The Causality between Corruption and Economic Growth in MENA Countries: A Dynamic Panel-data Analysis

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Abstract: Complex and extensively researched, the impact of corruption on economic growth that seems to be intricate. Many experts believe that corruption reduces economic development. However, counterarguments have suggested that corruption either promotes growth and development or has no significant impact on economic performance. Clearly, there is no consensus in the economics literature regarding the possible relationship between corruption and economic development. Corruption's complex and clandestine nature, which makes it difficult to define and measure, is one of the obstacles that must be overcome when investigating its effect on an economy. In an attempt to contribute to the ongoing debate, this study examines the impact of corruption on economic growth in the Middle East and North Africa (MENA) region between 2000 and 2021 using a Customized Corruption Index-CCI and panel data on MENA countries. These countries were selected because they are understudied in the economic literature, and despite the World Bank's recent emphasis on corruption in the developing world, the MENA countries have received little attention. Researcher used Cobb-Douglas functional form to test corruption in MENA using a customized index CCI to track corruption over almost 20 years, then used the dynamic panel data. The findings indicate that there is a positive correlation between corruption and economic growth, but this is not consistent across all MENA nations. First, the relatively recent lack of data from MENA nations. This issue is related to the inaccessibility of data for many MENA countries, particularly regarding the returns on resources, private malfeasance, and other variables in Gulf countries. In addition, researcher encountered several restrictions, such as electricity and internet outages, due to the fact that he is from Lebanon, a country whose citizens have endured difficult living conditions since the Lebanese crisis began in 2019. Demonstrating a customized index that suits the characteristics of MENA countries to peculiarly measure corruption in this region, the outcome of the Customized Corruption Index-CCI is then compared to CPI and CC-from WGI.

Keywords: Impact of corruption, Economic Growth, Corruption measurements, Empirical Review, MENA.

1. INTRODUCTION

Corruption is an extensively researched topic with a heavy focus on its impact on economic growth for which Mauro (1995) was the pioneer. Since the 1950s, various economists, sociologists, and political scientists have researched and written papers on corruption. A good number of these studies have not only raised awareness but built significant knowledge on its socio-political governance and economic implications and the subsequent dramatic increase (Méon and Sekkat, 2005). As knowledge of the dynamics of corruption and its manifestation increases, there is a revelation of its prevalence across the globe, the trends, nature, and similarities. In this regard, available knowledge confirms corruption as a systemic, temporal, and sometimes cultural phenomenon wherever it takes place. Furthermore, the presence of corruption in Europe, the United States of America, and Asian and African countries indicates that the vice is so widespread. For the preceding reason, corruption is hardly limited to a specific geographic setting, time series, or specific government form. Wherever it takes place, corruption has had a debilitating effect on the socio-economic and political spheres of human existence.

The battle against corruption and corrupted systems is as old as human civilization, yet it is far from being won. Specifically, the vice is cultivated by an innate human selfish nature that prioritizes self, a factor that sustains it despite exhortation, resources, and time dedicated to fighting against it. A combination of individual greed morphs to become corrupt systems that are represented in the top echelons of power where decisions are made and executed like the state. Notably, there is a remnant that desires and lives honestly, but at the risk of being for failure to conform. It is like a hurricane that consumes everything in its path from Europe, Asia, as well as the Middle East and North Africa (MENA). Despite

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the gloomy picture, corrupt systems can be changed if there is sufficient individual and political will to confront them. Unfortunately, there has been very limited that in the MENA region leading to significant economic counter-effects. For this reason, this study investigates the economic effects of corruption in the MENA region between 2000 and 2021.

Given the complex nature of corruption, this study employs a "Dynamic Panel-data Analysis" using varied tests from the 1990s until 2021. The study aims to investigate the impact of corruption on economic growth in the MENA region and testify whether there is a negative, positive, or no impact of corruption on economic growth.

2. LITERATURE REVIEW

In the past few years, MENA countries have witnessed great political unrest that was a protest against corrupt governments, among other ills. Moreover, the protests, which aroused in the wake of the 2011 Arab Spring, resulted in the decay of many dictatorships such as in Tunisia, Sudan, and other MENA countries. As a result, many countries are striving to foster democracy and social inclusion, while struggling to fight systemic corruption, which was one of the reasons that ignited protests.

To forestall protests, some governments in MENA, such as Jordan and Morocco, responded to demands and implemented some reforms. Such actions succeeded in promoting change and fighting corruption which hindered the entirety of the revolution; noting that these two countries did not face any outright revolutions. Nowadays, the MENA region is still perceived as politically unstable with great-unfulfilled calls for fighting corruption and other main sources of popular dissatisfaction. Along with political instability, economic failure in many of the region's countries has either initiated or aggravated political conflict. In Lebanon, for instance, economic collapse triggered the protests.

Many MENA countries are marked by poor governance, high unemployment rates (especially among youth), and low economic growth, with the remarkable exclusion of most Gulf countries. According to Fakir and Yerkes (2018), the region's future is also very gloomy. Given these constant political and economic issues, it is hardly surprising to witness an increase in corruption levels and low confidence in governments. It is saddening that fewer citizens believe that they can carry out change on their own. These are only a few of the solemn results of the year 2019 illustrated by the "Global Corruption Barometer" (GCB), which investigates citizens' encounters and experiences, and viewpoints of corruption in six countries in Mena: Tunisia, Morocco, Lebanon, Palestine, Jordan, and Sudan. However as demonstrated, the comprehensive image is rather gloomy, the situation varies extremely from one country to another.

2.1. Theoretical Background on the Relation between Corruption and Economic Growth

According to Sharma and Mitra (2019), corruption affects economic performance beyond morality. The literature suggests that corruption's economic effects determine morality. Poor governance and confusing regulations are regarded to promote corruption. Corruption "greases the wheels" and boosts economic performance in such a setting. Corruption may be advantageous in some instances, but also increases production costs, validating the "sand the wheels" idea.

According to Bardhan (1997), corruption may benefit society despite its negative repercussions. When private agents compete for government contracts, corrupt bureaucrats award them to the highest bribe payer. Allocation efficiency may not be harmed if contract objectives and quality are not jeopardized. Bribery only reduces the producer surplus. Beck and Maher (1986) and Lien (1986) show that when information is limited, bribery can simulate the efficiency of competitive bidding. Inefficiency might occur if the official is swayed by factors other than the amount of the bribe.

Bribery has been shown to increase production (Huntington, 1968; Leff, 1964; Leys, 1965). In some cases, "grease the wheels" has been proven to work. Slow governance promotes slowness because government employees have little motivation to work quicker. Because bribing necessitates talent, corruption may aid bureaucracy in making sound judgments. Bjorvatn and Naghavi (2011) revealed that corruption only boosts economic efficiency when the real government size is larger than the optimal level, suggesting that corruption, despite moral condemnation, can support growth and efficiency. Bribes, according to the "sand the wheels" theory, do not improve efficiency or address institutional flaws. Efficiency, investment, and growth are all negatively affected (Myrdal, 1968; Rose-Ackerman, 1997). Bribes are thus unlikely to secure a license for the most efficient producer. The top briber may simply be the one who is prepared to compromise on the quality of his goods in exchange for a license (Méon & Sekkat, 2005; Rose-Ackerman, 1997). Finally, it does not appear that bribery stimulates private investment.

Corruption reduces public investment and shifts public spending from efficient to inefficient regions (Tanzi & Davoodi, 1997) (Mauro, 1995). Ugur and Dasgupta (2011) discovered that corruption had a direct if little, impact on per capita GDP growth in low-income nations. However, public finance and human capital channels offer greater indirect benefits. Corruption, according to Ajie and Wokekoro (2012), harms economic performance. Méon and Weill (2010) studied whether corruption can aid the functioning of weak institutions. In countries with weak institutions, corruption has less of an impact on efficiency. According to studies, corruption may also help countries with bad administration. Zhou and Peng (2012) discovered inconclusive results as well.

The cross-country panels of D'Agostino, Dunne, and Pieroni (2016a, 2016b), Sharma and Mitra (2015), and Huang (2016) showed mixed results, showing that heavy regulation and convoluted business rules constrain enterprises' strategic options while empowering bureaucracy. Except for South Korea, Huang and Ho (2017) discovered no link between governance and economic growth in Asian countries. Some research has concluded that the resource curse idea only applies to nations with inefficient institutions and extensive corruption (Bhattacharyya and Hodler, 2010; Collier and Hoeffler, 2009; Mehlum, Moene, and Torvik, 2006; von Haldenwang and Ivanyna, 2018).

3. METHODOLOGY

Several variables are used to assess and quantify the amount of corruption in MENA area countries in this study. Following that, the researcher discusses the influence of corruption on economic growth and evaluates the relationship between corruption and economic growth. The current study employs the Cobb-Douglas functional form to test and estimate the corruption effect, as well as the approach used by "Transparency International's Corruption Perception Index-CPI" and "Worldwide Governance Indicators-WGI-," in addition to the index that was customized by the researcher to test corruption in MENA region countries, known as the "Customized Corruption Index-CCI."

The current study examined the 20-year trajectory of corruption levels in the MENA area and compared it to the level of economic growth in these countries. This will be accomplished by measuring corruption using three models and comparing the results to the influence on economic growth. The MENA region included as a sample for this study includes around 19 nations. The MENA region typically includes "Algeria, Bahrain, Djibouti, Egypt, Iran, Iraq, Palestine, Jordan, Kuwait, Lebanon, Libya, Malta, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates UAE, and Yemen"; Sudan and Ethiopia are occasionally included. The MENA area contains over 6% of the world's population; among these countries are those wealthy in natural reserves of both oil and gas. As a result, the MENA area countries play an important role in global economic stability. Countries that do not have enough data due to issues such as political instability, such as Syria, will be removed from the analysis.

The researcher focuses on developing and investigating the relationship between corruption and its impact on economic growth in the study; the researcher elucidates the variables that are most likely responsible for no, positive, or negative impact on economic growth. As a result, this goal necessitates empirical testing for these aspects by regression analysis. These factors that influence the effect of corruption on economic growth could be turned into an econometric model; this economic model provides economic, structural, and social data about each country, such as corruption levels, and so on. As a result, these characteristics would later be classified as predictors of economic growth in MENA region countries. Thus, the research will conduct a multiple regression analysis in which numerous factors that influence the countries' level of corruption will be regarded as independent variables and the level of economic growth will be considered as the dependent variable.

3.1. Research Model and Specifications

The main challenge lies in measuring the disputed concept of corruption. Therefore, the researcher will develop a customized procedure model previously mentioned and specified in Chapter 3, which is the CCI, to ensure that corruption's effect on economic growth is measured properly. Since CPI only measures corruption's perception, which is not the synonym of measuring corruption itself, indicating that CPI tends to simplify the method of measuring a complex phenomenon such as corruption. Besides, CC from WGI does not reflect the real rate of corruption that they are controlling. Therefore, this sub-section is dedicated to stating the dependent, independent, and control variables of this research that will develop a model using proxy variables for measuring corruption. This subsection will state the variables that will assist in increasing the sturdiness of the research model. Therefore, this model mainly depends on the classic equation of multiple regression that is presented as follows:

$$Y = \alpha + \beta 1\ X1 + \beta 2\ X2 + \beta 3\ X3 + \ldots\ \beta nXn + \mu \qquad (1)$$

Where Y is the dependent variable, α is the intercept or constant, $\beta 1...n$ is the co-efficient, $X1...n$ is the independent variable and μ is the error term.

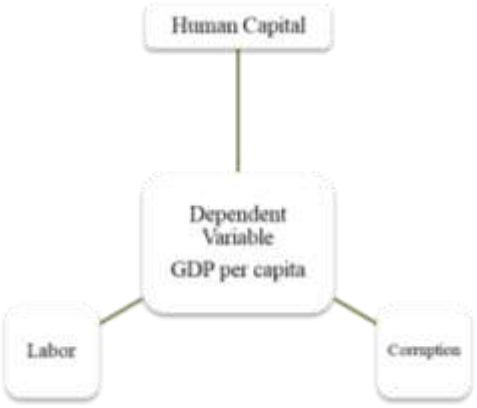

Fig. (1). Solow Growth Model.

Source: Researcher Illustration

Thus for this study researcher designed 3 model specifications as presented below:

Model One: $lgdp_t = \alpha + \beta_1 ll_t + \beta_2 lk_t + \beta_3 lcci_t + \varepsilon_t$ (2)

Model Two: $lgdp_t = \alpha + \beta_1 ll_t + \beta_2 lk_t + \beta_3 lcpi_t + \varepsilon_t$ (3)

Model Three: $lgdp_t = \alpha + \beta_1 ll_t + \beta_2 lk_t + \beta_3 lccwgi_t + \varepsilon_t$ (4)

4. RESEARCH RESULTS AND DISCUSSION

4.1. Unit Root Tests

In this study, the Auto-Regressive Distributed Lag (ARDL) Bounds Test is applied. The limits testing methodology has various econometric advantages over other co-integration processes. Despite different integration orders, Pesaran (1997) claims that the ARDL technique provides precise estimates of long-run parameters and valid t-statistics. The extent to which the underlying regressors are I(0), I(1), or mutually integrated (see Table **1**). The unit root test was employed initially to evaluate whether the data was stationary or not. The null hypothesis states that no unit root exists, whereas the alternative hypothesis states that the data is stationary. The ARDL test was run as a result of a unit root cause problem. The Panel Unit root test is used to determine the unit root for each series in a panel by combining the Levin, Lin, and Chu (LLC), Im, Pesaran, and Shin (IPS), Dickey-Fuller (ADF), and Phillips Perron (PP) tests. As a result, the unit root test is employed to analyze the variables' stationarity. Stationarity can be explored using many tests such

Table 1. Panel Unit Root Test.

Variables	Level & first difference	Intercept/trend	LLC	IPS	ADF	PP	Decision
LNGDP	Level	Intercept	1	0.0117*	0.0278*	0.0616	I(1)
		Intercept &trend	0.9033	1	0.9999	1	
	First difference	Intercept	0.0039**	0.0004***	0.0007***	0.0000****	
		Intercept &trend	0.0000****	0.6144	0.0000****	0.0000****	
	Second difference	Intercept	0.0000****	0.0000****	0.0000****	0.0000****	
		Intercept &trend	0.0000****	0.0000****	0.0000****	0.0000****	
LNL	Level	Intercept	0.0643	0.9959	0.9324	0.0063**	I(1)
		Intercept &trend	0.8481	0.5096	0.2004	0.0000****	
	First difference	Intercept	0.0000****	0.0000****	0.0000****	0.0000****	
		Intercept &trend	0.0000****	0.0000****	0.0000****	0.0000****	
	Second difference	Intercept	0.0000****	0.0000****	0.0000****	0.0000****	
		Intercept &trend	0.0000****	0.0000****	0.0000****	0.0000****	
LNK	Level	Intercept	0.0000****	0.0009***	0.0011**	0.0018**	I(0)
		Intercept &trend	0.8718	0.9997	0.8682	0 .9612	
	First difference	Intercept	0.0000****	0.0000****	0.0000****	0.0000****	
		Intercept &trend	0.0000****	0.0000****	0.0000****	0.0000****	
	Second difference	Intercept	0.0000****	0.0000****	0.0000****	0.0000****	
		Intercept &trend	0.0000****	0.0000****	0.0000****	0.0000****	
LNCCI	Level	Intercept	0.0035**	0.0371*	0.0675	0.0005***	I(0)
		Intercept &trend	0.2697	0.5006	0.3572	0.0000****	
	First difference	Intercept	0.0000****	0.0000****	0.0000****	0.0000****	
		Intercept &trend	0.0000****	0.0000****	0.0000****	0.0000****	
	Second difference	Intercept	0.0000****	0.0000****	0.0000****	0.0000****	
		Intercept & trend	0.0000****	0.0000****	0.0000****	0.0000****	

Source: Researcher illustration, EViews 12.

as Augmented dickey-fuller (ADF, 1984), Philips Perron (PP, 1988), Im *et al* (2000), Shin and Snell (2002), and others to determine whether or not a unit root problem exists.

Model One Specifications

$$lgdp_t = \alpha + \beta_1 ll_t + \beta_2 lk_t + \beta_3 lcci_t + \varepsilon_t (2)$$

H_0: Ø=1, All the panels contain unit roots

H_1: Ø#1, At least one panel is stationary

According to the table above, the result of the panel unit root test indicates that the result is a mixture of I (0) and I (1) this means the necessity of using the panel ARDL model.

Model Two Specifications

$$lgdp_t = \alpha + \beta_1 ll_t + \beta_2 lk_t + \beta_3 lcpi_t + \varepsilon_t (3)$$

H_0: Ø=1, All the panels contain unit roots

H_1: Ø#1, At least one panel is stationary

Table 2. Panel Unit Root Test.

Variables	Level & First Difference	Intercept/trend	LLC	IPS	ADF	PP	Decision
LNGDP	Level	Intercept	1	0.0117*	0.0278*	0.0616	I(1)
		Intercept &trend	0.9033	1	0.9999	1	
	First difference	Intercept	0.0039**	0.0004***	0.0007***	0.0000****	
		Intercept &trend	0.0000****	0.6144	0.0000****	0.0000****	
	Second difference	Intercept	0.0000****	0.0000****	0.0000****	0.0000****	
		Intercept &trend	0.0000****	0.0000****	0.0000****	0.0000****	
LNL	Level	Intercept	0.0643	0.9959	0.9324	0.0063**	I(1)
		Intercept &trend	0.8481	0.5096	0.2004	0.0000****	

	First difference	Intercept	0.0000****	0.0000****	0.0000****	0.0000****	
		Intercept &trend	0.0000****	0.0000****	0.0000****	0.0000****	
	Second difference	Intercept	0.0000****	0.0000****	0.0000****	0.0000****	
		Intercept &trend	0.0000****	0.0000****	0.0000****	0.0000****	
LNK	Level	Intercept	0.0000****	0.0009***	0.0011**	0.0018**	I(0)
		Intercept &trend	0.8718	0.9997	0.8682	0.9612	
	First difference	Intercept	0.0000****	0.0000****	0.0000****	0.0000****	
		Intercept &trend	0.0000****	0.0000****	0.0000****	0.0000****	
	Second difference	Intercept	0.0000****	0.0000****	0.0000****	0.0000****	
		Intercept &trend	0.0000****	0.0000****	0.0000****	0.0000****	
LNCPI	Level	Intercept	0.0675	0.2771	0.3781	0.0545	I(1)
		Intercept &trend	0.1718	0.1848	0.2556	0.0001***	
	First difference	Intercept	0.0000***	0.0000***	0.0000***	0.0000***	
		Intercept &trend	0.0000***	0.0000***	0.0000***	0.0000***	
	Second difference	Intercept	0.0000***	0.0000***	0.0000***	0.0000***	
		Intercept & trend	0.0000***	0.0000***	0.0000***	0.0000***	

Source: Researcher Illustration, EViews 12.

Table 3. Panel Unit Root Test.

Variables	Level & first difference	Intercept/trend	LLC	IPS		ADF	PP	Decision
LNGDP	Level	Intercept	1	0.0117*		0.0278*	0.0616	I(1)
		Intercept &trend	0.9033	1		0.9999	1	
	First difference	Intercept	0.0039**	0.0004***		0.0007***	0.0000****	
		Intercept &trend	0.0000****	0.6144		0.0000****	0.0000****	
	Second difference	Intercept	0.0000****	0.0000****		0.0000****	0.0000****	
		Intercept &trend	0.0000****	0.0000****		0.0000****	0.0000****	
LNL	Level	Intercept	0.0643	0.9959		0.9324	0.0063**	I(1)
		Intercept &trend	0.8481	0.5096		0.2004	0.0000****	
	First difference	Intercept	0.0000****	0.0000****		0.0000****	0.0000****	
		Intercept &trend	0.0000****	0.0000****		0.0000****	0.0000****	
	Second difference	Intercept	0.0000****	0.0000****		0.0000****	0.0000****	
		Intercept &trend	0.0000****	0.0000****		0.0000****	0.0000****	
LNK	Level	Intercept	0.0000****	0.0009***		0.0011**	0.0018**	I(0)
		Intercept &trend	0.8718	0.9997		0.8682	0 .9612	
	First difference	Intercept	0.0000****	0.0000****		0.0000****	0.0000****	
		Intercept &trend	0.0000****	0.0000****		0.0000****	0.0000****	
	Second difference	Intercept	0.0000****	0.0000****		0.0000****	0.0000****	
		Intercept &trend	0.0000****	0.0000****		0.0000****	0.0000****	
LNCCWGI	Level	Intercept	0.1889	0.0847		0.1045	0.0000****	I(1)
		Intercept &trend	0.6820	0.0451		0.0633	0.0000****	
	First difference	Intercept	0.0000****	0.0000****		0.0000****	0.0000****	
		Intercept &trend	0.0000****	0.0000****		0.0000****	0.0000****	
	Second difference	Intercept	0.0000****	0.0000****		0.0000****	0.0000****	
		Intercept & trend	0.0000****	0.0000****		0.0000****	0.0000****	

Source: Researcher Illustration, EViews 12.

Table 4. Short-Run Equation.

	Coefficient	*Std. Error*	*t-ratio*	*p-value*
CointeQ01	-0.259217	0.053401	-4.854200	**0.0000****
ΔLNCCI	2.171626	1.184780	1.832937	0.0679
ΔLNL	-0.144430	0.176726	-0.817254	0.4145
ΔLNK	0.351458	0.086730	4.052334	**0.0001****
C	-3.911131	0.826654	-4.731279	**0.0000****

Source: Researcher Illustration, EViews 12.

Table 5. Short-Run Equation.

	Coefficient	*Std. Error*	*t-ratio*	*p-value*
CointeQ01	-0.262322	-0.262322	-4.27998	**0.0000****
ΔLNL	-0.124036	0.193635	-0.640564	**0.0000****
ΔLNK	0.359076	0.082786	4.337411	0.5224
ΔLNCPI	0.042216	0.074605	0.545867	0.5720
C	0.109917	0.041595	2.642534	**0.0087****

Source: Researcher Illustration, EViews 12.

According to the table above, the result of the panel unit root test indicates that the result is a mixture of I (0) and I (1) this means the necessity of using the panel ARDL model.

Model Three Specifications

$$lgdp_t = \alpha + \beta_1 ll_t + \beta_2 lk_t + \beta_3 lccwgi_t + \varepsilon_t \quad (4)$$

H_0: Ø=1, All the panels contain unit roots

H_1: Ø#1, At least one panel is stationary

According to the table above, the result of the panel unit root test indicates that the result is a mixture of I (0) and I (1) this means the necessity of using the panel ARDL model.

4.2. Regression Analysis Results

ARDL model of MENA countries contains 357 observations of 22 MENA countries. The sample was taken from 2000 to 2020. The dependent variable was the log of GDP per capita, whereas there were three independent variables which included a log of the labor force, Capital, and corruption. Corruption was recognized in three different models using three measurements, CPI, CC from WGI, and CCI. These log-log model results were obtained from e-views to derive the following analysis below in the tables.

Short run equation

$$\Delta LNGDPt = -0.259217 + 2.171626\Delta LNCCIt$$

$$-0.144430\Delta LNLt + 0.351458\Delta LNKt - 3.911131 + \varepsilon t \quad (5)$$

According to the table below (see table **4**), the co-integration coefficient is significant and negative, which reflects the long-run equilibrium observed in the previous year that influence the adjustment of the variables towards their equilibrium relationship. In addition, there is no effect of LNCCI on LNGDP, only LNK has a positive effect in the short run on LNGDP, where the increase in LNK for 1 unit will lead to an increase in LNGDP in 0.35458 units.

$$\Delta LNGDPt = -0.262322 + 0.042216\Delta CPIt$$

$$-0.124035\Delta LNLt + 0.359076\Delta LNKt - 0.109917 + \varepsilon t \quad (5)$$

According to the table below (See table 5), the co-integration coefficient is significant and negative, which reflects the long-run equilibrium observed in the previous year that influence the adjustment of the variables towards their equilibrium relationship. In addition, there is no effect of LNCPI and LNK on LNGDP, only LNL has a negative effect in the short run on LNGDP, where the increase in LNL for 1 unit will lead to a decrease in LNGDP in 0.124036 units.

$$\Delta LNGDPt = -0.259217 + 2.171626\Delta LNCCIt$$

$$-0.144430\Delta LNLt + 0.351458\Delta LNKt - 3.911131 + \varepsilon t \quad (6)$$

According to the table below (see table **6**), the co-integration coefficient is significant and negative, which reflects the long-run equilibrium observed in the previous year that influence the adjustment of the variables towards their equilibrium relationship. In addition, there is no effect of LNCCWGI on LNGDP, only LNK has a positive effect in the short run on LNGDP, where the increase in LNK for 1 unit will lead to an increase in LNGDP in 0.354820 units.

Long Run Equation

Table 6. Short-Run Equation.

	Coefficient	*Std. Error*	*t-ratio*	*p-value*
CointeQ01	-0.283238	0.059970	-4.722984	**0.0000****
ΔLNCCWGI	-0.095916	0.061321	-1.564159	0.1190
ΔLNL	-0.109326	0.187752	-0.582291	0.5609
ΔLNK	0.354820	0.090146	3.936063	**0.0001*****
C	0.853872	0.176394	4.840709	**0.0000******

Source: Researcher Illustration, Eviews 12.

Table 7. Long-Run Equation.

	Coefficient	*Std. Error*	*t-ratio*	*p-value*
LNCCI	5.090491	2.057095	2.474602	**0.0140***
LNL	0.002400	0.082693	0.029022	0.9769
LNK	0.771204	0.069100	11.16074	**0.0000******

Source: Researcher Illustration, Eviews 12.

Table 8. Long-Run Equation.

	Coefficient	*Std. Error*	*t-ratio*	*p-value*
LNK	0.763547	0.04158	18.36301	**0.0000******
LNL	0.188112	0.077362	2.431571	**0.0157***
LNCPI	-0.040933	0.109921	-0.372384	0.7099

Source: Researcher Illustration, Eviews 12.

Table 9. Long-Run Equation.

	Coefficient	*Std. Error*	*t-ratio*	*p-value*
LNK	0.763547	0.04158	18.36301	**0.0000******
LNL	0.188112	0.077362	2.431571	**0.0157***
LNCPI	-0.040933	0.109921	-0.372384	0.7099

Source: Researcher Illustration, Eviews 12.

$$LnGDPt = 5.090491LNCCIt + 0.002400LNLt + 0.771204LNKt (1)$$

According to the long-run equation (see Table **7**), LNGDP has a positive and significant relationship between LNCCI and LNK, when LNCCI increases by 1 unit, LNGDP increase by 5.09 unit, and when LNK increase by 1 unit, LNGDP increase 0.771204 units.

$$LnGDPt = -0.040933LNCPIt +$$

$$0.188112LNLt + 0.763547LNKt (1)$$

According to the long-run equation (see table **8**), LNGDP has a positive and significant relationship between LNL and LNK, when LNK increases by 1 unit, LNGDP increases by 0.763547 units, and when LNL increases by 1 unit, LNGDP increases units.

$$LnGDPt = -0.095721LNCCWGIt +$$

$$0.741866LNLt + 0.046210LNKt (1)$$

According to the long-run equation, LNGDP has a positive and significant relationship between LNCCI and LNK, when LNCCI increases by 1 unit, LNGDP increases by 5.09 units, and when LNK increases by 1 unit, LNGDP increase by 0.771204 units.

4.3. Comparison Between 3 Models- ARDL Estimation

Table 10. Comparison Between 3 Models- ARDL Estimation on the Long-Run.

Variables	**Model 1**	**Model 2**	**Model 3**
	LNCCI	LNCPI	LNCCWGI
LNGDP	5.090491 (0.0140*)	-0.040933 (0.7099)	-0.095721 (0.0177*)

Source: EViews 12.

According to the long run estimation, the three models indicate that the logarithm of customized corruption index (LNCCI) influence positively on the logarithm of Gross domestic product (LNGDP) in 5.090491 points while the logarithm of international corruption perception (LNCPI) and the logarithm of Worldwide Governance Indicators (LNWGI) have no impact on the dependent variable Logarithm of GDP in the MENA region.

Table 11. Comparison Between 3 Models- ARDL Estimation on the Short-Run.

Variables	Model 1	Model 2	Model 3
	ΔLNCCI	ΔLNCPI	ΔLNCCWGI
LNGDP	2.171626 (0.0679)	0.042216 (0.5720)	-0.095916 (0.1190)
CointeQ01	-0.259217 0.0000****	-0.262322 0.0000****	-0.283238 0.0000****

Source: EViews 12.

In the short run, there is no impact of the logarithm of each independent variables: logarithm of customized corruption index (LNCCI), the logarithm of international corruption perception (LNCPI) and the logarithm of Worldwide Governance Indicators (LNWGI) on the dependent variable Logarithm of GDP in the MENA region.

5. CONCLUSIONS, PROPOSALS, AND RECOMMENDATIONS

Corruption is a widespread challenge that appears in practically every society around the world in various forms and levels. It is so deeply established in the system that it is sometimes impossible to eradicate. Governments endeavor to lessen corruption's impacts, but most fail due to the intricate and sophisticated tactics used to conceal their crime. Previous literature on corruption featured three opposing theories: one arguing that corruption is advantageous to the economy with a positive impact, two alleging that it is harmful impacts, and the third indicating that there is null or no impact on economic growth.

This study aimed to empirically deduce corruption's impact on economic growth using an extended Solow growth model, including labor, capital, and corruption. Annual time-series data from 2000-2020 was used; this study is the first research to analyze and distinguish these impacts in two different countries of the MENA region. CPI, CC-WGI, and CCI were used as indicators of corruption.

In contrast, GDP per capita was used as an indicator of economic growth as it is a precise variable incorporating changes in GDP with population changes. ARDL Bounds method model for integration was used to test both the short-run and the long-run relationship between corruption and economic growth.

The study found that in the case of the short run, there is no impact of the logarithm of each independent variable: the logarithm of customized corruption index (LNCCI), the logarithm of corruption perception Index (LNCPI) and the logarithm of Control of Corruption from World Governance Indicators (LNWGI) on the dependent variable Logarithm of GDP in the MENA region.

While in the case of the long-run estimation of the three models, that model one indicate that the logarithm of customized corruption index (LNCCI) influence positively on the logarithm of Gross domestic product (LNGDP) in 5.090491 points while for both model two and three that the logarithm of corruption perception index (LNCPI) and the logarithm of control of corruption from Worldwide Governance Indicators (LNWGI) have no impact on the dependent variable Logarithm of GDP in the MENA region.

Last but not least, from the collected data it is obvious that corruption is unfortunately widespread in the MENA region, with many governments plagued by bribery, nepotism, and embezzlement. This has had a detrimental impact on economic growth, political stability, and public trust in government institutions. However, there are signs of progress as several countries have taken steps to combat corruption through increased transparency and accountability measures. For example, Saudi Arabia launched an anti-corruption campaign in 2017 that resulted in the arrests of dozens of high-profile businesspeople and officials. Similarly, Tunisia established an independent anti-corruption agency tasked with investigating and prosecuting cases of corruption. While these efforts are promising, much work still needs to be done to effectively root out corruption in MENA to sense the real difference in the levels of corruption in the MENA region.

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Received: June 15, 2023 Revised: June 18, 2023 Accepted: June 20, 2023