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Study of the Relationship Between Energy Consumption Economic Growth and Climate Change Using Panel Data

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Abstract:

This study aims to measure the relationship between energy consumption, economic growth, and climate change, which is represented by the emission of CO2 gas, in the case of five North Africa and the Middle East (MENA) countries during 1980-2014. To this end, the study uses the techniques of economic measurement of longitudinal data (Panel). First, the study estimates the model. Second, studying the stability of the strings for the variables. Third, implementing cointegration test to verify the existence of a long-term relationship between the studied variables.

Results suggest that the model estimation with OLS technology as well as FMOLS and DOLS techniques that give us more efficient models.

key words: Energy Consumption, Economic Growth, Climate, CO2, Panel data.JEL Classification: O44 ،Q29.

Introduction:

Increasing the consumption of conventional energy and its impact on climate change is one of the most important questions currently circulating at the international level, whether political, security or economic in recent decades, there are a lot of polluting

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gases for the environment as a result of the industrialization race of the major industrialized countries as well as southeast Asian countries such as India, China and Japan, but CO2 is the most influential gas for climate change.

The relationship between energy consumption, economic growth and co2 emissions has become one of the most important challenges for decision makers to preserve the environment and thereby enshrine the concept of sustainable development, i.e. to preserve the share of energy of future generations and to reduce or reduce the phenomenon of climate change associated with energy consumption. The phenomenon of climate change, especially global warming, is defined as a gradual increase in the temperature of the lowest layers of the earth's atmosphere, thus raising the earth's temperature, and this is caused by increased greenhouse gas emissions, which are natural gases that play an important role in warming the earth's surface so that it can live, without which it reaches a degree The earth's surface temperature is 18°C below zero, as these gases absorb part of the infrared radiation emitted from the earth's surface as a reflection of the earth's surface rays from the Sun, and keep them in the Earth's atmosphere, to maintain the earth's temperature at its normal rate, which is 15°C. However, with advances in industry and transportation from the industrial revolution to the present, with the reliance on conventional depleted energy (coal, oil and natural gas) as the primary source of energy, and with the combustion of this fossil fuel for energy production, the most important gases were produced in larger quantities of carbon dioxide than the atmosphere needed to maintain the earth's temperature thus reducing the availability of these additional gases to retain greater atmospheric heat, thus naturally starting to increase the surface of the Earth.

The Middle East and North Africa (MENA) region is one of the most vulnerable to climate change risks, and this is due to the catastrophic environmental impacts of high temperature and the fact that the region is already dry desert, which increases and

results in disasters at the agricultural, tourism and health levels for humans, animals and plants.

The MENA region is considered the most unstable region in the world and this is the result of wars of an economic, religious, sectarian and recent Arab Spring nature against the existing regimes, and one of the most important reasons for these disturbances is that the region is one of the richest areas with energy where it contains 2/3 of the world's oil reserves, as well as OPEC energy exporters MENA countries make up 80% of them, there is a disparity in population, per capita income and abundance of natural resources from one country to another, especially between the Countries of the Arab Gulf region and the rest of the MENA region. The most important international conferences under the umbrella of the United Nations, which discussed the phenomenon of energy consumption and its association with the phenomenon of climate change, especially global warming, is the Kyoto Protocol of 1997 and came into force in 2005 as well as the Paris Convention of 2015, where the ultimate goal was to limit the temperature rise to less than 2°c at the end of the century with an attempt to reduce the target to 1.5°C, the convention was ratified by the most important industrialized countries causing climate change as well as the countries of the world including the MENA.
The paper focuses on the following problem:

What is the impact of economic growth and climate change on energy consumption in the selected Middle East and North Africacountriesfrom1980to2014?

In order to answer this question, we rely on a standard study for the period mentioned above, by looking for the long-term relationship that measures the phenomenon in question, based on the techniques of the static and dynamic panel, after ensuring the homogeneity of the data for the sample studied, where we work to determine the quality of the model that fits these data, then study stability, then estimate the long-term relationship if any, then study causality and its direction in the short term as well as in the long term.

1. Methods and Materials:

The Panel models have recently gained considerable interest, especially in economic studies, since they take into account the effect of time change and the effect of the difference between the ct units in the study sample data, and longitudinal data models come in three main forms: regression model Pooled Regression Model (PRM), one of the simplest longitudinal data models where all transactions are fixed for all time periods gives any effect to time, and the Fixed Effects Model (FEM) through which we aim to know the behavior of each data set by making the cutting parameter vary from one group to another with the slope coefficient remaining constant for each segmented data set, the FEM is called the Least Squares Dummy Variable model, as well as the Random Effects Model(REM). The government's support for the government's work in the country is a good, where the error limit σ^2_ε has a normal distribution in the middle of zero and a variation equal to the difference to the difference of the Error Components Model (Error Components Model) because the model contains two error compounds -135 الصفحات ،2018 عطية، و بوكثير) (143, one of the most important advantage of panel analysesis it exceeds the time series On its own or data alone, many advantages (143-135 الصفحات ،2018 عطية، و بوكثير) are summarized in:

- Control of individual variation, which may appear in the case of ct or temporal data, which leads to biased results;
- Panel data includes more information content than that in ct or time, and therefore the possibility of obtaining higher confidence estimates, and the problem of inter-variable correlation is less severe than time series data, and on the other hand, The Panel data is characterized by a greater number of degrees of freedom as well as more efficiently;
- Panel models provide better possibility to study the dynamics of modification, which may be concealed by ct data, and are also suitable for studying periods of economic situations, such as unemployment, poverty, growth, etc., and on the other hand,

through the data panel can link the behaviors of the sample vocabulary from a point of time. For another;

- Contributes to reducing the possibility of variables neglecting problem, that results from the characteristics of unseen vocabulary, which usually leads to biased estimates, and highlights the importance of using Panel data in that it takes into account what is described as "heterogeneity or unnoticeable differences" of the sample vocabulary either CT or temporal; These forms help prevent the emergence of a problem of the persist entity of the common Heteroscedasticity error line when using cross-section data to estimate standard forms.

The proposed sample for the study consists of five countries from the MENA, which are Algeria, Iran, Jordan, Saudi Arabia, and Turkey. The variables in question are as follows:

CE: Per capita energy consumption, measured kg oil equivalent.

PIB: Per capita real output (2010 as basis year), measured in US Dollars.

CO2: Per capita co2 emission, measured metric ton.

The chosen time period is from 1980 to 2014, the variables data was all taken from the World Bank data (World Bank data, 2020).

Logarithm transformation is used in order to reduce the divergence of variability, especially between the Gulf and other countries, and the data are more homogenous.

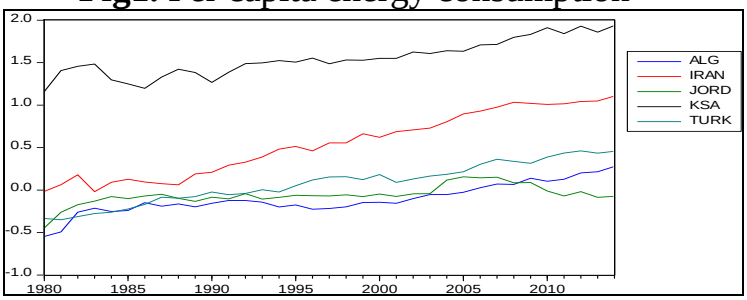
The proposed model of estimation is as follows:

$$LCE_{it} = \alpha_i + \beta_i LPIB_{it} + \delta_i LCO_{2it} + e_{it}$$

Where: represents the country; t represents time measured by years; e expresses random error.

In order to take a look at the status of the study variables for the sample countries figure 1 below is constructed.

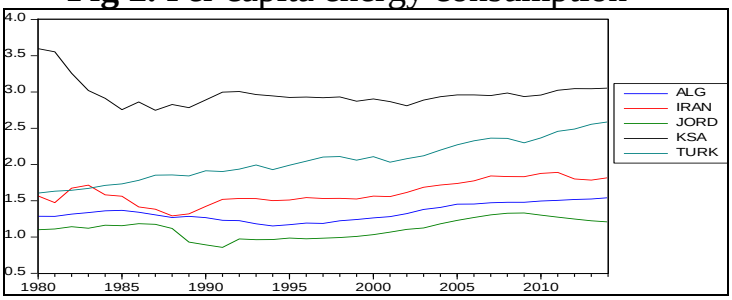
Fig1. Per capita energy consumption



Source: Prepared by the Researchers based on EViews10 outputs

Through Figure 1, it is clear that the per capita energy consumption of the sample countries is taking an upward trend in time during the period 1980 to 2014, although there is a variation in curves but generally homogeneity through the data.

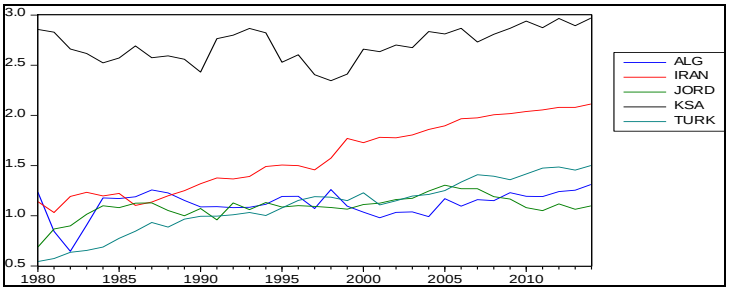
Fig 2. Per capita energy consumption



Source: Prepared by the Researchers based on EViews10 outputs

Through Figure 2, it is clear that the real per capita output of the sample countries takes a stable turn in time during the period 1980 to 2014.

Fig3. CO2 per capita emissions



Source: Prepared by the Researchers based on EViews10 outputs

Through Figure 3, it is clear that the per capita co2 emission of the sample countries is taking an upward trend in time during the period 1980 to 2014, although there is a variation in curves, but there is homogeneity through the shape.

2. Results and discussion:

Study and analyze the results of the estimate: After ascertaining the homogeneity between the countries of the sample, we follow the following steps as a methodology for the study:

- Descriptive statistics of study variables;
- Determine the type of model that is appropriate for data for the study;
- Stability test;
- Shared integration test;
- Model assessment and analysis with different techniques OLS, FMOLS, DOLS;
- Study of causality.

2. 1Descriptive statistics of the sample studied:

Table 1.descriptivestatisticsforthe studyvariables

	LCE	LCO2	LPIB
Mean	0.401454	1.519817	1.818793
Median	0.123184	1.199420	1.564828
Maximum	1.936903	2.971914	3.597807
Minimum	-0.545673	0.543980	0.857488
Std. Dev.	0.664263	0.663435	0.682676

Skewness	0.927449	0.988334	0.752647
Kurtosis	2.475111	2.581636	2.333052
Jarque-Bera	27.09694	29.76637	19.76575
Probability	0.000001	0.000000	0.000051
Observations	175	175	175
Cross Sections	5	5	5

Source: Prepared by the Researchers based on EViews10 outputs

2.2 Identify the appropriate model for the study:

When using the Panel data, and in order to find the appropriate model among the three main longitudinal models mentioned in this study, the first model is estimated the total homogenization model in the manner of normal micro squares (Hurlin, 2005), the second model of the second effect model. The third model is a random effect model in the way of generalized micro-squares(Sevestre, 2002), we get the following results:

Table 2. Results of the estimation of the three models

REM	FEM	PRM	Variables
.8942 (0.0000) *	.8964 (0.0000) *	0.1065 (0.0001) *	**LCO2**
0.06753 (0.2527)	.0472 (0.4873)	0.8873 (0.0000) *	**LPIB**
-1.0804 (0.0000) *	-1.0468 (0.0000) *	-1.1409 (0.0000) *	**α**
.8082	**.9698**	**.9598**	**R2**
362.48 (0.0000)	900.92 (0.0000)	2057.23 (0.0000)	**F Prob (F)**
.4185	.5717	.4327	**DW**

Source: Prepared by the Researchers based on EViews10 outputs

2.3 Test the possibilité of an individuel effect in the form:

To trade between the agrégation regression model and the other two models, i.e. the Fixed effects model or the random effects model, we use the Fisher test, Where the hypotheses are as follows:

H_0: The assembla regression model is the appropriate model.

H_1: The statice and/or random effects model is appropriate.

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

We get that F_c=112, and the Schedule Statistic F_t =2.60, and the refore reject the hypothesis of non-morale at a moral level of 1% and say that there is an individuel effect within the study sample data.

2.4 Test quality of impact:

In order to determine the quality of the impact between the constant and the random, we use the Hausman test in which the hypotheses are as follows:

H_0: The random effects model is appropriate.

H_1: The fixed effects model is appropriate.

Through Eviews outputs and based on the implementation of Hausman test on the model we get that calculated statistic χ_c^2=0.42 less than the scheduled statistic χ_c^2=9.2 this is at a moral level of 1% and from it we accept the zero hypothesis i.e. that there is no difference between the variables explained and the individual effect, and therefore the appropriate model of the study sample data is of the type is the random individual effect, this means that the sample countries agree on the one hand together The numbers of variables interpreted vary in constant values and this difference is not determined by the values of the variables interpreted for each country.

2.5 A stability test of longitudinal series of model variables:

The methodology in applied studies obliges the researcher before estimating the model to ensure the stability of the time series used, as instability leads to the problem of false regression, which gives us biased capabilities.

Some of the most popular tests for the stability of longitudinal chains include:

- Test (LLC-2002) Levin, Lin et Chu;
- Test (IPS-2003) Im, Pesaran et Shin;
- ADF-Fisher X^2 test;
- PP-Fisher X^2 test.

The results recorded in the table below for unit root tests confirm that all variables: LCE, LCO2, LPIB as a whole are unstable at their levels and this using the tests mentioned earlier at a moral level of 5%, but the use of the same tests for the first differences of the variables studied found that Stable at a moral level of 1%, we therefore conclude that the longitudinal chains: LCE, LCO2, LPIB are stable at the first difference, i.e. they are integrated at I(1).

Table 3. Results of longitudinal chain stability tests

LPIB	LCO2	LCE	Variables
LLC-T *			
-0.1242 (0.4505)	-1.5928 (0.0556)	-0.3698 (0.3558)	**thelevel**
-3.1046 (0.0010) *	-7.1100 (0.0000) *	-6.4196 (0.0000) *	**Thefirstdifference**
IPS-W-Stat			
-0.5451 (0.2928)	-1.5193 (0.0643)	1.2111 (0.8871)	**thelevel**
-4.2162 (0.0000) *	-7.9023 (0.0000) *	-8.6180 (0.0000) *	**Thefirstdifference**
ADF-Fisher X^2			
24.1452 (0.0072) *	19.1687 (0.0382) **	6.0814 (0.8084)	**thelevel**
37.4294 (0.0000) *	74.5299 (0.0000) *	82.0906 (0.0000) *	**Thefirstdifference**
PP-Fisher X^2			
14.0439 (0.1710)	23.4142 (0.0093) *	13.0173 (0.2227)	**thelevel**

69.1012 (0.0000) *	138.461 (0.0000) *	134.576 (0.0000) *	**Thefirstdifference**

Source : Prepared by the Researchers based on EViews10 outputs

2.6 Co integration test:

Co integration means that long-term variables converge on condition that longitudinal chains have a stability or stillness, if they are unstable, and their estimation leads to a false decline.

After ensuring that the longitudinal chains of variables are stable and are equally integrated, a balanced relationship between long-term longitudinal chains is tested by joint integration tests, and the co-integration relationships of Pedroni and Kao are known as the unit root hypothesis test for Residue Integration.

2.6.1 Pedroni Test:

Pedroni test, which was completed in 1999 and developed in 2004, is one of the most important tests to demonstrate the simultaneous integration of longitudinal data, dividing it into several partial tests divided into two categories dimension, and its application requires a prior appreciation of the long-term relationship, and its hypothesis is formulated as Following:

H_0: Lack of shared integration.

H_1: A shared integration.

The test is judged as follows: the zero hypothesis is rejected or accepted through the results of the majority of partial tests.

Considering the LPIB, LCO2, LCE variables are stable at their first differences, i.e., at the same level, we can conduct joint integration tests for both Pedroni and Kao, bearing in mind that the dependent variable is LEC energy consumption and the rest of the variables are independent variables.

Through the results in Table 4, using the Perdroni test to test the stability of the ponies in the model, where the tests are classified into two groups: internal dimension tests, inter-dimensional tests and tracking of these natural distribution tests (Pedroni, 2004, pp. 597-625), we find that The majority of partial tests have a critical

probability of less than 5%, confirming a long-term balance between economic growth, co2 emissions and energy consumption.

Therefore, we reject the zero hypothesis and accept the alternative hypothesis, in the sense that the variables in the model are in a state of Co integration and we can estimate the long-term relationship.

2.6.2 Kao Test:

The zero hypothesis in the Kao Co integration test states that there is no Co integration between the chains, as this test is based on a regression-protective stability test using the Extended Dickey Fuller Test (ADF).

Through the results in Table 4, the zero hypothesis of this test is rejected at a moral level of 1% and includes the lack of Co integration and therefore we can estimate the variables used in the model are in a state of Co integration and we can estimate the long-term relationship.

Table 4. Results of the cointegration tests of longitudinal chains

Pedroni Residual Cointegration Tests (LNEC As Dependent Variable)		
	Test Statistic	**Probability**
Within-Dimension		
Panel V-Statistic	-0.391545	.6523
Panel Rho-Statistic	-1.185058	.1180
Panel PP-Statistic	-2.593231 *	.0048
Panel ADF-Statistic	-1.305868 ***	.0958
Between-Dimension		
Group Rho-Statistic	-1.828569 **	.0337
Group PP-Statistic	-4.317542 *	0.0000

Group ADF-Statistic	-2.355462 *	.0092
Kao Residual Cointegration Tests (LNEC As Dependent Variable)		
	T- Statistic	**Probability**
ADF	-4.471653 *	0.0000

Source: Prepared by the Researchers based on EViews10 outputs

2.7 Estimate the long-term relationship:

As model variables in a case of common integration, we can estimate the long-term relationship, at this stage we use several methods of estimation:

- Estimate the small square method of the previously selected random model;
- Grade FMOLS method of micro-squares that are fully modified;
- Estimate the DOLS method of dynamic micro-squares;
- Estimate of each country in three ways;

Estimate the total panel in all three ways.

Table 5. Estimation the long-term relationship of the Five Countries and the panel in several ways LEC Variable Child

LCO2			**LPIB**			**Variables**
OLS	**FMOLS**	**DOLS**	**OLS**	**FMOLS**	**DOLS**	**/ Statesestimationmethods**
0.3005 * **	0.460 **	.0456	1.053 *	1.0084 *	0.996 *	**Algeria ALG**
1.062 *	1.056 *	1.039 *	-0.033	-0.0033	0.058	**Iran IRAN**
0.879 *	0.831 *	0.769 *	0.109 **	0.137 **	0.16 **	**Jordan JORD**
0.874 *	1.0865 *	.807	-0.389 **	-0.263	.529	**Saudi KSA**
0.553 *	0.555 *	0.534 *	0.333 *	0.337 *	0.375	**Turkey**

					*	TURK
0.887 *	0.938 *	0.892 *	0.106 *	0.095	0.229 ***	**Panel**

Source: Prepared by the Researchers based on EViews10 outputs

The estimation of the model in the manner of the small squares in the case of The Panel data usually gives us biased and inconsistent capabilities and this is due to the internality of the slopes and the instability of the variance of the residuals as well as the possibility of a autocorrelation of errors (العقاب، 2016، الصفحات 12-24) and this is evidenced by the DW value of Table 2, which is equal to 0.4185a. that there is a autocorrelation to errors.

The FMOLS estimate (Das & Chowdhury, 2012, pp. 277-286) and DOLS address the problems mentioned above and address implicit problems between variables i.e. the presence of internally determined variables(نبيل خضير، 2018، الصفحات 45-58) as well as the problem of heterogeneity between countries ensuring unbiased, more Efficient, and powerful results.

Table 5 represents each country as well as the annuals estimate for the group as a whole, in order to study the impact of economic growth on energy consumption as well as the extent of co_2 emissions and its relationship to energy consumption.

✓ **The relationship between economic growth and energy consumption:**

For the individual relationship (for each country) there is a moral and positive relationship between the two variables of the following countries: Algeria and Turkey at a moral level of 1% and Jordan at a moral level of 5%, this is estimated by the FMOLS method as well as by DOLS.

As for Iran and Saudi Arabia, there is no relationship, i.e. economic growth does not affect energy consumption.

For the Panel, we note that there is no relationship between the FMOLS method estimate between the two variables, while DOLS method there is a moral and positive relationship between economic growth and energy consumption.

✓ **The relationship between CO2 emissions and energy consumption:**

As for the individual relationship (for each country) there is a moral and positive relationship between the two variables for all the countries of the sample at a moral level of 1% except Algeria at a moral level of 5%, and this is estimated by the method FMOLS, but for the DOLS method there is also a moral and positive relationship between the two variables for the following countries: Iran, Jordan, Turkey. As for Algeria, there is a significant and positive relationship with the appreciation of the FMOLS and DOLS method between the two variables. Algeria and Saudi Arabia, there is no relationship between the two variables.

2.8 Causal analysis of the Panel model:

At this stage, we examine the causal relationships of the Panel model of the three LCE, LPIB, lCO2, both short-term and long-term, using the Engle and Granger method, whichinthe first phase aims to estimate the model chosen for the analyses of residuals, and the second phase is to estimate the parameters related to the correction of the near term (Dritsaki & Dritsaki, 2014, pp. 125-136). provides for two phases of causal study of The Panel models.

In general, the causal equations of Angel and Granger for the three variables are written as follows:

$$\Delta \mathrm{LCE}_{i,t} = \alpha_{1,i} + \sum_{k=1}^{m}\left(\alpha_{1,1,i,k} \times \Delta \mathrm{LCE}_{i,t,k}\right) + \sum_{k=1}^{m}\left(\alpha_{1,2,i,k} \times \Delta \mathrm{LCO2}_{i,t-k}\right) + \sum_{i=1}^{m}\left(\alpha_{1,3,i,k} \times \Delta \mathrm{LPIB}_{i,t-k}\right) + \lambda_{1,,t} \times ECT_{i,t-1} + U_t$$

$$\Delta \mathrm{LCO2}_{i,t} = \alpha_{2,i} + \sum_{k=1}^{m}\left(\alpha_{2,1,i,k} \times \Delta \mathrm{LCE}_{i,t,k}\right) + \sum_{k=1}^{m}\left(\alpha_{2,2,i,k} \times \Delta \mathrm{LCO2}_{i,t-k}\right) + \sum_{i=1}^{m}\left(\alpha_{2,3,i,k} \times \Delta \mathrm{LPIB}_{i,t-k}\right) + \lambda_{2,,t} \times ECT_{i,t-1} + U_{2,i,t}$$

$$\Delta \mathrm{LPIB}_{i,t} = \alpha_{3,i} + \sum_{k=1}^{m}\left(\alpha_{3,1,i,k} \times \Delta \mathrm{LCE}_{i,t,k}\right) + \sum_{k=1}^{m}\left(\alpha_{3,2,i,k} \times \Delta \mathrm{LCO2}_{i,t-k}\right) + \sum_{i=1}^{m}\left(\alpha_{3,3,i,k} \times \Delta \mathrm{LPIB}_{i,t-k}\right) + \lambda_{3,,t} \times ECT_{i,t-1} + U_{3,i,t}$$

Since Δ Represents the first différence, k =1,...m represents the optimal number of délayas by Schwarz standard, $ECT_{i,t-1}$ Referas to the long-term effect of cointegration of the équation whereitrepresents the long-term ajustement coefficient.

Table 6. The results of the Causal Test of The panel

Dependent variable	Sources Of Causation (Independent Variables)			T-Test
	Short-Run			Long-Run
	ΔLCE	ΔCO2	ΔPIB	ECT
ΔLCE		4.214 (0.1216)	12.269 * (0.0022)	-0.0039 (0.9125)
ΔCO2	.873 (0.646)		.749 (0.687)	-0.207 * (0.003)
ΔPIB	8.092 ** (0.0175)	0.825 (0.661)		0.0028 ** (0.0244)

Source : Prepared by the Researchers based on EViews10 outputs

✓ **Short-term causality:**

There is a short-term bilateral relationship between economic growth and energy consumption, i.e. in the short term an increase in economic growth requires an increase in energy consumption as well as an increase in energy consumption that positively affects economic growth, which is consistent with economic theory.

✓ **Long-term causality:**

According to the causal results in the table above, there are two long-term relationships:

- The increase in co_2 emissions is the result of increased energy consumption and increased economic growth of the sample countries;

The development of the economic growth of the countries in question is the result of an increase in energy consumption and thus an increase in co_2 emissions.

3.CONCLUSION:

Energy consumption and economic growth are among the most important indicators in the macroeconomic, but the impact of fuel consumption in increasing quantities and for a long period of time

has led to the emergence of climate changes and more accurately the problem of global warming due to the increase of greenhouse gases in the atmosphere, the most important of which is co_2 Carbon.

The measurement of the three indicators, i.e., energy consumption, economic growth and the amount of co_2 emissions associated with them for MENA the period 1980-2014 led to the acceptance of the random impact model as a model suitable for the study sample data, but the model is unacceptable. A record due to bias caused by self-linking errors and due to the instability of the longitudinal chains of model variables as shown by the stability tests.

(LLC, IPS, ADF-Fisher X^2, ADF-Fisher X^2), or the model's inability to estimate sample data.

However, the model variables are stable in their initial differences and based on both the Kao Perdoni test, we have confirmed that the variables are in a state of first-class joint integration, so we can accept the long-term relationship and provide the conditions for estimating the error correction model, using the FMOLS method. The micro-squares are fully modified, and DOLS is a dynamic micro-square method that has the ability to address the implicit problem of variables, the problem of heterogeneity of individuals, i.e. states, as well as the problem of contrast instability of the parameters and the problem of self-linking of errors, ensuring unbiased results. And more efficient and powerful parameters.

The estimate was individually using the three methods: OLS, FMOLS, and DOLS, which gives the relationship of the three variables to each other by country during the period 1980 to 2014, and we also estimated the panel for the same period.

In the end, we discussed the causal analysis of Granger and Angel for The panel data in terms of direction as well as for its analysis in the short and long term, where we get that there is a dual-directional causality between energy consumption and economic growth in the short term, but for the long term, we get

that increase co_2 emissions are the result of increased energy consumption and economic growth, as well as economic growth linked to energy consumption and increased co_2 emissions for the model studied during the period.

4. Bibliography List:

1- *World Bank data.* (2020). Consulté le sur https://data.albankaldawli.org/country

2- Das, A., & Chowdhury, M. (2012). Panel cointegration and pooled mean group estimation of energy output dynamics in south asia. *Journal of economics and behavioral studies, N° 05*.

3- Dritsaki, C., & Dritsaki, M. (2014). Causal relationship between Energy Consumption, Economic Growth and CO2 Emissions: A dynamic Panel Data Approach. International . *Journal of Energy Economics and Policy*.

4- Hurlin, C. (2005). *l'économétrie des données de Panel Modéles linéaires simples.* Paris: Université d'Orleans.

5- Pedroni, P. (2004). *Panel cointegration: asymptotic and finite sample proprieties of pooled times series tests with an application to the PPP hypothesis. Econometric Theory, 20.*

6- Sevestre, P. (2002). *économetrie des données de Panel.* Paris: Dunod.

7- العقاب ,م .(2016) .عوامل الضغط التضخمي في دول الشرق الأوسط وشمال إفريقيا–دراسة قياسية .–*مجلة دفاتر اقتصادية*.

8- بوكثير ,ج& .,عطية ,ع .ا .(2018) .نمذجة علاقة تقلبات أسعار النفط بالنمو الاقتصادي باستخدام بيانات بانل .*مجلة الباحث*.

9- نبيل خضير ,ع .(2018) .تقدير تأثير استثمارات دول منظمة التعاون الاقتصادي والتنمية على نمو الدول العربية .*مجلة اقتصاديات شمال افريقيا*.