Corruption and Economic Growth in Arab Countries-An Econometric Study using Dynamic Panel Modelsand (GMM) Technique during the period (2003-2017)-

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Abstract:
    The objective of this study is to estimate the impact of corruption on the economic growth of a sample of (10) countries from the Arab region during the period (2003-2017) using dynamic panel model and GMM- technique in the estimation process, The results of the study indicate that there is a negative and moral impact of corruption on the economic growth in the Arab countries. When the increase of corruption by one degree will lead to a decline in the growth rate of per capita GDP in the Arab countries by 0.04%, the study also recommended the need for Arab Countries to fight corruption and establishing good governance, democracy, accountability and transparency.
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1. INTRODUCTION

    The subject of corruption, in its forms, won a deep interest all over the world, whether in developed or least developing countries, in its capacity as one of the recent worldwide and multi-dimensional problem in which interfere different factors difficult to distinguish.

    Certainly, the prevailing of such phenomenon has thorough effects on the economic, political and social performance in this country. So economically, corruption presents a big menace for the economic growth. It hinders efforts in development through reducing opportunities of trade and impedes the climate of investment for countries, and restricts public and private sectors performance.

    Many economic researchers point out that corruption weakens outcomes achieved by investment in human Capital, public investment and parity in revenue. Socially and politically, corruption has a devastating impact on elementary, marginalising large categories in society, and damaging state institution and credibility, as well as affecting their security and stability.

    Likewise, Arab countries are not away from this phenomenon in view of the fact that the spreading corruption includes private and public sectors. These countries face big challenges in accelerating economic development and making progress, and according to a report released on corruption perception index on 1995 by international transparency, most of Arab countries achieved lower indicators in fighting corruption.

2.Problematic of the study and its Hypothesis

    The problematic of this study is centred on the following main question:

Has corruption a statistical significant effect on the economic growth of a sample of Arab countries during the period2003-2017?

To answer this problematic, this study starts from the basic elementary hypothesis as follows: there is a negative statistical significant relation between corruption and the economic growth .it means: whenever corruption increases, this leads to decrease the economic growth and the reverse is true.

3. Objective of the study

The importance of this study arises from being in search of the impact of corruption on economic growth in Arab countries in their view of the fact that it is a worldwide major problem affecting all countries of the world differently, and regarding the negative effects as results of corruption in different developing sides and domains. It is considered as the most influencing obstacle to development and progress in the Arab region. So this study aims basically at testing to what extent corruption can affect economic growth in Arab countries, besides other determinants that can affect economic growth using dynamic panel data models and the generalized method of moments in the period of 2003-2017.

4. Literature Reviews

Empirical studies conducted on corruption effect on economic growth has witnessed an unprecedented extension since the middle of the nineties of the last century, and basically this is due to emergent and more credible new data about corruption. Therefore, we shall present an abstract of the most important studies on the subject:

-Corruption and Economic Growth (Pak Hung. Mo, 2001)
This study aimed to determine the role of corruption in economic growth using the least square method, and concluded that the increases of corruption level by 1% diminished the rate of economic growth by 0.71%. The study results indicated also that the most influencing channel of corruption on economic growth the political instability that represents totally 53% and lessens also human capital level and private investment share.

-Corruption and Economic Growth -the African Experience- (Emmanuel. A and Habtu.B, 2005)
This study aimed to analyse the effect of corruption on the economic growth by using data in eighteen African states in the period of (1984-2000) employing data processing types (FMOLS) to study the long-term dynamic relation between corruption and economic growth within these states. The study results also indicated that corruption retards directly growth through the decline of productivity and indirectly through investment restriction.

-Corruption and Democracy and Economic Growth (Cooper. D, Jonathan. K and Michael.B, 2006)
This study aimed at investigating corruption effects and democracy on economic growth targeting a sample of more than 100 state in the period dating from 1982 to 1997, using panel models in data analysis, and concluded that corruption has not a great impact on economic growth of democratic states, where as non democratic ones incur serious damages because of corruption, and also political factors play a pivotal role in achieving growth as well.

-Corruption and Economic Growth in the Middle East and North Africa (Nour. C,

2016)

The objective of this study is to identify the effects of corruption on economic growth in the middle east and north Africa (MENA), using two samples DATA from north Africa and gulf countries in the period of 2004-2015 and by utilizing panel models; study results of both samples pointed to the existence of a statistically insignificant negative relation between economic growth for the examined countries and corruption level.

-Effects of Corruption on Economic Growth –Empirical Study of Asia Countries (Nguyen. N, Mai. B, and Tran. T, 2017)

This study aimed to investigate effects of corruption on economic growth using date in 19 Asian countries in the period of 2004-2015 by GMM technique in estimating panel models. The study showed that corruption restricts economic growth in those Asian countries besides economic growth is affected by corruption in various criteria. The study also pointed to the important roles of qualitative institutions and free democracy played in economic growth.

5. Theoretical side of corruption

We can present the most important conceptions relevant to corruption:

5.1. Definitions

Definitions presented on corruption were different and various. We can present the most important ones stated by international institutions and organisations as follows:

- Definitions presented on corruption were different and various. We can present the most important ones stated by international institutions and organisations as follows:

-The World Bank defines corruptions as a misuse of public authority for personal earnings. Corruption happens when a public officer or a clerk accepts a demand, extortion or a bribery to facilitate contract or a bid in general. It occurs also when companies agents propose businesses specially bribery to benefit from policies or public procedures to defeat rivals and achieve profit illegally. It can happen also via the use of authority without recourse to bribery by nominatingrelative or public money utilization.

- IMF is a report released in 1996, defines corruption as the use of public authority for the purpose of obtaining personal earnings and it is achieved when a public officer accepts officially bribery or by embezzlement.

- International transparency organisation, corruption is the misuse of commissioned authority to achieve personal earnings or profits. This definition permits to isolate three main elements: Misuse of authority, personal ends and intentions, and in consequence not compulsory only for the person who misuses authority, buy includes his family and his relatives, Power received in commission this can come both from private and public sector(Touati, 2014, p. 2)

Though corruption could take on many forms, it would be seldom to achieve personal earnings through usage of assigned authority. (Admir & Martin, 2017, p. 1)

5.2. Forms of corruption

Corruption usually implies two global categories: Major and minor level corruption, political corruption.

5.2.1.Major and minor corruption

Corruption can happen on different levels, varying from "minor" on that can take place between citizens and companies or civil servants (public offices) to the major one that implies bribery or embezzlement of large sums of money from personalities at the top of the governmental hierarchy, "Minor" corruption that can be also called administrative corruption or bureaucracy in domains managed by public policies.

5.2.2. Political corruption

The widespread definition of corruption is the abuse of political authority or power to achieve personal earnings, especially for the purpose of retaining or enhancing a position or an office, or to be wealthy or both of them. Political corruption is attributed also to those who make political decisions concerning laws and legislations, or state main resources.

5.3. Corruption assessment

There are many institutions all over the world interested in corruption phenomenon assessment through indexes of a quality reflecting diffusion in different countries. Among the most famous indexes used in field studies is corruption perception index released by international transparency,control of corruption index and governance index released by the World Bank.

Among the most important indexes used to assess corruption that we shall comply with this study is PCI (perception corruption index) released on 1995 to be most important one of international transparency organisation, and the most prominent world indexes to assess corruption prevalence in public sectors.

PCI classifies countries and regions based on public sector corruption scope in a country according to experts and executive officers in business sector, including bribery, money embezzlement , abuse of public authority to achieve personal earnings, favouritism in civil service or state over power, this by a unit of measurement varying from 0 to 100pts. Zero for the most corrupted countries and 100pts for the most transparent countries.

6. Corruption and economic growth

On a macroeconomic level, earlier empirical studies indicated that corruption has a negative effect on development and economic growth.

Corruption has negative effects not only on constant competence but also on investment and growth so paying tips to obtain investment licence will clearly make less motivation for investment (even disregarding the effect on the investment structure) in the light of secret considerations and uncertainty. (Bardhan, 1997, p. 1327), Corruption effect on growth resulting from investment can also happen due to(Ugur & Ddasgupta, 2011, p. 20): investment costs rise (and in consequence investment decrease), accelerating permission grant for investment (in consequence investment increase), indirect high production costs

rise, ainty increase about future revenues on capital investment.

This corruption can have also negative effects on changing public expenses; as elimination from valuable investments in domains, such as healthcare, education, and their orientation to projects of squandered resources to achieve short-term earnings, as for education in most countries where corruption prevails, has less overheads in teaching, and therefore a lower investment level in human capital(Mauro, 1995, p. 681).

Furthermore, when a number of researches investigated the relationship between economic growth and corruption, they concluded the big effect of corruption on E.G tends to decline or change direction, and that the degree of its effect in integrating other determinants, is important in economic growth. This pointed that a big part of effect weakening E.G moves indirectly through their main determinants of this growth, and to which is indicated by channels of transmission and transformations(Vironica & Eva, 2016, p. 722). This is on one hand on the other hand, there are economists who think that corruption can push the wheel of trade and participate in achieving a continuous growth. In this context (Leff,1964) and (Hatington,1968) proposed a theory that economic growth can be positively affected if individuals avoid heavy procedures (bureaucracy) , and they also present the idea that government officers will be eager to make a great effort in work with the possibility receiving tips(Admir & Martin, 2017, p. 2)

7. Corruption and economic growth in the Arab countries

7.1.Classification of Arab countries according to corruption perception index for the year 2017:

According to corruption perception index released by international transparency, countries are classified on the basis of the prevailing corruption level, that's to say: the countries in which transparency rate increases, they reach first classes, whereas countries in which rates of corruption increase they reach last classes. And in 2017, Arab countries were classified according to corruption perception index as they appear in figure (01).

Fig (01): Classification of Arab countries according to corruption perception index (2017)
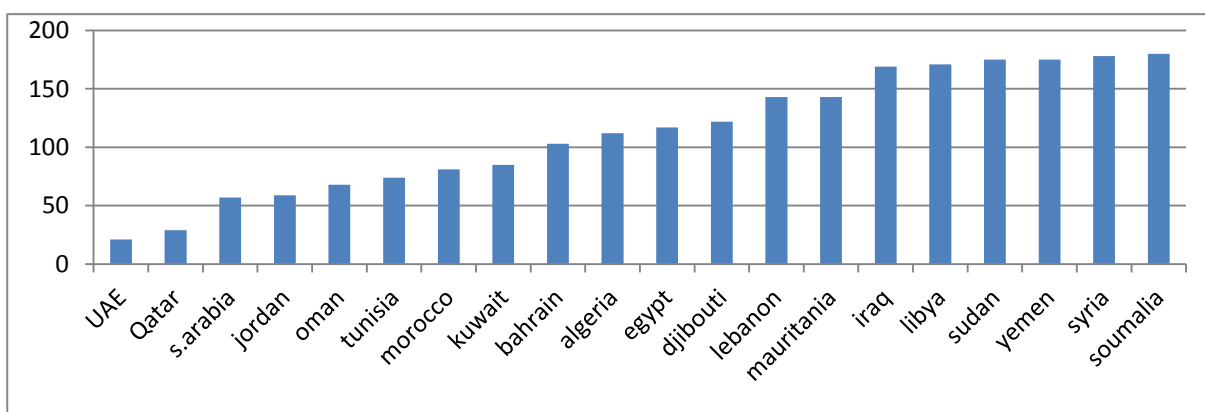
Source:elaborated by researchers based on international transparency organisation data.

Figure (01) shows Arab countries results classified by corruption index released by international transparency for the year 2017, wherein most Arab countries failed in achieving advanced classes, and in accordance with world order for the year 2017, they emerge, whosoever Syria (178), Yemen and Soudan (175) rank, Libya (171), Iraq (169), among the most prevailing corrupted countries group because of deteriorating political

situation and acts of violence taking place in these countries. whereas united Arab emirates are ranked 21st in the world and first in the Arab countries , Qatar 29th in worldwide and second place in Arab countries and are considered the best countries in the Arab region as for transparency and corruption fighting in the year 2017. However, Algeria occupied 108 place in the world for the year 2016 and 112 in 2017 according to the same index; and retained the 10th place in the Arab world for the same period.

The main causes of the phenomenon of its corruption and its forms are centred on authority positions in the Arab world. And forcing interferences have contributed in strengthening corruption culture and in their roles led to worsening poverty in Arab societies.

Corruption prevailing in Arab countries is due to poverty and lack of democracy, and in consequence the absence of contract mechanisms and asking for accounts, is considered as one of the main causes of prevailing and permitting corruption in Arab zones.

Generally speaking, among the most important causes of corruption in the Arab countries are lack of transparency, access to information and weak mechanisms for asking accounts internally and externally. Additionally, corruption spreads in private and public sectors, and this requires conscious efforts from Arab countries in the purpose of fighting corruption and consolidating transparency (Hashem, 2014, p. 124).

7.2. Economic growth in Arab countries (2003-2017)

The economy of Arab countries witnessed global development and regional transformations that affected its performance in the period 2003-2017; and can be divided into two periods: the first period dated from 2003 to 2008, whereas the second one dated from 2009 to 2017.

-The first period (2003-2008)

Global economy witnessed evolution throughout approving various economic policies to achieve stability and liberate markets to support productivity and competitivity in increasing global economic growth rates, which produced a positive effect on Arab countries, so it has been, recorded a GDP high growth rates, for this period 9.33% and thus was in 2004 compared with 5.31% in 2003, and also GDP average growth Arab countries during this period reached 6.19%.

-The second period (2009-2017):

In this period, economic performance of Arab countries was affected by a series of evolutions and situations that global economy has ever witnessed. In the first place, financial crisis (estate mortgage in USA)

Wherein effects of crisis extended to real sectors, and stretched out developed to least developed countries including Arab ones; as world trade investment low collapse, when GDP growth of Arab countries was estimated 0.46% in 2009. Some Arab countries were also affected by prevailing political situations, such as Egypt,Libya,Syria, Yemen and Tunisia, besides, the return of these events on other Arab countries like Jordan and Lebanon. thus GDP growth rate for the Arab countries reached 3.31% at the end of 2013 versus 6.95% in 2012 and 3.6% during the year 2011; and oil-prices rise in world markets at the end of 2014 took part in the regress of economic growth rates in Arab countries, when was

recorded in this period lower growth rates estimated at 1.19% in 2017 as a result of economic growth regress of petroleum exporting countries and GDP growth average was estimated at 3.17% for the Arab countries in this period.

fig(02) :GDP growth rate advancement in the Arab countries during the period (2003-2017)
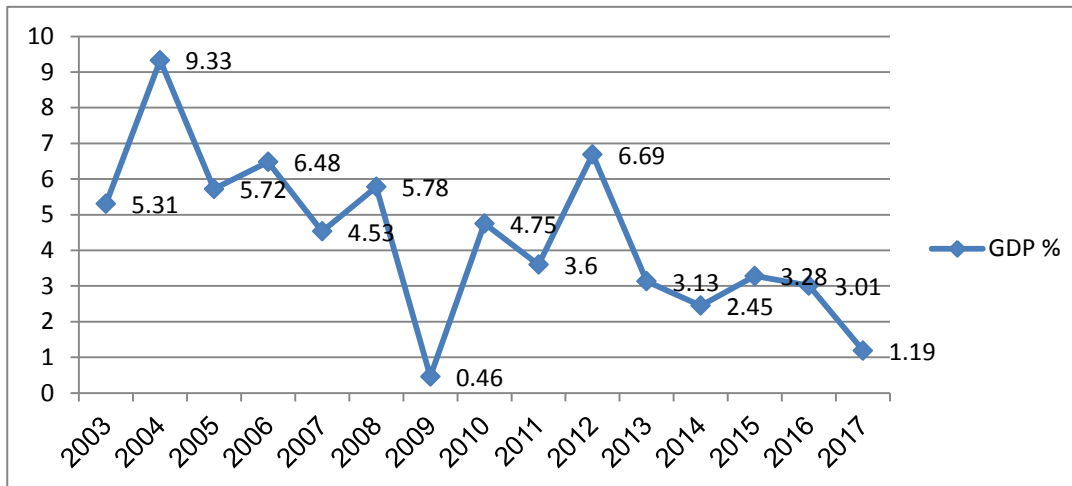
Source: elaborated by researchers based on international monetary fund data.

8. RESULTS AND DISCUSSION

8.1.The relationship between corruption and economic growth in the Arabcountries

Assessment and analysis to carry out this study that consists of identifying effect of corruption on economic growth in Arab countries, we'll use dynamic panel data models as to assess and determine the nature of relationship between corruption and economic growth based on the available data about these two variables and some other interpretative variables for the period 2003-2017.

8.2.Sample, period of study and data sources

The period of study dated from 2003-2017, and the choice of this period is due to availability of data related to all study variables for Arab countries , and the sample used in estimation consisted of Arab countries : Algeria, Tunisia , morocco, Egypt , Oman , Saudi Arabia , ,Yemen; Bahrain , and Lebanon , and data related to study variables has been obtained from the following sources : world bank and international transparency organisation .

8.3.Study Model

Based on the economic theory and the early empirical studies related to effect of corruptions on economic growth, we shall rely on the growth rate yearly in the average of real global domestic product per capita as a subordinate variable, thus capital, foreign direct investment and the rate of population growth, and corruption index as interpretative variable this takes the following mathematical formula:

RGDPpc = f (K, FDI, POP, CORR)   ,   t = 2003-2017

K= represents a capital stock as a rate from global domestic product.

FDI= foreign direct investment
POP = population growth rate
CORR = represents corruption index, and is calculated by subtraction of corruption perception index values from 0 to   100, and this for obtaining a lower value for CPI corroborative to a lower level and the rising level is indicative to a corruption high level.

We shall use in this study dynamic panel data models and generalized methods of moment technique.

8.4.Study of stationary for variables

To unveil unit root of panel data and identify the degree of their integration, there are many tests for this purpose. We shall use the most important and the most prevalent of them. This consists of Levin, lin and chu (LLC),Impeasaran and Shin (TPS) and fisher-ADF tests. And this is in order to reveal data models for the studied variables.

Table (01): Results of stationary tests for variables

ADF	LLC test	IPS test	variable.
(Level)			
62.5368 (0.0000)	-5.12776 (0.0000)	-2.40364 (0.0081)	*RGDPpc*
12.8304 (0.8845)	0.07267 (0.5290)	-1.09759 (0.1362)	*K*
34.6585 (0.0220)	-3.43389 (0.0003)	-2.68746 (0.0036)	*FDI*
13.8140 (0.8398)	0.99217 (0.8394)	2.65914 (0.9961)	*POP*
10.9709 (0.9439)	1.14002 (0.8729)	-1.15893 (0.1232)	*CORR*
(1st Difference)			
115.158 (0.0000)[*]	-10.6282 (0.0000)*	-5.48953 (0.0001)*	*DLK*
97.0542 (0.0243)[**]	-9.30948 (0.0000)[*]	-8.57278 (0.0000)*	*DPOP*
114.537 (0.0000)[*]	-10.9420 (0.0000)[*]	-9.14543 (0.0000)*	*DLCORR*

Source: elaborated by researchers based on (Eviews10) outputs.

Via table (01) that shows unit roots tests results, we observe that all the tests used, indicated the absence of unit root as for the studied variables next.

Real global domestic product per capita yearly growth rate (RGDPpc), foreign direct investment FDI, and therefore they are stationaryat the level and integrated at the degree I (0), whereas results showed that the variable capital (k), population growth rate (POP), corruption index are notstationary. After making difference of first degree, they become stationary, that means integrated from the first degree I(1). The results of stationarystudy by using IPC, LLC, ADF, tests proved that the variable RGDPpc , PDI are stationaryat the level, whereas the variables k, POP , CORR are stationaryat the level and stationaryat the first difference . That's to say integrated from the first degree I(1).

And consequently, we can't make Co- integration between study variables. It can only be at integrated variables of the same degree.

8.5. The estimation of study model by using GMM-technique

The usage of ordinary least square could not be harmonious units the cross-section time series data because of impalpable individual impact between the countries, and this leads to heterogeneity. The generalized method of moment technique developed by (Arellano and Bover, 1995) and (Blundell and Bond 1998) is considered as the most important methods used in estimation in the context of dynamic panel data models.

GMM estimator has already been largely used in modern empirical works, especially in macroeconomics and finance studies in view of the advantages they have. As for panel models estimators by using GMM technique is good in explanatory variances of time series data and calculating unobservable individual effects (Liang, 2006, p. 15).

to investigate the validity of the model, we can use Sargan test method of over-identifying restrictions , which examines the quality and the convenience of tools used in the models and the validity of moments conditions in estimation, so as null hypothesis H0 for this test consists in that instrumental variables are not bound to random error (Bucheli & Munoz, 2011, p. 15), departing from this, we shall estimate dynamic panel model by using GMM-technique and this to modifies the equation , it mentioned in the following equations:

$$RGDPpc_{i\,t} = \alpha RGDPpc_{i\,t-1} + \beta_1 K_{i\,t} + \beta_2 FDI_{i\,t} + \beta_3 POP_{i\,t} + \beta_4 CORR_{i\,t} + \mu_i + \varepsilon_{i\,t}$$

Table (02):estimation results of corruption effect on economic growth in Arab countries by using GMM-technique

(RGDPpc)			
Prob	T-statistic	Coefficient	
*(0.000)**	*5.55*	*0.4813347*	RGDPpc(-1)
*(0.000)**	*4.04*	*0.1575146*	K
*(0.007)**	*2.67*	*0.2988032*	FDI
*(0.002)**	*-3.15*	*-0.7079416*	POP
*(0.002)**	*-3.10*	*-0.0488117*	CORR
130			Number of Obs
10			Number of groups
101.32 *(0.000)**			Wald chi$_2$
11.48 *(0.718)*			Sargan test
-0.48 *(0.633)*			Arellano-Bond test for AR(2)

Source: elaborated by researchers based on (Eviews10) outputs

As for diagnostic test of the model, we can observe that Sargantest statistical probability is superior than 0.05% and consequently accepting null hypothesis stipulates that the quantity and convenience of the tools used in the model and the validity of moments conditions used in estimation. As far as (Arelliano-Bound test) is concerned, results proved that the statistical probability of this test is superior than 0.05%, it means accepting null hypothesis that there is no autocorrelation between errors of the 2ndorder, and this indicates that the model is statistically acceptable.

The results of estimation above show also:

- Capital stock effect on RGDPpc statistically positive and abstract at the level 1%, hence the increase of foreign direct investment by 1% leads to an increase in RGDPpc by 0.29% , and this result corresponds to the economic theory , provided that investment is considered as a basic element for the economic growth.

- Assessment results showed that foreign direct investment influence on RGDPpc is positive and abstract at the level 1%, hence the increase DFI entails RGDPpc by 0.29%, and this corresponds to the economic theory. It is a matter of foreign direct investments that participates in increasing economic productivity energy through information and technology transference to Arab countries.

- As for the population growth variables, its signal is abstract and negative at the level 1% , and this corresponds to econometrics that stipulate the existence of a negative relationship between economic growth and population growth; provided that each increase in (pop) growth leads to decrease in PGDPpc in Arab countries by 0.7%.

- However, it is showed that corruption effect is negative on economy in Arab countries , so that results of estimation showed a negative and abstract corruption effect on RGDPpc at the level 5% when corruption index increases one degree, this leads to decrease of RGDPpc to 0.04% , and this what each of the studies (Cooper,D Pak h, Mo, 2001) (Mauro, p ,1995) (Noyan,N.T, Mai B, Tran.T, 2017) , (Jonathan K, and Michael 2006) , concluded and asserted that corruption has a negative effect on economic growth performance .

9. CONCLUSION

This study targeted the assessment of corruption effect on economic growth in Arab countries by using data sample composed of ten Arab countries in the period of 2003-2017. And to carry out this study, there have been used dynamic panel data models and GMM-technique in the process of estimation, So that this methodology permits an assessment of corruption effect on the economic growth in Arab countries.

The study concluded to a series of results we can sum up as follows:

- Most empirical studies asserted that corruption has a negative effect on the economic growth performance via various factors, among which a negative effect on investment in capital, human levels and political stability.

- According to corruption perception index released by international transparency organisation, most Arab countries occupy a low place compared to other regions on the world.

-Results of stability study showed that we can't survey the relationship of common integration between study variables, in view of the fact that it is integrated in the same order.

-Sargan test results indicated that quality and convenience of tools used in the model and the validity of moments conditions used in the estimation, where as Arelliano had proved that the model estimated by using GMM-technique does not support the self-bond serial between margins from the second order.

-Study results pointed to a convenience with the hypothesis of an existing negative corruption effect on the economic growth in the Arab countries. So when corruption level increases one degree, this leads to decrease in RGDPpc in the Arab countries by 0.04%, and this result confirms what had been concluded in multiple early studies that corruption has a negative influence on economic growth as a whole.

In the light of what the study concluded as results we can give the following recommendations;

-make into practice fighting and facing corruption in public and private sector through reinforcement   of legal and institutional instruments. so various studies indicate then that political stability beside corruption indicate them that political stability beside levels decrease affect positively the economic growth and the other macroeconomic variables.

-activating and making into practice political will in Arab countries to figure corruption and consolidate transparency and respect of real democratic principles.

-consolidating control mechanism for asking accounts and enhancing the role of different educational institutions to define this phenomenon and its negative aspects, particularly on socio-political and economic sides.

-Adopting necessary structured reforms to reinforce growth and economic development in Arab countries.

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