



Impact of corruption, public debt and democracy on economic growth: An analysis of SAARC member countries for the period of 1996 to 2020

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ABSTRACT

The purpose of this study was to know the impact of corruption, public debt, and democracy on the growth of economy-centering developing countries, especially six (6) South Asian Association for Regional Cooperation (SAARC) countries, as they are highly affected by it, and this type of research has not been carried out before based on intense literature review. Data has been collected from the World Bank's reliable indexes, such as; perspective mode and world governance indicator index, and democracy index from the Freedom House Index. Fixed Effect, Random Effect, and Pooled OLS models, have been used to analyze the data for the period of 1996 to 2020. Based on the findings, we may conclude that public debt is significantly and adversely affecting countries' growth, so SAARC countries should form policies to tackle that debt related issues and make it profitable for their countries; although corruption impact is insignificant and negative, and democracy impact is insignificant and positive, so countries' should relax their anti-corruption measures, especially in those sectors that foster economic growth although corruption in the form of money laundering, kickbacks, and non-development projects should be stopped and governments should provide more civil and political rights to its people in SAARC countries, so that will give freedom to choose sincere and honest governments and improve economic growth.

Keywords: *Corruption; Democracy; Public debt; Economic growth; SAARC countries; Random effect model; Fixed effect model; Hausman test*

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INTRODUCTION

The basic intention of every responsible government is to speed up economic growth because it is linked with other macroeconomic issues, such as inflation, unemployment, poverty, income inequality, human development and improvement in living standards. Economic growth depends on the policies adopted by that concerned government, for example, attaining public debt to invest in development projects, taking anti-corruption measures to tackle corruption-related issues, and improving the governance of that country. Economic growth may be defined in many ways, but in simple words, economic growth means an increase in real GDP through an increase in national income, national output or increase in total national expenditure (McKibbin et al., 2018; Summers, 2013; Henderson et al., 2012). Economic growth enables countries to increase the trade of goods and services, improve the living standard of people, and attain a virtuous stage of prosperity (Saunders et al., 2003). However, the literature provides contrasting arguments about governance, corruption, public debt and economic growth.

Corruption is considered one of the prime factors affecting the growth of an economy. As per the World Bank definition, "Corruption is the use of public assets for personal benefit". Corruption disturbs economic growth because corrupt culprits move funds from projects that develop the economy into projects where they can make the most (d'Agostino et al., 2012). In 1996, at World Bank's annual meeting, corruption was declared as a major factor that adversely affects the economic growth in developing countries that affect even worsen due to poor management of government (Bruno and Pleskovic, 1997). Sometimes governments, despite of trying different economic policies, remain unsuccessful in achieving targeted economic growth (Howes et al., 2017). Countries' failure occurs for several reasons, for example, due to internal conflicts, rise in criminal offenses, failure in providing political stability to its residents, lack of democracy, overburden of debt, institutional flaws, infrastructural destructions, alteration in markets, instability in attaining property rights and increasing level of corruption (Mira and Hammadache, 2017; Hall and Jones, 1999; Clague et al., 1997).

Various studies are available showing the impact of corruption on economic growth. Although two contradictory arguments have been concluded by researchers focusing on the impact of corruption on economic growth. Many researchers conclude that corruption negatively affects economic growth (Gründler and Potrafke, 2019; Cieřlik and Goczek, 2018; Pacific et al., 2017). These research studies concluded that corruption not only causes

misappropriation in resource allocation but also causes poverty, disinvestment and a fall in growth and leads towards economic inequality. On the other hand, some researchers conclude that corruption is beneficial for countries because it accelerates economic growth (Montes et al., 2019; Du et al., 2018).

Many economists and researchers have analyzed the association between governance and economic growth, and they have concluded that governance plays a key role in achieving economic growth and attaining income equality in countries (Erum and Hussain, 2019; Bekhet and Latif, 2018). Researchers mentioned that governance focuses on accountability, the rule of law, transparency, corruption control, freedom of expression, quality in bureaucracy, government efficiency, and civil and property rights protection, all are necessary for achieving economic growth (Méndez-Picazo et al., 2012). Quality of governance is positively associated with economic growth (Huang and Ho, 2017; Fayissa and Nsiah, 2013; Cooray, 2009; Jalilian et al., 2007). Some studies conclude that poor governance negatively affects economic growth, such as poor governance encourages political culprits to use public assets for personal use, ultimately creating adverse effects on the economy (Bekhet and Latif, 2018; Thach et al., 2017; Al Mamun et al., 2017).

In search of sustainable economic growth, some countries finance their domestic projects with public debt, such as in the form of loans, aids, remittances, or grants. Therefore, debt is one of the major sources of raising funds for the government to finance its productive activities, such as investment in infrastructural development and human capital development that leads towards economic growth. South Asian countries are low to lower-middle-level underdeveloped economies. These countries are facing a serious over burden debt situation, and the ineffective and inefficient financial system of those countries is unable to tackle that debt issue, which ultimately causes the issue of debt servicing and paying debt obligations on time. In general individual debt profiles of South Asian countries indicate a high variance of debt accumulation. Some countries of this region have reported a high level of external debt among any low to middle-level economy.

Political instability, heavy debt burden, high level of corruption, and decline in economic growth poses disastrous effects on South Asian economies that increase the reliance of this region on even more debts and aids/grants from the world to stabilize the economic conditions. Researchers conclude that most of the debt acquired by South Asian countries is due to payment of debt servicing (interest payment on acquired debt) or being embezzled by authorities instead of being invested into human and physical capital for fruitful purposes. Wastage of resources by incompetent governments and high levels of corruption, which is a regular practice in South Asian countries, has adversely affected all social, economical, and political institutes that may work to bring growth to the economy (Richards et al., 2003). In this study, external debt has been used as a proxy of public debt, as public debt is composed of internal and external debt and data for internal debt is hard to acquire in developing countries due to having multiple types of complex internal liabilities over the government.

Moreover, numerous steps taken by governments to recover and stabilize economic activities are highly affected by diminishing economic growth, which might be due to heavy domestic and foreign debt and a high level of corruption. Various studies have individually analyzed the relationship between corruption, debt, and democracy on economic growth. Although the literature indicates most of the studies are in developed countries, the African region, MENA and OIC countries as a sample but no study was available in selected SAARC regions focusing on the above-mentioned study variables as a whole based on intense literature review. Therefore, it was worth conducting research on how corruption, debt and democracy affect economic growth in the SAARC region.

The main objectives of this study are to know the impact of corruption on economic growth, the impact of public debt on economic growth, the impact of democracy on economic growth and lastly, the combined impact of corruption, public debt and democracy on economic growth in SAARC Region for the period of 1996 to 2020.

This research study fills the gap that exists in the literature in the selected area by addressing the ill effects of developing countries of corruption on the growth of an economy because most developing countries hold weak control over corruption. This study clears the increasing debt and debt servicing impacts on economic growth in SAARC member countries and how democratic states are playing their part in improving economic growth by handling corruption and public debt issues. Keeping in view the economic growth equation suggested by the Solow Growth model, some important economic determinants have been included in this study that is expected to have a high impact on economic growth.

This study contains five sections. Section 1 was of introduction. Section 2 contains literature review about corruption, public debt, democracy, and its impact on economic growth. Section 3 contains data and methodology used to achieve the study's objectives. Section 4 contains data analysis and results, and the final section 5 contains the discussions and study's conclusion.

LITERATURE REVIEW

Immense literature empirically has been examined in the last three decades, focusing the institutional quality, specifically corruption control, and its consequent impact on economic growth. The study that works as the base was of North (1981) which focused on characteristics of the country, for example, property rights and their impact on the nation's prosperity. Easterly & Levine (2003) and Clague et al. (1997) concluded that the quality of institutions is vastly correlated with the growth of an economy and further mentioned that institutional quality enables countries to form better macroeconomic policies that lead towards good economic effects and achieve economic sustainability. Mauro (1995) concluded that a high level of corruption results decrease in the degree of investment instead of its efficiency.

Corruption (the first determinant of governance in this study) is an international phenomenon that has a tendency to affect developed, underdeveloped and developing economies in a very harsh way. In-depth literature suggests that a high level of corruption increases uncertainty in economic policies and makes the economic environment unstable, which ultimately leads towards a fall in the volume of domestic as well as foreign investment. Baumol (1990) concluded that in corrupt countries, concerned institutes, instead of preferring investment in productive projects, suggest investment in rent-seeking projects, where they can get high kickbacks. He further concluded that corruption affects significantly and negatively economic growth. They summarized that in countries having a high level of corruption, investors and entrepreneurs avoid investing because they need to pay high bribes to regulators along with state taxes to attain necessary permissions that increase the cost of doing business for entrepreneurs. Easterly & Levine (2003) studied multiple types of corruption in detail to find out its possible positive and negative effects on the economy, especially on businesses. He concluded that by paying bribes, entrepreneurs might easily enter into markets that may promote economic growth, but in the long run, corruption will be harmful to an economy.

However, (Qureshi et al., 2020; Gossel, 2018) concluded that corruption does not sand but grease the wheels of economic growth. They summarized that bribes enable investors and entrepreneurs to avoid complex regulations of governments and rigid bureaucratic intentions, so corruption in highly regulated countries increases efficiency. Jalil et al. (2016) empirically tested and concluded that corruption improves productivity by conducting a test on plant output in Indonesia with the help of the Ordinary Least Square (OLS) technique. These outcomes match with the outcomes of Leff (1964), who concluded corruption enhances innovation and raises financial and economical activity, which increases economic growth in third-world countries. Cieřlik & Goczek (2018) conducted direct research to know the impact of corruption on economic growth by using the generalized method of moments (GMM) technique. The statistical results based on the sample of 142 countries show that corruption inversely affects real per capita GDP. He summarized that corruption causes a fall in foreign investment and international financing, whereas by tackling the issue of corruption, countries can bring improvement in investments.

Based on theoretical literature, it has been concluded that the impact of public debt on economic growth is positive up to a certain level. So it is important to find out the debt level of the target country where its respective debt impact negatively affects economic growth. The scarcity of capital for investment at the initial stage in developing countries compels the governments to borrow funds from other national and international sources up to a stage where the marginal return on capital will be above its borrowing costs. That is the stage when borrowing starts negatively affecting economic growth. Countries borrow funds to invest in development projects that generate profits and bring economic growth and enable countries to pay back debt (Pattillo, et. al., 2002). Jalil et al. (2016) concluded in their studies that debt positively affects economic growth.

However, (Hameed and Quddus, 2020) examined the relationship between debt and economic growth and concluded a negative relationship between debt and economic growth. Greene & Villanueva (1991) concluded that foreign debt repayments decrease private investments. Serieux & Samy (2001) also concluded that total investments are negatively affected by foreign debt servicing payments. To avoid vulnerability, countries are required to borrow debt because vulnerability causes a debt crisis in developing countries. In a situation of a debt crisis, when central banks also refuse to lend loans to governments compels governments to borrow external debt. Due to the low level of saving in a country, the required investments encourage the governments to go for external financing to achieve economic growth and bring sustainability into economic development. Although in developing countries, due to corruption and mismanagement by governments, the debt servicing repayments grow much higher than the return on investments, discourage other foreign lenders from lending further loans, which adversely affects economic growth (Claessens et al., 1997).

Literature showing the relationship between economic growth and democracy (the second determinant of governance in this study) is also somewhat controversial. Hameed and Quddus (2020) studies indicate a positive relationship between democracy and economic growth. Kormendi & Meguire (1985) concluded that countries providing high civil and political rights to their people increase their economic growth by 1% and vice versa. Scully (1988) examined the relationship and resulted that politically open economies grow at a compound rate of 2.5% per annum, then politically closed economies grow at 1.4% per annum. Jalles (2010) conducted a panel study based on statistical evidence and concluded that highly democratic countries positively affect their economic growth.

However, many studies show an inverse relationship between democracy and economic growth. Clague et al. (1997), based on the political right index of Gastil, concluded that keeping other variables constant impact of the democracy index on economic growth is negative and insignificant. Clague et al. (1997), also based on the Gastil index of democracy, concluded that the impact of democracy is negative and insignificant on economic growth.

Four control variables, Population Growth Rate (PGR), Total Domestic Investment (TDI), Trade Openness Indicator (OI) and Foreign Direct Investment (FDI), have been used in this study. Population growth rate (PGR) adversely affects economic growth because the increase in population reduces the proportion of the labor force, leading towards an increase in the dependency ratio (Headey & Hodge, 2009). So, in this study, population growth has been included to know the impact on economic growth. Total domestic investment contributes highly to achieving economic growth as per the neoclassical theory of growth. Neoclassical economists argue that economic growth relies on capital accumulation, while capital accumulation occurs through a country's savings and investments. The trade openness indicator (OI) is the third control variable in this study. Economists believe that openness enables countries to achieve the latest technologies that help in improving productivity. More open economies enable countries to achieve a high level of economic growth (Ertimi et al., 2016). Foreign Direct Investment (FDI) is the fourth and last control variable used in this study. FDI means direct equity investment in an economy from foreign countries' individuals and firms into an enterprise of another country. Cooray (2009) concluded that in developing countries, FDI is considered a major contributor to investment, especially in times of debt crisis. FDI plays the role of balancing between domestic savings and the required level of investment in a country and also enables the government to collect taxes and increase tax revenues for the host country. FDI also fulfills foreign exchange currency needs and helps countries to improve their technology, entrepreneurial and managerial skills and economic growth and development (Serieux & Samy, 2001). Foreign Direct Investment (FDI) is a percentage of GDP, mostly used by researchers as a proxy of technological shift and development that stimulate economic growth.

DATA AND METHODOLOGY

This study focuses on corruption, public debt and democracy and its impact on Economic growth tested empirically by focusing on a sample of six South Asian countries (Members of SAARC) which are Bangladesh, Bhutan, Nepal, India, Pakistan and Sri Lanka, for the time period 1996 to 2020. Afghanistan and Maldives are not included in the study due to the unavailability of data.

The real per capita Gross Domestic Product Growth (PCGDPG) is used as a dependent variable in this study indicating the economic growth of countries. Data on PCGDPG has been collected from the World Bank Development Indicators series.

Table 1: Variable with data sources used in the study

Study variables	Data Source
Real Per Capita GDP Growth (annual %)	World Development Indicators – World Bank
Corruption	World Governance Indicators – World Bank
Democracy	Freedom House Index – Freedom in the World Survey
Foreign Debt	World Development Indicators - World Bank
Population Growth	World Development Indicators - World Bank
Total Domestic Investment	World Development Indicators - World Bank
Trade Openness	Author's computation (Export+Import) % GDP
Export (GDP %)	World Development Indicators - World Bank
Import (GDP %)	World Development Indicators - World Bank
Foreign Direct Investment	World Development Indicators - World Bank

Corruption (cor), democracy (demo) and public debt (Debt) are independent variables in this study, along with it four additional control variables, namely; Foreign Direct Investment (FDI), Population Growth rate (PGR), Total Domestic Investment (TDI) and Trade Openness Indicator (OI) (Exports plus Imports) has been used as per literature support showing strong association with our dependent variable.

Corruption is the first independent variable of our study. Here, we have utilized the control of corruption: estimate provided by the World Governance Indicator index of the World Bank. The index ranges from -2.5 to 2.5 (-2.5 representing highly corrupt and 2.5 representing clean economy). Although 2.5 has been added to existing index scores, making index values from 0 to 5, 0 representing highly corrupt and 5 representing clean economy, to avoid the impact of negative values in our study. Democracy is the second independent variable in this study. Democracy focuses on the quality of institutions and governance within an economy. Again democracy cannot be measured directly by any country, so we rely on indexes provided by different agencies having scores on democracy. In this study, we have used the political & civil rights combine index by Freedom House. A country has a score of 5 or less than 5 indicates a free economy, a score between 6 to 10 indicates partly free, and a score of 11 or above 11 indicates no free economy. Foreign debt (external debt) data has been used as a proxy for public debt. Debt data has been obtained from the World Bank development indicators index of the World Bank database.

Population growth rate adversely affects economic growth, so, in this study, population growth has been included to know the impact on economic growth, and its data has been collected from the World Bank database. Total domestic investment has been represented by gross capital formation as a percentage of GDP obtained through World Bank development indicators. The trade openness indicator is the third control variable. Trade openness was calculated by adding Exports as a percentage of GDP plus Imports as a percentage of the GDP of an economy. However, export and import data have been derived from World Bank Development Indicators. Foreign direct investment as a percent of GDP data has been collected from World Bank Development indicators. The sources used for data collection are given in Table 1 above.

Methodology

In this study, quantitative research techniques and secondary data have been used from the World Bank databases keeping in view the nature of the topic of research. Panel GMM model cannot be used because of a few countries and many time periods. Panel GMM model performs efficiently only in a few time periods and many countries' sample sizes. Due to the small sample size, the Arellano-Bond autocorrelation test and robust standard errors will also perform very poorly, so the researchers cannot use them. Therefore, Random Effect Model, Fixed Effect Model and Pooled Ordinary Least Square (OLS) technique has been used in this study. The Pooled OLS, fixed effect model and random effect model are also selected based on decision-making criteria given by Dougherty (2011), and which have been widely used by prior researchers while conducting research on economic fields.

Fixed Effect Model / Random Effect Model

Wooldridge (2003), expressed the panel model as;

$$Y_{it} = \beta_0 + \beta_1 x_{it1} + \beta_2 x_{it2} + \dots + \beta_k x_{itk} + \mu_{it} \quad \text{Eq (1)}$$

$$Y_{it} = \beta_0 + \beta_1 x_{it1} + \beta_2 x_{it2} + \dots + \beta_k x_{itk} + a_i + v_{it} \quad \text{Eq (2)}$$

In the above equation, $X_1 \dots X_k$ stands for a set of explanatory variables, i refers to a country, t refers to a time period. μ_{it} represents the error term and is divided into two parts: a_i denotes a time-constant error, and v_{it} denotes a time-varying error. a_i indicates unobserved determinants that are invariant with time and affect Y_{it} although v_{it} indicates an idiosyncratic error part that varies with time and affects Y_{it} .

In fixed effect model estimation, the time-invariant part of error a_i is correlated with independent variables. While in the random effect model estimation, a_i is not correlated with independent variables. The estimation of Pooled OLS assumes that there is no correlation between independent variables and the error part, so using Pooled OLS in eq (2) may cause bias. Here pooled OLS estimation by driving time-demeaned constructs will resolve the issue that is the same as fixed effect estimation. The objective behind using fixed effect model estimation is to eradicate the unobserved change a_i correlated with independent variables at any time period.

If a_i time-constant error is not correlated with independent variables, eq (2) will become a random effect model estimation. The Pooled OLS technique will cause bias as it believes no serial correlation within the error term. So to eradicate the serial correlation, we use the generalized least square (GLS) Method of Random Effect Model Estimation. It is important to apply both the fixed effect model and random effect model on data to find out appropriate model. Durbin Watson Hausman's test has suggested an appropriate model out of the fixed effect model and random effect model. Hausman's test suggested a random effect model; therefore Breusch and Pagan Lagrangian Multiplier (LM) test has also been used to verify the validity of the random effect model.

In the economic growth eq (3), we have used the fixed and random effect models to determine the impact of corruption, public debt and democracy along with control variables population growth, total domestic investment, openness indicator and foreign direct investment on economic growth.

$$PCGDPG_{it} = \beta_{0i} + \beta_1 Cor_{it} + \beta_2 Debt_{it} + \beta_3 Demo_{it} + \beta_4 PGR_{it} + \beta_5 TDI_{it} + \beta_6 OI_{it} + \beta_7 FDI_{it} + \varepsilon_{it} \quad \text{Eq (3)}$$

RESULTS AND DATA ANALYSIS

Descriptive Statistics

Table 2 shows the summarized descriptive statistics table of variables under study. The total observations for all variables under study are 150. The average value for Per Capita GDP Growth (PCGDPG) is 3.69% of SAARC countries from 1996 to 2020. The standard deviation for PCGDPG is 2.98% which denotes variation into average value. The minimum value of PCGDPG is -8.87%, and the maximum value is 17.03%. Likewise, the mean average, standard deviation, maximum and minimum values of all other study variables are given in Table 2.

Table 2: Summarized Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
PCGDPG	150	3.6872	2.980951	-8.87	17.03
Cor	150	2.1426	0.7293248	1	4.15
Demo	150	8.006667	2.106228	5	14
Debt	150	41.53993	24.85861	14.88	130.74
FDI	150	1.006	0.897286	-0.68	6.32
PGR	150	1.431133	0.638764	-0.27	2.87
TDI	150	28.6092	12.39121	12.52	69.67
OI	150	51.9522	24.04277	21.93	116.55

Correlation Analysis

Correlation analysis shows the direction and relationship strength among variables. In Table 3 below, we can view the correlation table, which shows the relationship among variables. In this study, debt, total domestic investment and trade openness are highly correlated with corruption because the results are above "0.7". Descriptive results also indicate that trade openness is highly correlated with debt and total domestic investments. But based on these results, we will not eliminate any of the correlated variables from this study because, in economic phenomena, the correlations among variables always exist. So we need to conduct a variance inflation factor (VIF) test to find out multicollinearity among variables, and based on VIF test results, we will decide to eliminate any of the variables from this study.

Table 3: Correlation Analysis

	PCGDPG	Cor	Demo	Debt	FDI	PGR	TDI	OI
PCGDPG	1							
Cor	0.1716	1						
Demo	0.0009	0.1727	1					
Debt	-0.0781	0.7284	0.2216	1				
FDI	0.3134	0.0603	-0.0931	-0.052	1			
PGR	-0.2604	-0.1954	0.3014	-0.0496	-0.1142	1		
TDI	0.3175	0.8029	0.0858	0.5382	0.084	-0.1821	1	
OI	0.2787	0.8082	0.1724	0.7315	0.1884	-0.3179	0.7362	1

Multicollinearity test

The multicollinearity test helps us to find out those variables that are strongly correlated with each other. Table 4 shows the VIF test results, and if any of the values of the variable is less than 10, then we eliminated that variable from this study due to the multicollinearity issue. So Table 4 shows that all variables' values are less than 10 (even less than 5), so we may conclude that no issue of multicollinearity exists in our study.

Table 4: VIF Test Multicollinearity Analysis

Variable	VIF	1/VIF
OI	4.81	0.207808
Cor	4.75	0.210389
TDI	3.25	0.307665
Debt	2.96	0.337421
PGR	1.42	0.704179
Demo	1.24	0.803846
FDI	1.15	0.866725
Mean VIF	2.8	

Regression Analysis

Table 5 indicates the results of the regression of our specified model given in eq (3) under fixed effect model estimation and Generalized least square – GLS random effect estimation, respectively. The results cover a time period of 25 years, starting from 1996 to 2020, of selected 6 SAARC countries, namely Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka. The results of the fixed effect model and random effect model given in Table 5 are summarized; however appropriate model in this study will be decided after performing Hausman Test.

Table 5: Fixed effect and Random Effect Regression Results

Variable	Fixed Effects	Random Effects
Corr	-1.372 (0.138)	-0.452 (0.462)
Demo	0.146 (0.439)	0.125 (0.249)
Debt	-0.054*** (0.005)	-0.055*** (0.000)
FDI	0.777** (.010)	0.640*** (0.009)
PGR	-0.321 (0.540)	-0.621 (0.106)*
TDI	0.023 (0.565)	0.082*** (0.006)
OI	0.026 (0.282)	0.044** (0.018)
Constant	5.354 (0.123)	1.522 (0.160)
Observations	150	150
No of Countries	6	6
R-Squared:		
Within	0.242	0.218
Between	0.113	0.966
Overall	0.076	0.320
F-test	0.000	0.000

*** Depicts significance at 1%

** significant at 5% and

* significant at 10%.

Values in parenthesis indicate the p-values of the t-statistics.

Hausman Test

Hausman test helps us to decide whether fixed effect estimation technique or random effect estimation test should be used based on our data. The null hypothesis in the Hausman test is that no correlation exists between the variable and the error term. Hausman test helps us to decide whether fixed effect estimation technique or random effect estimation test should be used based on our data. The null hypothesis in the Hausman test is that no correlation exists between the variable and the error term. Although a decision may be made based on the chi-square value and p-value, if the p-value is above 0.05, it indicates that the random effect model is suitable and the null hypothesis cannot be rejected for study. However, if the p-value is below 0.05, we conclude that the fixed effect model is suitable and will reject the null hypothesis for the study.

Hausman fixed random

After performing the Hausman test given in Table 6 below, the p-value is 0.4143, which is significantly above 0.05. Therefore, Random Effect Model is suitable, and the null hypothesis cannot be rejected for this study. Further, Breusch and Pagan Langrangian Multiplier test has been applied to decide either random effects in our study significantly exist or pooled ordinary least square (OLS) estimation technique may be used in the absence of random effect.

Table 6: Results of the Hausman Test

	Coefficients		(b=B)	Sqrt (diag(V _b =V _B))
	(b)	(B)		
	Fixed	Random	Difference	SE
Cor	-1.372726	-.4528708	-.919855	.6819146
Demo	.1468698	.1257273	.021142	.1544094
Debt	-.0547086	-.0552397	.000531	.0130609
FDI	.7775945	.6402624	.137332	.1689538
PGR	-.321193	-.6210922	.2998992	.3534856
TDI	.0239692	.0820703	-.0581011	.0287068
OI	.026212	.044655	-.018443	.0153253

b = consistent under H₀ and H_a; obtained from xtreg, B = inconsistent under H_a, efficient under H₀; obtained from xtregTest: H₀: difference in coefficients not systematicChi2(7) = (b-B)' [(v_b=V_B) ^ (-1)] (b-B) = 7.14Prob>chi2 = 0.4143 (v_b - V_B is not positive definite)

After performing the Hausman test given in Table 6 above, the p-value is 0.4143, which is significantly above 0.05. Therefore, Random Effect Model is suitable, and the null hypothesis cannot be rejected for this study. Further, Breusch and Pagan Langrangian Multiplier test has been applied to decide either random effects in our study significantly exist or pooled ordinary least square (OLS) estimation technique may be used in the absence of random effect.

Breusch and Pagan Langrangian Multiplier (LM) test – Random Effect Testing

With the help of the Breusch and Pagan LM test, we may decide between random effects estimation and a simple pooled OLS estimation. The null hypothesis of the LM test is "variances across cross-sectional units is zero, which means no significant cross-sectional differences exist. In other words, no panel effects are available in data." If the p-value is above 0.05, it indicates that the null hypothesis cannot be rejected means no panel effects exist in our study, so a simple pooled OLS model may be used. However, if the p-value is below 0.05, we reject the null hypothesis and conclude that panel effects exist, so we should use random effect model instead of Pooled OLS model. After performing the LM test given in Table 7, the p-value is 1.000, which is significantly above 0.05. So, panel effects exist, and the null hypothesis cannot be rejected in our data. Therefore, we cannot use Random Effect Model and will use the simple pooled OLS estimation technique.

Table 7: Breusch and Pagan LM Test results

	Var	Sd = sqrt (Var)
PCGDPG	8.886067	2.980951
E	6.246935	2.499387
U	0	0
Test: Var (u) =	0	
	Chibar2 (01)	= 0.00
	Prob > chibar2	= 1.0000

Pooled OLS Regression

After performing Breusch and Pagan LM test, we concluded that Pooled OLS model should be used in this study due to the unavailability of Random Effects in our data, so Pooled OLS regression results are given in Table 8 below:

Table 8: Pooled OLS Regression Results

Source	SS	Df	MS	Number of Obs	=	150
Model	424.741296	7	60.677328	F (7, 142)	=	9.58
Residual	899.28277	142	6.33297716	Prob > F	=	0.0000
Total	1324.02405	149	8.88606747	R – squared	=	0.3208
				Adj R – squared	=	0.2873
				Root MSE	=	2.5165

PCGDPG	Coef	std.err	T	P> t	[95 percent conf. interval]	
Cor	-.4528708	.6162801	-0.73	0.464	-1.67114	.7653985
Demo	.1257273	.109174	1.15	0.251	-.090089	.3415436
Debt	-.0552397	.0142774	-3.87	0.000	-.0834633	-.027016
FDI	.6402624	.2467967	2.59	0.010	.1523919	1.128133
PGR	-.6210922	.3846173	-1.61	0.109	-1.381408	.1392236
TDI	.0820703	.0299956	2.74	0.007	.0227746	.141366
OI	.044655	.0188103	2.37	0.019	.0074707	.0818394
_cons	1.52238	1.084516	1.40	0.163	-.6214989	3.666269

Running simple regression given in Table 8 indicates that we ignore the model having panel structure, and we assume that error is not correlated with cross-sectional effect.

DISCUSSIONS

Pooled OLS model concludes that the impact of corruption on economic growth is negative and insignificant, and the results are consistent with a study by (Erum and Hussain, 2019). The result answers the first research question of our study "Does corruption negatively affect economic growth in the SAARC region?" Most of the literature indicates that debt negatively affects economic growth, so regression results conclude that the impact of debt is negative and significant on economic growth, and results are consistent with a study by (Hameed and Quddus, 2020) and (Fraj et al., 2018). The results answer the second question of our study "does debt negatively affect economic growth in the SAARC region?" The third research question in this study was, "does democracy positively affect economic growth in the SAARC region?" Pooled OLS result concludes that democracy impact is positive and insignificant on economic growth, and the results are consistent with a study by (Erum and Hussain, 2019). Regression results conclude that the combined impact of all three independent variables is significant on economic growth. The R-square in this study which shows the overall fitness of the model is 64.57%, reflects combined impact and variation into independent variables due to variation in all explanatory variables of this study. Here p-value is 0.000, which shows the significance and fitness of the model and based on the results, we may conclude that our model is a good fit for this study.

CONCLUSION

The basic objective behind this study was to find out the impact of corruption, public debt and democracy on economic growth in SAARC countries for 25 years' time period from 1996 to 2020. Based on the literature review, four additional control variables have been included in this study model, namely, total domestic investment (TDI),

foreign direct investment (FDI), population growth rate (PGR) and trade openness indicator (OI). Data has been analyzed through Random Effect Model, Fixed Effect Model, and Pooled OLS models in this study. Based on the results, corruption impacts negatively and insignificantly on economic growth. In third-world countries, investment is only based on low checks and balances by concerned institutions, although the results indicate a negative impact, so countries' should tighten their control over corruption so economic growth may be improved. Debt is significantly and negatively affecting economic growth. Underdeveloped Countries borrow debt with the intention of developing their economies, although due to corruption and inefficient democratic system that debt impact adversely. So results suggest that countries should take debt as a serious factor affecting economies adversely. The impact of democracy on economic growth is positive and insignificant on economic growth, so these underdeveloped countries should prosper democratic systems; provide more civil and political rights to their people so this way economic growth may be improved.

REFERENCES

- Al Mamun, M., Sohag, K., & Hassan, M. K. (2017). Governance, resources and growth. *Economic Modelling*, 63, 238-261.
- Baumol, W. J. (1990). Entrepreneurship: Productive, Unproductive, and Destructive. University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship, Available at SSRN: <https://ssrn.com/abstract=1503897>
- Bekhet, H. A., & Latif, N. W. A. (2018). The impact of technological innovation and Governance institution quality on Malaysia's sustainable growth: Evidence from a dynamic relationship. *Technology in Society*, 54, 27-40
- Bruno, M., & Pleskovic, B. (Eds.). (1997). Annual World Bank Conference on Development Economics 1996. The World Bank.
- Cieřlik, A., & Goczek, Ł. (2018). Control of corruption, international investment, and economic growth—Evidence from panel data. *World Development*, 103, 323-335.
- Claessens, S., Detragiache, E., Kanbur, R., & Wickham, P. (1997). Analytical aspects of the debt problems of heavily indebted poor countries. *External Finance for Low-Income Countries*, 4, 21-48.
- Clague, C., Keefer, P., Knack, S., & Olson, M. (1997). Institutions and economic performance: property rights and contract enforcement. *Institutions and Economic Development: Growth and Governance in Less-Developed and Post-Socialist Countries*, 67-90
- Cooray, A. (2009). Government expenditure, governance and economic growth. *Comparative economic studies*, 51(3), 401-418
- d'Agostino, G., Dunne, J. P., & Pieroni, L. (2012). Corruption, military spending and growth. *Defense and Peace Economics*, 23(6), 591-604
- Dougherty C (2011). Introduction to Econometrics. 4th edition, *Oxford University Press*
- Du, J., Li, W., Lin, B., & Wang, Y. (2018). Government integrity and corporate investment efficiency. *China Journal of Accounting Research*, 11(3), 213-232
- Easterly, W., and Levine R. (2003). Tropics, Germs, and Crops: How Endowments Influence Economic Development, *Journal of Monetary Economics*, 50(1), 3-39.
- Ertimi, B. E., Dowa, A., Albisht, E. M., & Oqab, B. A. (2016). The impact of corruption on economic growth in OIC countries. *International Journal of Economics and Finance*, 8(9), 91-103.
- Erum, N., & Hussain, S. (2019). Corruption, natural resources and economic growth: Evidence from OIC countries. *Resources Policy*, 63, 101429.
- Fayissa, B., & Nsiah, C. (2013). The impact of governance on economic growth in Africa. *The journal of developing areas*, 91-108
- Fraj, S. H., Hamdaoui, M., & Maktouf, S. (2018). Governance and economic growth: The role of the exchange rate regime. *International economics*, 156, 326-364
- Gossel, S. J. (2018). FDI, democracy and corruption in sub-saharan Africa. *Journal of Policy Modeling*, 40(4), 647-662.
- Greene, J., & Villanueva, D. (1991). Private investment in developing countries: an empirical analysis. *Staff papers*, 38(1), 33-58.
- Gründler, K., & Potrafke, N. (2019). Corruption and economic growth: New empirical evidence. *European journal of political economy*, 60, 101810
- Hall, R. E., & Jones, C. I. (1999). Why do some countries produce so much more output per worker than others?. *The quarterly journal of economics*, 114(1), 83-116
- Hameed, M. R., & Quddus, M. A. (2020). Impact of High and Growing Public Debt on Economic Growth in SAARC Countries: An Econometric Analysis. *Journal of Political Studies*, 27(1).
- Headey, D. and Hodge, A., (2009). The Effect of Population Growth on Economic Growth: A Meta-Regression Analysis of the Macroeconomic Literature. *Population and Development Review*, 35 (2), 221-248
- Henderson, J. V., Storeygard, A., & Weil, D. N. (2012). Measuring economic growth from outer space. *American economic review*, 102(2), 994-1028

- Howes, M., Wortley, L., Potts, R., Dedekorkut-Howes, A., Serrao-Neumann, S., Davidson, J., ... & Nunn, P. (2017). Environmental sustainability: a case of policy implementation failure?. *Sustainability*, 9(2), 165.
- Huang, C.-J., & Ho, Y.-H. (2017). Governance and economic growth in Asia. *The North American Journal of Economics and Finance*, 39, 260-272
- Jalil, A., Qureshi, A., & Feridun, M. (2016). Is corruption good or bad for FDI? Empirical evidence from Asia, Africa and Latin America. *Panoeconomicus*, 63(3), 259-271
- Jalilian, H., Kirkpatrick, C., & Parker, D. (2007). The impact of regulation on economic growth in developing countries: A cross-country analysis. *World development*, 35(1), 87-103.
- Jalles, J.T. (2010). Does Democracy Foster or Hinder Growth? Extreme-Type Political Regimes in a Large Panel. *Economics Bulletin*, 30(2), 1359-1372.
- Kormendi, R., and P. Meguire (1985). Macroeconomic Determinants of Growth. *Journal of Monetary Economics*, 16, 141-163.
- Leff, N.H. (1964), *Economic development through bureaucratic corruption*. *American Behavioral Scientist*, Vol.8 No.3, pp.8-14, available at: <https://doi.org/10.1177/000276426400800303>
- Mauro, P. (1995). Corruption and growth. *The quarterly journal of economics*, 110(3), 681-712.
- McKibbin, W. J., Lee, J. W., Liu, W., & Song, C. J. (2018). Modeling the economic impacts of Korean unification. *Asian Economic Journal*, 32(3), 227-256
- Méndez-Picazo, M. T., Galindo-Martín, M.-Á., & Ribeiro-Soriano, D. (2012). Governance, entrepreneurship and economic growth. *Entrepreneurship & Regional Development*, 24(9-10), 865-877
- Mira, R., & Hammadache, A. (2017). Good governance and economic growth: A contribution to the institutional debate about state failure in Middle East and North Africa. *Asian Journal of Middle Eastern and Islamic Studies*, 11(3), 107-120
- Montes, G. C., Bastos, J. C. A., & de Oliveira, A. J. (2019). Fiscal transparency, government effectiveness and government spending efficiency: Some international evidence based on panel data approach. *Economic Modelling*, 79, 211-225
- North, D. (1981). *Structure and Change in Economic History*, Norton: New York. Institutions, Institutional Change and Economic Performance, Cambridge University Press, Cambridge.
- Pacific, Y. K. T., Ramadhan, A. A., & Gabriella, N. M. A. (2017). Does Control of Corruption, Accelerate Economic Growth in Botswana. *Global Journal of Human-Social Science Research*, 17(6), 41-50.
- Pattillo, C. A., Poirson, H., & Ricci, L. A. (2002). External debt and growth. Available at SSRN 879569. (<https://www.elibrary.imf.org/view/journals/001/2002/069/article-A001-en.xml>)
- Qureshi, F., Qureshi, S., Vo, X. V., & Junejo, I. (2021). Revisiting the nexus among foreign direct investment, corruption and growth in developing and developed markets. *Borsa Istanbul Review*, 21(1), 80-91.
- Richards, D., Nwanna, G., & Nwankwo, S. (2003). Debt burden and corruption impacts: African market dynamism. *Management Decision*, 41(3), 304-310
- Saunders, M., Lewis, P., & Thornhill, A. (2003). *Research methods for business students*. Essex: Prentice Hall: Financial Times.
- Scully, G. (1988). The Institutional Framework and Economic Development. *Journal of Political Economy*, 96(3), 652-662.
- Serieux, J., & Samy, Y. (2001, August). The debt service burden and growth: Evidence from low income countries. In *WIDER Conference on Debt Relief* (pp. 17-18).
- Summers, L. (2013). Why stagnation might prove to be the new normal. *Financial Times*, 15, 12
- Thach, N. N., Duong, M. B., & Oanh, T. T. K. (2017). Effects of corruption on economic growth-empirical study of Asia countries. *Imperial Journal of Interdisciplinary Research*, 7, 791-804.
- Wooldridge, J. (2002). *Econometric analysis of cross section and panel data*. Cambridge: MIT Press

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