The Impact of Good Governance Indicators on Economic Development

-An Econometric Study of Arab Countries during the Period 1996-2017-

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A R T I C L E I N F O	**A B S T R A C T**
	This study aims at highlighting the role that good governance plays in achieving economic development, since the establishment of the latter seems to be a prerequisite for the promotion of economic growth, which helps raise the living standard of the population as a whole. In order to achieve the objective of the study, pooled cross-sectional and time series data, based on economic variables including GDP per capita as the dependent variable and good governance indicators as the independent variables, were used. *The study concludes that the random effects model is appropriate for understanding the studied phenomenon. The model thus makes it possible to show a difference in the random component between the Arab countries when estimating the relationship of the effects of indicators of good governance on economic development. In other words, it seems necessary to introduce other factors outside the model which differ from one Arab country to another and which explain the differences between these countries.*

1. Introduction

The concept of economic development has covered several realities. Indeed, it includes not only changes in economic structures, but social and cultural changes, as well. Thus, the State seems to have to play an important role in economic development and in accordance with this role, the concept of good governance has emerged to, seemingly, accompany and be associated with economic development, expressed in per capita income .

Good governance is a priori, the key to economic development. Indeed, all the studies that have been carried out by international organizations have confirmed the close link between indicators of good governance and economic development. However, it seems that the Arab countries are suffering from numerous crises in the development process, mainly due to low national and individual incomes, lack of diversified economic activity, low productivity, low level of knowledge, widespread unemployment and manifestations of poverty ... which generate economic dependence and increased debt.

1.1. Problem: From the above argument, the following question can be asked:

What is the effect of indicators of good governance on economic development of the Arab countries?

1.2. Study hypotheses: The study hypotheses are based on:

- There is a difference in the levels of economic development in the Arab countries;

There are random individual differences with regard to Arab countries, mainly due to the magnitude of the effects of indicators of good governance on economic development.

1.3. Importance of the study: The importance of the study lies in the following:

- to know the reality of indicators of good governance and economic development in the Arab countries;
- to know to what extent the indicators of good governance contribute to the economic development of the Arab countries;
- to explain the most important indicators of good governance which have a definite impact on the development of the Arab countries.

. Theoretical aspect of the study

The concept of development has greatly evolved over time, since this concept has been able to cover various initial realities and various assigned objectives.

2.1. Economic development: components and objectives

2.1.1. Definition of economic development

If we follow the evolution of the concept of development, we find that it has tended, in the first place, to focus on the aspect of economic growth and what is achieved there, so that economic development is defined as: "the rapid and continuous increase in the level of per capita income over time". *[Mandour, 2011]*

Economic development is also defined as the achievement of a continuous increase in real national income and the average per capita share of it, as the contribution of many changes in production structures and the quality of the goods and services produced, and finally, as a more egalitarian distribution of national income, i.e. a change in the distribution structure. *[Ajamia et al, 2007]*

Development is also known as "planned and targeted operations in multiple fields which change society to improve the conditions of individuals by facing the problems of society, removing obstacles and achieving the optimal exploitation of potentials and energies , in order to achieve the progress and growth of society and the well-being and happiness of individuals ".*[Al-Sukhn, 2015]*

Through the previous definitions, we can conclude that economic development is the expression of the structural changes taking place in the national economy with its economic, political, social and organizational dimensions in order to ensure a decent quality of life for all members of society, to meet their basic needs and achieve autonomous development harmonious with the environment.

2.1.2. Elements of Economic Development

Economic development requires a variety of resources, including natural and human resources, and also includes capital and technology.

A- Natural resources: the United Nations defines natural resources as what people find in their natural environment and which they can exploit for their benefit.

B- Human resources: These resources include all kinds of human efforts or human inputs that go into the production process.

C- Physical capital: This type of capital includes buildings, installations, equipment and stocks.

D- Technology: Technology is defined as organized practical knowledge based on experience or practical theory and which improves the capacity of society to produce goods and services. *[Al-Quraishi, 2010]*

2.1.3. Economic development objectives

Each country seeks to raise the standard of living of its people. Development goals differ from country to country, however, and this is due to various conditions including the structure of the state, and social, economic, cultural and even political conditions. However, there are fundamental objectives that countries seek in their development plans and the most important of these fundamental objectives can be listed as follows:

- **Increase national income**: it is considered one of its main objectives, because the main objective of development is to eradicate poverty, raise the standard of living and guarantee a decent life for individuals.
- **Raising the standard of living**: It is impossible to satisfy the material necessities of life such as food, clothing, housing and an adequate level of health without raising the standard of living.
- **Reduce inequalities in income and wealth**: this objective is, in fact, a social objective, because it makes it possible to reduce the gap between a state of excessive wealth and a state of extreme poverty.
- **Modify the relative composition of the national economy**: by merging the interests of industry, agriculture and the service sectors. *[Bakri, 1986]*

2.2. Good governance and its elements

2.2.1. The concept of good governance

The term "good governance" in the French language appeared in the 13th century as a synonym of the term "government", then as a legal term, in 1978, to, finally, express in a broader framework, the costs of management in 1979. On the basis of this definition, there is no doubt or disagreement on the French origin of the word. Governance, on the other hand, is an old English notion that was re-used by the World Bank in the mid-1980s, because it became a major concern and a key concept in the political discourse, especially in the development analysis dictionaries. It can be succinctly explained as "the way of conducting politics and public affairs". *[Al-Kayed, 2003]*

The World Bank was the first institution to introduce the term "governance method" in 1989 based on a study of the economic crisis in sub-Saharan Africa. The bank thus defined the term, in general acceptance, as the exercise of political power to manage the affairs of the state.

In the early 1990s, experts from the World Bank developed the concept to make it more precise. Thus, a study carried out in 1992 on the style of governance and development made it possible to define good governance as the method of exercising power in the management of the country's economic and social resources for development.

In addition, **the United Nations** defines good governance as the exercise of economic, political and administrative authority to manage the affairs of the state at all levels, and includes mechanisms, processes and institutions through which citizens and groups express their interests, exercise their legal rights, fulfill their obligations and accept mediation to resolve their differences. *[Rabahi & Bin Yon, 2018]*

From the two previous definitions, we conclude that good governance is the exercise of authority within the state to manage the resources collected at various levels (economic, political and social, in particular), and includes the state, civil society and the private sector, which participate in the development of society and achieve long-term development, in the light of the principles of transparency, accountability and the rule of law.

2.2.2. Reasons for the emergence of good governance

Some reasons for the emergence of the concept of good governance can be linked to political, economic and social reasons.

A- Political reasons

- The weak structure of political and administrative institutions, the absence or weakness of structures of responsibility and the dilution of responsibility in governance systems, and the lack of separation between the public and the private sectors.
- Globalization and its implications for the growing role of NGOs, the globalization of market economy mechanisms and ideas, the globalization of democratic values and human rights
- The supremacy of the style of security state which follows a policy of repressive containment, control of civil society movements and a drastic limitation of the power of unions and parties through various mechanisms.

B- Economic reasons

- The focus on the State and development relates more to the transition of authoritarian regimes on the African continent which adopt systems based on multiparty politics and liberal democracy, the latter being considered as a condition for economic reform and access to development.
- The failure of the state and its inability to be the main engine of development, despite its observable omnipotence.

C- Social reasons

- The neglect of the main development problems, such as poverty and unemployment, in particular and more generally, social problems, with their negative consequences on various sensitive sectors such as health and education sectors;
- The inability of underdeveloped countries to respond to technological developments at the international level due to widespread ignorance;
- The demographic explosion and the parallel increase of different needs which require the introduction of new models of economic and social planning, already present in developed economies.

2.2.3. Indicators of good governance

Global governance indicators are considered to be the most comprehensive, credible and precise indicators for measuring the quality of governance compared to other available indicators. They consist of 6 criteria, which are:

A- Respect and equality: This standard represents respect for citizens and the State for the institutions that manage social and economic transactions in the State and includes:

- **The Anti-Corruption Index**: this indicator measures the presence and prevalence of corruption and bribery among public institutions and politicians, or the abuse of public office or power in order to achieve private interests.
- **Rule of law index**: this indicator aims at estimating the degree of confidence of individuals in the rules of law and their attachment to these rules, in particular with regard to the extent of crime, as well as the efficiency and effectiveness of the judiciary in its procedures and provisions.

B- The nature of the political system: this criterion represents the process through which governments are chosen, controlled and modified. This standard includes the voice and responsibility index, the political stability index and the absence of violence.

- **Democracy index (voice and responsibility)**: this indicator measures the capacity of the citizens of a country to participate in the election of their government, as well as freedom of association and freedom of the media.
- **Political stability and absence of violence index**: this indicator measures the possibility of destabilizing the government by non-constitutional means or by violence, including terrorism. *[Bin Desh & Zawat, 2016]*

C- Government capacity: this criterion represents the capacity of the State and the capacities it has in the efficient management of resources and the implementation of good policies. The following indicators include:

- **Government efficiency index**: this indicator measures the quality of public services, the quality of the public service and its degree of independence from political pressures, the quality of the development and implementation of credibility of the government's commitment to these policies. The main objective of this

index delineates the inputs necessary for the government to produce and implement good policies and provide everyday goods.

- **Regulatory framework quality index**: this indicator measures the government's capacity to provide sound policies and regulations enabling private sector development and assistance. *[Ben Desh & Zawat, 2016]*

3. The applied aspect of the study

3.1. Tools used in the study

Panel model data is of great importance in economic measurement, as it merges cross sections and time series, which have grown in popularity, especially in recent years. Therefore, the concepts used, the basic models and some tests of significance between the models will be discussed.

3.1.1. Panel data, concept and importance

A- The concept of panel data: By transverse temporal data or panel data, we mean a set of observations which are repeated on a group of individuals over several time periods, so that they combine both the characteristics of both cross-sectional data and time series. So, if the period is the same for all individuals, we call the panel model "balanced", but if the time period varies from one individual to another, the panel model will be called "unbalanced". *[Dielman, 1989]*

It should be noted that there are several names for the panel data, as they can be called "combined data"or "longitudinal data". All these notions are similar and the present study will use the notion of "panel data" *[Free & Kim, 2007]*

B- Importance of the use of panel data: The estimation according to these data has important advantages and gives more precise results because it takes into account information with a time dimension in the time series as well as a cross section dimension in different units. So we can say that the data in the panel have a double dimension, a time dimension and an individual dimension. This has made its practical use more efficient and more active in econometrics, and it is therefore extremely important to summarize the following points:

- control of individual variance, which can appear in the case of cross-sectional or temporal data, and which leads to biased estimators;
- Panel data include more information than cross-sectional or temporal data, and therefore have the capacity to obtain estimates with greater confidence. In addition, the problem of correlation between variables is less serious than in time series. On the other hand, the panel data are distinguished from other data by a greater number of degrees of freedom as well as better efficiency;
- The use of panel data will allow us to mitigate the problem of multi-collinearity, which can appear between the independent variables and the problem of frequent heteroskedasticity when using cross-sectional data in the estimation of standards models; *[Peracchi, 2001]*
- Panel models offer a better possibility of studying the dynamics of modification, which can be masked by instantaneous cutting data, and they make it possible to study particular situations, such as unemployment, poverty and growth, etc. . On the other hand, it is possible, through panel data, to link the behavior of the elements of the sample from one point to another; *[Badibaltagi, 2005]*
- the panel models help limit the possibility of the problem of neglected or omitted variables resulting from the characteristics of unobserved data, which generally leads to biased estimates in simple regressions, and highlights the importance of using the data of the Panel in that it takes into account what is described as "heterogeneity or imperceptible variation" of the observations of the sample, whether in instantaneous or temporal section.

1.2. Basic models for the analysis of panel data:

The modern approach proposes the basic form of panel data regression presented by W. Green (1993) and from there, panel data models come in three main forms: group regression model (PRM) , fixed effects model (FEM) and, finally, the random effects model (REM). To have N sectional observations measured in T periods, the PANEL data model is defined by the following formula:

$$y_{it} = \beta_{\circ(i)} + \sum_{j=1}^{k} \beta_j \, x_{j(it)} + \varepsilon_{it} \qquad , i = 1,2,....., N \quad t = 1,2,...., T \quad \cdots\cdots(1)$$

Where "y_{it}" represents the value of the response variable (dependent) in observation i at period t, B 0 (i) represents the value of the point of intersection in observation i, B (i) represents the value of the slope of the regression line,"x_j" (it) represents the value of the explanatory variable j in observation i at period t and ε_{it} represents the error value in observation i at period t, which can be interpreted so that the estimation of model parameters depends on the type of panel data model used. *[Badibaltagi, 2005]*

3.1.3. Selection tests of the appropriate form for the panel data

The panel tests are as follows:

A- Hausman's test (1978): *[Bourbonnais, 2015]* Hausman's (1978) test is used when there is a fundamental difference between fixed and random effects, which is the extent to which the individual effect is related to the independent variables. Thus, the null hypothesis is based on the absence of this link, i.e. when the estimators of the fixed and random effects are consistent, but the impact of the random effects is more pronounced, whereas, in the alternative hypothesis of the existence of the link, the impact of fixed effects is coherent and more effective. The Hausman test is given by the following relation:

$$W = (\hat{b}_{lsdv} - \beta_{GLS}) \, [\text{Var} \, (\hat{b}_{lsdv}) - \text{Var} \, (\hat{\beta}_{GLS})]^{-1} \, (\hat{b}_{lsdv} - \hat{\beta}_{GLS})$$

Where $(\hat{b}_{lsdv} - \hat{\beta}_{GLS})$ represents the difference between fixed effects and random effects

$\text{Var} \, (\hat{b}_{lsdv}) - \text{Var}(\hat{\beta}_{GLS})$ It is the difference between the covariance matrix for the effects of fixed effects and the random effects. W, under the null hypothesis, follows a chi-square distribution withk-1 degree of freedom, that is to say the number of independent variables minus the constant term. By comparing the calculated value of W with the tabular value, if the null hypothesis is accepted, the random effects model is retained. On the other hand, if the alternative hypothesis is accepted, the fixed effects model is the most relevant.

B- Restricted F-Fischer test: given as: *[Geen, 2012]*

$$F(N-1, NT-N-k) = \frac{\dfrac{(R^2_{FEM} - R^2_{PRM})}{(N-1)}}{(1 - (R^2_{FEM}))/(NT-N-k)}$$

Where k is the number of estimated parameters and R_{FEM} represents the coefficient of determination when using the fixed effects model and the coefficient of determination when using the aggregated regression model, the result of the equation is compared to F (α, N-1, Nt-Nk).

If the value of the test statistic is greater than or equal to the tabular value (or if the value of the P value is less than or equal to 0.05), the fixed effects model is the appropriate model for the data under study.

2.3. Econometric analysis

The lack of availability or the incompleteness of data in some countries prevented all Arab countries from being taken into account. Thus, the study includes 19 Arab countries, namely: Algeria, Bahrain, Djibouti, Jordan, Iraq, Saudi Arabia, Kuwait, United Arab Emirates, Lebanon, Libya, Yemen, Mauritania, Sudan, Morocco, Tunisia, Qatar, Sultanate of Oman, Sudan, Comoros. **Appendix N° 1**

The period covered by the study is 19 years (1996 to 2017). However, three years (1997, 1999 and 2001) were excluded, since the indicators of good governance only started to be published annually since 2001.

Through the subject of the study which analyzes the effect of indicators of good governance on economic development, we can consider that there is a dependent variable and several independent variables, which appear as follows:

- **The dependent variable**: There are several indicators through which economic development can be expressed, including: the human development index, gross domestic product per capita, average GDP growth per capita and the rate of growth of gross domestic product. In this study, we adopt an indicator, GDP per capita expressed in US dollars, and we designate it by: (PIBP).

- **Independent variables**: the independent variables are represented by the six indicators of good governance, represented by the following elements:

Table 1: Independent variables used in the study and its symbols

The original label	Coding
GovernmentEffectiveness	GE
RegulatoryQuality	RQ
Rulre of Law	RL
Control of Corruption	CC
Voice and Accountability	VA
PoliticalStability No Violence	PS

(Source: Prepared by researchers)

The variables under study linked to the indicators of good governance were collected, on the one hand, from the World Development Indicators of the World Bank database as well as via the variation of the production per capita, on the other other hand, the latter having been extracted from the website of the World Bank database during the month of April 2019. In order to know if there are differences in levels of development among the Arab countries, we will rely on an average comparison test using mono-variance analysis, where we have the following table:

Table 2: Analysis of the mono-variance of the average per capita product in the Arab countries

ANOVA					
GDPP					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	85170599149,892	18	4731699952,772	103,854	0,000
Within Groups	15581875735,195	342	45561040,161		
Total	100752474885,088	360			

(Source: Prepared by researchers using the XL-STAT program)

Using Table (02), we see that the value of the critical probability is 0,000, which is less than the 5% level of significance. This observation indicates that there is a difference in levels of development (expressed in GDP per capita) between the Arab countries. This indicator exhibits its lowest level, 296$, in Sudan in 1996. Furthermore, it appears relatively low in Yemen, the Comoros and Mauritania, while the highest level is estimated at 88,564$ in 2012 in the 'State of Qatar, as we also find it high in Kuwait and the United Arab Emirates.
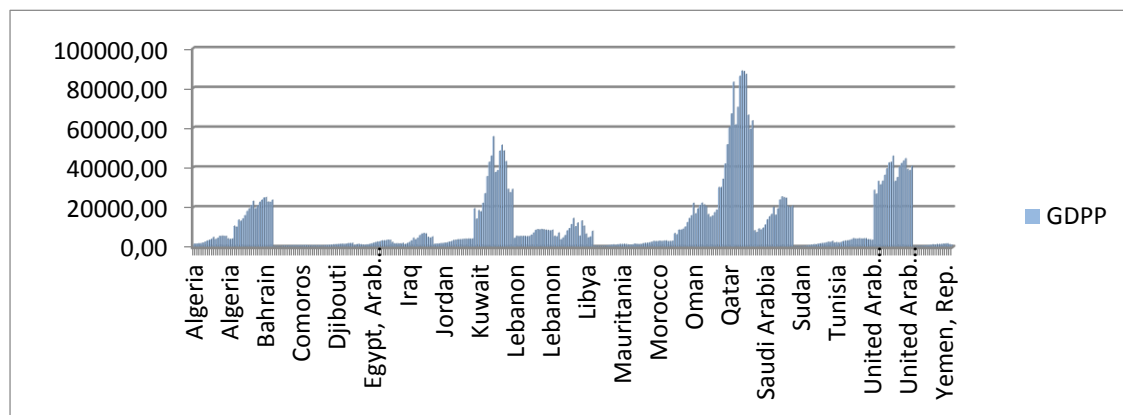
In Figure 01 below:

Figure1:Evolution of the GDP per capita in the Arab countries 1996-2017

(Source: Prepared by researchers using the XL-STAT program)

We will estimate the basic models of the panel data, since the study data are compatible with the panel observations. These include sections represented in the Arab countries and a time series for the period 1996-2017 (T = 19). Therefore, we will apply the panel models to determine the source of the difference between the Arab countries.

The question is whether the difference is homogeneous within an aggregate model or whether it is a fixed or a random individual effect.

The estimation model proposed is the model that includes each of the independent variables related to good governance and its impact on the variable dependent on economic development, so we will perform a static analysis of the panel models to choose the relevant model.

The proposed estimation model can be formulated as follows:

$$GDPP_{it} = \alpha + \beta_1 GL_{it} + \beta_2 PS_{it} + \beta_3 RL_{it} + \beta_4 RQ_{it} + \beta_5 VA_{it} + \beta_6 CC_{it} + \varepsilon_{it}$$

Where: T = 1; 19, i = 1; 19 express the syllables which are the Arab countries: n = N * T = 19 * 19 = 361

Table3: Estimation of basic models of panel data

Random effects model	Fixed effects model	Aggregate regression model	Variables and coefficients
8640,118 2,963	**8191,850 (5,319)	**10909,85 (7,321)	Constant
1598,972 0,799	1623,83 (0,798)	1623,83 (1,013)	GL
**-4045,068 -4,765	**-4293,69 (-4,926)	-9,487 (-0,009)	PS
**9956,878 4,5683	**9752,804 (4,261)	2631,92 (0,953)	RL
4266,274 2,377	*4546,916 (2,494)	4697,94 (-1,908)	RQ
**-7312,856 -5,516	**-7444,187 (-5,502)	**-6670,43 (-4,584)	VA
2098,505 1,194	1468,206 (0,828)	**16530,35 (6,081)	CC
0,198	0,873	0,496	The coefficient of determination(R^2)
**14,625	**96,745	**58,147	Fisher's test(F)
0,388	0,414	0,141	Value test of DW

** significant at% 1, * significant at% 5, (): value of the student's test

(Source: According to the results of the rose in Appendix (2,3, 4) according to the 10 EVIEWS program)

After having estimated the three basic models: the aggregated regression model (PRM), the fixed effects model (FEM) and the random effects model (REM), we will differentiate them in order to choose the appropriate model using statistical tests.

3.2.1. Methods of choice between models:

A- Fischer F restricted test

$$F(N-1, NT-N-k) = \frac{\frac{(R^2_{FEM} - R^2_{PRM})}{(N-1)}}{(1 - (R^2_{FEM})/(NT-N-k)}$$

$$F_c = \frac{\frac{(0,873-0,496)}{(19-1)}}{(1-0,873)/(19*19-19-6)} = 55,412$$

$$F_t\big((19-1; 19*19-19-6); 5\%\big) = F_t(19; 336; 0,05) = 1,52$$

Since the calculated value (Fc) is greater than the expected value (Ft), we accept the alternative hypothesis that the fixed effects model is appropriate compared to the aggregated regression model, so we will apply the Hausman test which differentiates the fixed effects model (FEM) from the random effects model (REM).

C- The Hausman test

Table4: The results of the Hausmann test

Correlated Random Effects - Hausman Test			
Equation: Untitled			
Test cross-section random effects			
Test Summary	**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**Prob.**
Cross-section random	10.552706	6	0.1032

(Source: Prepared by researchers using the EVIEWS10 Program)

Looking at Table 04, we see that the calculated Khi square value has reached (10.55) and its critical probability is 0.103, which is higher than the level of significance (5%). This observation leads us to accept the zero hypothesis (H0), which indicates that the random effects model is appropriate.

3.2.2. Evaluation of the random effects model

Using the estimated random effects model, we find that there are positive signals for the estimated parameters, which indicates the direct relationship between them and economic development. These indicators are: government effectiveness (GE), quality of organization (RQ), rule of law (RL), anti-corruption (CC). This relationship is closer to economic logic, because the higher these indicators, the more there will be an acceleration of economic development in the country, in addition to the constant component having a positive impact. On the other hand, two variables have a negative impact on economic development in the Arab countries, namely solidity and responsibility (VA), political stability and the absence of violence (PS).

In terms of partial significance, we note that the parameters of each of the indicators: political stability and absence of violence (PS), voice and responsibility (VA) and rule of law (RL) have had a significant impact on the economic development of the countries Arab.

In the same vein, we find that the global model is significant, given the value of the Fisher test, which amounts to (14, 62), and that it is significant at a risk level of 1 %. In addition, the explanatory capacity is 0.198, which means that the variables listed (indicators of good governance) contribute to the interpretation of economic development at a rate of 19.8%, which is relatively low. This indicates that there are other factors not included in the model that contribute to economic development in the Arab countries. However, we can accept the estimated model from an economic and statistical point of view.

3.3. Results of the standard study

Through the application of a static analysis of panel models, the model that includes the independent variables related to good governance and its effect on the variable dependent on economic development was estimated, and the preferred model was chosen using the restricted Fischer test and the Haussmann test. After estimating the three basic models: the group regression model (PRM), the fixed effects model (FEM) and the random effects model (REM), it was found that the random effects model is the most relevant. This proves the existence of a difference in the random component between the Arab countries when estimating the relation of the effects of the indicators of good governance on economic development, that is, in other words, the presence of other factors outside the model which differ from one country to another and which are at the origin of the appearance of random differences between Arab countries. As for the indicators that have had a significant impact on economic development, namely political stability and the absence of violence (PS), voice and responsibility (VA), the rule of law (RL).), they can be listed as follows:

- **Political and security factors**: Arab countries are different in terms of systems of government where relatively stable monarchies rub shoulders with republics where the leaders change at each period and often change the policies applied and the laws in force according to their objectives. In addition, the stability of the security situation

plays a major role in the economic development of the country. However, in recent years, some Arab countries have experienced chronic instability which can only have negative effects on any development policy.

- Economic and natural factors: the cause of random individual differences can be attributed to the presence in certain countries of oil and gas resources, which gives them a definite advantage compared to other countries lacking these resources. Indeed, the integration of the hydrocarbon sector in the calculation of the various macroeconomic variables can only bias comparisons between unequally endowed countries.

4. Conclusion

This study came to show the magnitude of the effects of good governance indicators on economic development in the Arab countries during the period 1996-2017 thanks to the use of good governance and economic development indicators expressed by the GDP. Per inhabitant. A sample of 19 Arab countries was selected on the basis of statistical methods and the following results were highlighted:

- There is a difference in the levels of economic development between the Arab countries. Through a mono-variance analysis table to compare the means, we note a difference in the index of gross domestic product per capita between Arab countries (Qatar has the largest domestic product per capita and this shows the validity of the first hypothesis).
- There are random individual differences with regard to the Arab countries mainly due to the influence of indicators of good governance on economic development. Thanks to the static analysis of the Panel and using differential tests, it was found that the random effects model is appropriate, i.e. the existence of variables not included in the model that have an impact on development in Arab countries. This proves the validity of the second hypothesis.

Based on the above, recommendations can be made as follows:

- The need to pay attention to indicators of good governance in the Arab countries because they are of great importance and have a strong impact on economic development. These indicators also provide a political, legal, environmental and economic climate that contributes to the development of the country and the elimination of debt.
- Arab governments should use and encourage competition to ensure the stability of public institutions;
- The need to achieve political stability in the Arab countries due to its great impact on economic activity in order to achieve economic growth and attract foreign investment.
- The indicators of good governance must achieve interdependence between them in the Arab countries in order to achieve the desired objectives, since one cannot be applied at the expense of the other, but the two must be applied together.

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7. Appendixes
Appendix1.

Arab countries used in the study

PAYS	N°	PAYS	N°
Algeria	1	Mauritania	11
Bahrain	2	Morocco	12
Comoros	3	Oman	13
Djibouti	4	Qatar	14
Egypt.	5	Saudi Arabia	15
Iraq	6	Sudan	16
Jordan	7	Tunisia	17
Kuwait	8	United Arab Emirates	18
Lebanon	9	Yemen, Rep.	19
Libya	10	------	----

Appendix2.

Results of the estimate of the aggregate regression model

Dependent Variable: GDPP
Method: Panel Least Squares
Date: 04/18/19   Time: 13:56
Sample: 1996 2017
Periods included: 19
Cross-sections included: 19
Total panel (balanced) observations: 361

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GE	2607.562	2571.632	1.013972	0.3113
PS	-9.487469	1039.872	-0.009124	0.9927
RL	2631.927	2761.446	0.953097	0.3412
RQ	-4697.949	2460.953	-1.908996	0.0571
VA	-6670.438	1454.884	-4.584860	0.0000
CC	16530.35	2718.268	6.081207	0.0000
C	10919.85	1491.411	7.321824	0.0000

R-squared	0.496359	Mean dependent var	11532.66
Adjusted R-squared	0.487823	S.D. dependent var	16729.26
S.E. of regression	11972.55	Akaike info criterion	21.63782
Sum squared resid	5.07E+10	Schwarz criterion	21.71323
Log likelihood	-3898.627	Hannan-Quinn criter.	21.66780
F-statistic	58.14705	Durbin-Watson stat	0.141568
Prob(F-statistic)	0.000000		

*(**Source:** Prepared by researchers using the EVIEWS10 Program)*

Appendix3.

Results of the estimate of the fixed effects model

```
Dependent Variable: GDPP
Method: Panel Least Squares
Date: 04/18/19   Time: 13:57
Sample: 1996 2017
Periods included: 19
Cross-sections included: 19
Total panel (balanced) observations: 361
```

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GE	1623.834	2034.455	0.798167	0.4253
PS	-4293.694	871.5682	-4.926401	0.0000
RL	9752.804	2288.484	4.261688	0.0000
RQ	4546.916	1822.415	2.494994	0.0131
VA	-7444.187	1352.792	-5.502832	0.0000
CC	1468.206	1771.081	0.828989	0.4077
C	8191.850	1539.928	5.319632	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.873584	Mean dependent var	11532.66
Adjusted R-squared	0.864554	S.D. dependent var	16729.26
S.E. of regression	6156.865	Akaike info criterion	20.35526
Sum squared resid	1.27E+10	Schwarz criterion	20.62457
Log likelihood	-3649.125	Hannan-Quinn criter.	20.46233
F-statistic	96.74527	Durbin-Watson stat	0.414035
Prob(F-statistic)	0.000000		

(Source: Prepared by researchers using the EVIEWS10 Program)

Appendix4.

Results of estimating random effects model

```
Dependent Variable: GDPP
Method: Panel EGLS (Cross-section random effects)
Date: 04/18/19   Time: 13:58
Sample: 1996 2017
Periods included: 19
Cross-sections included: 19
Total panel (balanced) observations: 361
Swamy and Arora estimator of component variances
```

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GE	1598.972	2000.223	0.799396	0.4246
PS	-4045.068	848.7510	-4.765906	0.0000
RL	9965.878	2181.498	4.568364	0.0000
RQ	4266.274	1794.760	2.377072	0.0180
VA	-7312.856	1325.520	-5.516974	0.0000
CC	2098.505	1756.788	1.194512	0.2331
C	8640.118	2915.776	2.963230	0.0033

Effects Specification		S.D.	Rho
Cross-section random		11010.00	0.7618
Idiosyncratic random		6156.865	0.2382

Weighted Statistics

R-squared	0.198651	Mean dependent var	1467.507
Adjusted R-squared	0.185069	S.D. dependent var	6863.948
S.E. of regression	6196.330	Sum squared resid	1.36E+10
F-statistic	14.62582	Durbin-Watson stat	0.388176
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.359609	Mean dependent var	11532.66
Sum squared resid	6.45E+10	Durbin-Watson stat	0.081771

(Source: Prepared by researchers using the EVIEWS10 Program)