Area

For conducting the study, we have taken data from Bangladesh, India, and Pakistan to show the association between economic growth and corruption.

Data collection and variables

For this study necessary secondary data have been collected from 1990 to 2016 based on countries like Bangladesh, India, and Pakistan. Data for economic growth (dependent) and trade(independent) are collected from World Development Bank and data for corruption are taken from International Country Risk published by the PRS Group.

Econometric model specification

The panel data regression model for this study is given below in equation (1).

$$GDP_{it} = \beta_0 + \beta_1 Corrp_{it} + \beta_2 TD_{it} + \mu_{it} \tag{1}$$

Where i denotes countries and t denotes time.

N = Number of countries.

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t =Period

$\beta_0, \beta_1, \beta_2$ are the parameters and μ are error term. GDP= Gross domestic product per capita growth (annual %), Corrp= Corruption, TD= Trade (% of GDP growth).

Fixed effect model

Fixed effects (FE) model is applied to know the influence of variables which change over time(Adu-Gyamfi et al., 2019). FEM also recognized as "Least-Squares Dummy Variable (LSDV) model". The value of intercepts changes for each cross section countries in this model(Raza et al., 2014). The equation for fixed effect model can be written as equation (2),

$$Y_{it} = \beta_1 X_{it} + a_i + \mu_{it} \ldots \ldots \ldots . (2)$$

Where, Y_{it} is the dependent and X_{it} independent variable and μ_{it} is the error term.

Random effect model

Entities are assumed to be random and uncorrelated in random effect model (Adu-Gyamfi et al., 2019). Basically in random effect model, units are taken randomly or from its population as representative (Tasci, 2009). The equation for random effect model can be written as equation (3),

$$Y_{it} = \beta_1 X_{it} + a_i + \mu_{it} + \varepsilon_{it} \qquad (3)$$

Where, μ_{it} is the between and ε_{it} is the within-entity error.

Panel ARDL Model

Pesaran and Shin (1999) were the pioneer of the panel ARDL model and this model is expanded by Pesaran, Shin, and Smith (2001) which dealing with long and short-run association among the variables. The bounds testing approach is an important cointegration procedure compare to other procedures. Banerjee et al. (1993) showed that ECM can be derived from the ARDL approach whether the data is integrated at level or first difference or integrated in mixed order. Based on panel ARDL model we can write the equation for economic growth, corruption and trade,

$$\Delta GDP_{it} = \beta_{it} + \beta_{1it} Corrp_{i(t-1)} + \beta_{2it} TD_{i(t-1)} + \sum_{j=0}^{p} \beta_{3it} Corrp_{i(t-1)} + \sum_{j=0}^{p} \beta_{4it} \beta_{1it} TD_{i(t-1)}$$
$$+ \Phi ECT_{i(t-1)} + \mu_{1it} \qquad \ldots (4)$$

Here, μ_{1it} is the error term, Δ refers first difference and Φ is the coefficient of ECT in the model.

4. HYPOTHESES STATEMENT

- ### *H1: Corruption has a negative impact on economic growth*

Many studies identified the negative influence of corruption in various countries by many researchers such as Amin (2013), Pulok (2012), Egunjobi (2013), Aluchna *et al*. (2009), Dasgupta(2011) and Chamseddine(2016).

- ### *H2: Trade has a positive impact on economic growth*

Many studies have identified the positive influence of trade such as Azees et al. (2014), Kehindeet al. (2012) and Javedet al. (2012). They have found that trade accelarates the economic growth and development the domestic economy most of the cases that is why it is the most influential components.

5. RESULTS AND DISCUSSION

Descriptive Statistics

The descriptive statistics show 81 observations. Table 3 show that the mean value of GDPG is 3.455866; its standard deviation is 2.238356, and the maximum value and minimum value respectively 8.763184 and -1.449514. The probability of Jarque-Bera shows that our data for Gross domestic product per capita growth, Corruption, Trade are normally distributed.

Table 3: Results of the Descriptive Statistics

	GDP	*Corrp*	*TD*
Mean	*3.455866*	*2.165123*	*33.72186*
Median	*3.077798*	*2.000000*	*32.86893*
Maximum	*8.763184*	*3.000000*	*55.79372*
Minimum	*-1.449514*	*0.083333*	*15.67452*
Std. Dev	*2.238356*	*0.601447*	*9.529978*
Skewness	*0.067968*	*-0.470117*	*0.350619*
Kurtosis	*2.569971*	*3.539322*	*2.585478*
Jarque-Bera	*0.686487*	*3.965322*	*2.239529*
Probability	*0.709465*	*0.137702*	*0.326357*
Sum	*279.9252*	*175.3750*	*2731.470*
Sum Sq. Dev.	*400.8190*	*28.93904*	*7265.638*
Observations	*81*	*81*	*81*

Panel Unit Root Test

We have used panel unit root test to test the stationarity of the selected variables and and the result is presented in the Table 4 below and we see from the table that GDP per capita is integrated at I(0) level and corruption and trade are integrated at I(1) level indicates that our data is stationary at mixed order.

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Table 4: Panel Unit Root Test

Variables	Levin, Lin & Chut t*				Im, Pearson and Shin W-stat				Level of integration
	Level		First Difference		Level		First Difference		
	t-stat	P-value	T stat	P-value	T stat	P-value	T stat	P-value	
GDP Growth	-1.98946	0.0233	-5.42735	0.0000	-1.73985	0.0409	-6.07811	0.0000	I(0)
Corruption	-0.29378	0.3845	-3.06494	0.0011	-1.47202	0.0705	-3.07304	0.0011	I(1)
Trade	-0.62516	0.2659	-2.65458	0.0040	0.52418	0.6999	-2.81551	0.0024	I(1)

Model Estimation

We have 3 countries Bangladesh, India, and Pakistan. Three variables are growth rate, corruption, and trade. We want to check the relationship between GDP per capita and other two variables. We have a pooled, fixed, and random effect model. After estimating those models by using the Hausman test we able to find out which model is suitable. At first, we estimate the fixed-effect model; we can see that only trade has significant variables to explain growth. And then we check the random effect model, also here the trade is a significant variable because the probability value is very small and showed in Table 5.

Table 5: Fixed Effect Model and Random Effect Model

Fixed effect model				Random effect model			
Variable	**Coefficient**	**Std. Error**	**Prob.**	**Variable**	**Coefficient**	**Std. Error**	**Prob.**
C	0.495751	0.878502	0.5742	C	-0.683943	0.840870	0.4185
CORRP	-0.074000	0.350933	0.8336	CORRP	0.572461	0.326653	0.0836
TD	0.092532	0.020642	0.0000	TD	0.086008	0.020615	0.0001
R-squared Prob(F-statistic) Durbin-Watson stat		0.472971 0.000000 1.576875		R-square Prob(F-statistic) Durbin-Watson stat		0.193353 0.000229 1.089437	

Out of these two models, which one is the appropriate model for accepting. For this reason, we are going to check the Hausman test given in Table 6.

Table 6: Result of Hausman Test

Hausman Test			
Test Summary	***Chi-Sq. Statistic***	***Chi-Sq. d.f***	***Prob.***
Cross-section random	40.3221333	**2**	0.0000

Here we can see from the Hausman Test that the probability value is less than 5%, meaning that we can reject the null hypothesis and accepting alternative hypothesis. That means the fixed effect model is appropriate for our study. Here, trade is significant as the p-value is less than 5% but corruption value is not significant as the p-value is 83.36%. So trade is a significant variable to explain our dependent variable. Where 1unit increase in corruption decreases GDP by 0.07 units and shows a negative relationship with GDP. Again if trade increases by 1 unit then GDP will increase by 0.09 units on average and shows a positive relationship.

From the unit root test, we can see that all our variables are integrated into the mixed order. So apply here ARDL procedure for long and short-run impact of corruption on growth in these three countries.

Optimal Lag Selection

Table 7 shows optimal lags is 1 for the ARDL model.

Table 7: Lags Length Selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-427.4562	NA	92.80531	13.04413	13.14366	13.08346
1	-292.9875	252.6382	2.072717*	9.242045*	9.640164*	9.399361*
2	-286.5815	11.45314	2.246611	9.320652	10.01736	9.595954
3	-281.9679	7.829189	2.577951	9.453572	10.44887	9.846861
4	-274.8266	11.46935	2.750864	9.509897	10.80378	10.02117
5	-262.8202	18.19152*	2.546463	9.418793	11.01127	10.04806

Estimates of Panel ARDL Model

Table 8 shows result of panel ARDL model. We find that the coefficient of corruption is positive but not significant which means it has a long-run positive impact on economic growth by 3% but trade has a long-run positive impact on economic growth in these three countries and significant at a 1% level of significance and reveals that 1% increase in trade will lead 12% increase in economic growth. The error correction term indicating that the adjustment is corrected by 70% in these three countries.

Table 8: Long Term and Short Term Coefficients

Variable		Coefficients	T statistics	Probability
Long- Run	Corrp	0.039404	0.130320	0.8967
	TD	0.125473	5.556575	0.0000
Short-Run	ECM	-0.702180	-4.842383	0.0000
	ΔCorrp	-0.425724	-0.406044	0.6860
	ΔTD	-0.076045	-1.371765	0.1747
	C	-0.368185	-0.858746	0.3935

Findings

From the fixed-effect model we noticed that corruption is negatively associated with GDP growth in these three countries which result is also supported by the study of Aluchna *et al*. (2009), Anh *et al*. (2016), Nwankwo (2014) and Ugur and Dasgupta (2011). But the coefficient is not statistically significant. Again, trade is significantly and positively associated with GDP growth in these three countries which result is also supported by the study Azees *et al*. (2014), Kehinde et al. (2012) and Javed *et al*. (2012). From the Panel ARDL model, it finds that corruption positively but not significantly impacts growth but trade significantly and positively impacts growth and reveals that if trade increases by 1% than growth will increase

by 12% on average.

6. CONCLUSION AND POLICY RECOMMENDATIONS

The main motive of the paper is to know the impact of corruption on growth in Bangladesh, India, and Pakistan during 1990-2016. For investigating empirically the existence of a long-run or short-run association between corruption and growth, we used ECM ARDL Model and the Fixed Effect Model.We used panel unit root test and found that GDP is stationary at I(0) and corruption and trade is stationary at I(1).

The Houseman test ensures that the fixed effect model is appropriate. Here, trade is significant as the p-value is less than 5% but corruption value is not significant as the p-value is 83.36%. So trade is a significant variable to explain our dependent variable. Where 1unit increases in corruption decrease GDP by 0.07 units and show a negative relationship with GDP. Again if trade increases by 1 unit then GDP will increase by 0.09 units on average and shows a positive relationship.

From the panel ARDL model, we find that the positive coefficient of corruption means it has a long-run positive impact on growth but it's not statistically significant but long run impact of trade is significant impact on economic growth in these three countries. The error correction term indicating that the adjustment is corrected by 70% in these three countries.

Based on the result of the study we can recommend the following policy. Any countries economics are unable to function and operate their activities properly because corruption prevents the as usual laws of the economy from functioning freely. Corruption has direct and indirect effects of these variables on growth. Corruption has an indirect impact on trade. Other countries don't want to trade with the high corrupted country. And we all know that trade is one of the major contributors to the growth of the country. The government of these countries should take proper measures to combat corruption from all the economic sectors as corruption hinders economic growth.

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