Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 46 – 57
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.4710

The Statistical Relationship between Industrial Development and Economic Growth: Empirical Evidence from Egypt

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Abstract

This paper aims to test the statistical relationship between industrial development and economic growth in Egypt. The study relied on the hypothesis that industrialization causes economic growth as measured by real gross domestic product, Also, economic growth causes industrialization, and a standard model was used to test this causal relationship, depending on the co-integration method, and using the error correction model (VECM). The results of the test model came to the existence of a unidirectional causal relationship in the short run from the real added value of the industrial sector to the real GDP, the real value added growth rate of the industrial sector causes the real GDP in the short run, the causal relationship between real GDP and labor supply is bidirectional in the short run, the causal relationship between real GDP and real capital accumulation is unidirectional in the long run from real GDP to real capital accumulation and bidirectional in the short run.

Keywords: *Economic Growth, Industrialization, Capital Accumulation, Labor Force.*

Introduction

Manufacturing has become linked to economic development, and it is a term synonymous with economic development. Of course, no country can be considered developed and have reached an advanced state of economic development without a sound agricultural base [1]. Just as some countries with a backward agricultural sector can benefit from the agricultural resources of other more developed countries, although agriculture was a "leading sector for growth" in some other countries, at the same time, rapid economic development has become fundamentally dependent on rapid industrialization. For example, there is hardly any country in the world except New Zealand that can reach the level of per capita income of the industrially developed countries in the West without relying heavily on agriculture and manufacturing its products [2]. As for oil-producing countries such as Saudi Arabia, Kuwait, and the United Arab Emirates, they represent a special case or exception to the positive relationship between per capita income and the share of industry. The basic criteria used to distinguish between a developed economy and an underdeveloped economy are related to the proportion of the workforce engaged in industrial activity, and the proportion of the national product that originates in the industrial sector, and so on. It is no wonder that there is no big difference between the two terms "industry" and "economic development", and both are used interchangeably [3,4,5].

It is worth noting that about 17 sustainable development goals (SDGs) and about 169 targets have been set to advance economic prosperity and social well-being while protecting the environment. The 2030 plan aims to leave no one behind and therefore represents a common plan for both developed and developing countries, as the United Nations are committed to. UNIDO is fully committed to contributing to the achievement of the Sustainable Development Goals [6], while fulfilling its mandate to support Member States in achieving comprehensive and sustainable industrial development. Objective No. 9 of the Sustainable Development Goals calls for building resilient infrastructure, promoting sustainable industrialization, and promoting innovation, given the interconnected nature of the development goals.

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Sustainable development, many UNIDO activities contribute to more than just Sustainable Development [7,8]

Even though manufacturing contributes to the global goal of economic growth [1,9], its impact differs depending on the stage of a country's development. In advanced economies, industrial growth is reflected in higher productivity, adoption of new technologies, smart production processes, and reducing the impact of industrial production on the environment and climate. For developing economies, manufacturing means structural transformation of the economy from traditional sectors such as agriculture and fisheries to modern manufacturing industries fueled by innovation and technology [10]. Such expansion in the manufacturing sector creates jobs and helps improve income, thereby reducing poverty [11,12]. It also introduces and strengthens new technologies and produces goods and essential services for the market. The top 10 global manufacturing producers in 2017 and their share of global manufacturing value added can be further illustrated as (Figure 1).

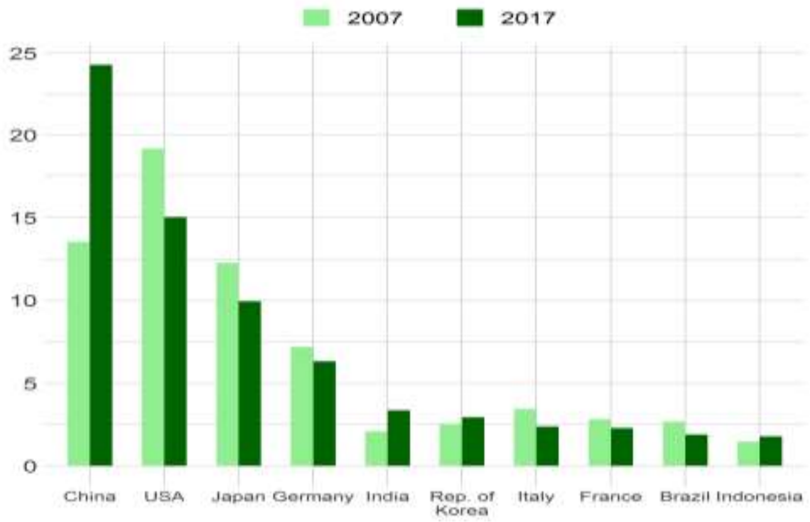

Figure 1. The 10 Largest Producers of Manufacturing Industries in The World During 2017 and Their Share of The Value Added to Global Manufacturing**.**

It is evident from Figure (1) that the developing and emerging industrial economies have maintained a strong pace of industrial growth, much higher than growth in the world and industrialized economies, where China dominates the value added of manufacturing in developing and emerging industrial economies, as its share of value added increased from 13.5% in 2007 to about 24.3% in 2017. Emerging industrial economies, excluding China, accounted for 16.4% of global manufacturing output in 2017, while the share of other developing economies and least developed countries was a small proportion, at about 2.8% and 0.8%, respectively, in the same year.

As can be seen, China has topped the list of the ten largest manufacturing countries in the world since 2010, with a share of about 24.3% of the global manufacturing value added in 2017, followed by the United States at about 15%. Manufacturing output in China is also approaching that of Europe, which accounted for about 25.5% in 2017. The remaining countries on the list of the top ten manufacturers are Japan, Germany, India, South Korea, Italy, France, Brazil, and Indonesia. These countries together accounted for more than 70% of the global manufacturing value added in 2017. Despite being home to more than 12% of the world's population, the least developed countries accounted for only about 0.8% of total industrial output worldwide in 2017. In comparison, industrial economies with around 17% of the world's population account for more than 55% of global manufacturing output. It is therefore crucial for least developed countries to expand their capacities to achieve a higher growth path overall. [2,6,9,13]

The study attempts to test the relationship between Industrial Development and economic growth in Egypt, [10,14] especially since Egypt's ranking in the Global Competitiveness Index of the manufacturing sector

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fell to 68th globally in 2023 compared to 65th in 2020, out of 153 countries ranked from first to last. The study is based on the hypothesis that manufacturing causes economic growth, measured by real GDP, and that economic growth causes manufacturing. The study aims to test the validity of the study hypothesis by relying on the inductive approach that studies the relationship between manufacturing and economic growth in Egypt. The study also relies on the inductive approach by collecting data and statistics to achieve the research objective [11,13].

To test the validity of the hypothesis, the researchers propose dividing the study into six parts, in addition to the introduction. Part two explains previous studies, part three discusses competitive industrial performance indicators, part four explains the study model, part five explains the research methodology, and part six clarifies the conclusion and recommendations of the study.

Literature Review and Hypothesis Development

Many previous studies have addressed the relationship between industrialization and economic growth, including [9,15,16,17,18,19,20]

The connection between industrialization and economic growth is a well-established concept in economics. Historically, countries that have undergone industrialization have experienced significant increases in GDP and standards of living [16]. This literature review will explore the various ways in which industrialization can lead to economic growth.

Increased Productivity

One of the key drivers of economic growth through industrialization is the rise in productivity. Industrial processes allow for the mass production of goods, which can be produced more cheaply and efficiently than handmade goods [17]. This leads to an increase in output per worker, which in turn contributes to economic growth [21].

Structural Transformation

Industrialization often leads to a structural transformation of an economy, away from agriculture and towards manufacturing and services [22], This shift can be beneficial for growth as the manufacturing and service sectors tend to be more productive than agriculture [23]

Job Creation and Income Growth

Industrialization creates new job opportunities, particularly in manufacturing sectors. These jobs typically offer higher wages than agricultural jobs, which can lead to an increase in overall income levels and a rise in the standard of living [24]

Technological Advancement

Industrialization is often accompanied by technological advancements. As industries develop new technologies to improve production processes, these advancements can spill over into other sectors of the economy, further boosting productivity and growth [9,25]

Increased Investment and Innovation

Industrialization can attract investment, both domestic and foreign. This influx of capital can be used to finance further industrial development, as well as research and development (R&D) in new technologies [10,16,26]. This can lead to a cycle of innovation and growth.

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Criticisms and Considerations

While the relationship between industrialization and economic growth is generally positive, there are also some potential drawbacks to consider. For example, industrialization can lead to environmental pollution and resource depletion [27]. Additionally, the benefits of industrialization may not be evenly distributed, with some countries or regions benefiting more than others [15,28,29,30].

Mechanisms of Industrialization-Led Growth

Enhanced Productivity: Industrial processes enable mass production, leading to cheaper and more efficient goods compared to handmade alternatives. This translates to increased output per worker, ultimately contributing to economic growth [31].

Structural Transformation: Industrialization often triggers a shift in an economy's structure, moving away from agriculture and towards manufacturing and services [32]. This transformation can be beneficial as the manufacturing and service sectors are generally more productive than agriculture [10].

Job Creation and Income Improvement: Industrialization generates new employment opportunities, particularly in manufacturing sectors. These jobs typically offer higher wages than agricultural ones, leading to a rise in overall income levels and a higher standard of living [33].

Technological Progress: Industrialization and technological advancements are often intertwined. As industries develop new production process technologies, these advancements spill over into other sectors, further propelling productivity and growth [34].

Investment and Innovation: Industrialization can attract domestic and foreign investment. This influx of capital can be used to finance further industrial development, alongside research and development (R&D) in new technologies [15,24]. This fosters a cycle of innovation and economic growth.

The Case of Developing Countries

While the relationship between industrialization and economic growth holds true, developing countries face unique challenges:

Limited Infrastructure: Developing countries often lack the robust infrastructure (transportation, energy) necessary to support large-scale industrialization [35].

Human Capital Constraints: A skilled workforce is crucial for efficient industrial processes [14]. However, developing countries may have limited access to quality education and training programs, hindering the development of a skilled workforce [16].

Financing Challenges: Developing countries may struggle to secure the significant capital investments needed to establish and maintain industrial capacity [36].

Globalized Market Integration: Developing countries entering the globalized market may face competition from established industrial powers, making it difficult to gain a foothold [29].

The Role of Competitive Industrial Performance (CIP)

The concept of Competitive Industrial Performance (CIP) is particularly relevant for developing countries aiming to leverage industrialization for growth. CIP serves as a composite measure to assess a country's industrial competitiveness across various dimensions. By enhancing CIP, developing economies can [2,8,17,30]:

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Attract more investment, both domestic and foreign [31].

Improve resilience against external shocks impacting global commodity prices or economic downturns [26].

Prioritize areas for improvement based on the five key CIP indicator categories: trade performance, investment, innovation and technology, entrepreneurship and business environment, and labor and employment [7,13,29].

Hypothesis Development

Based on the previous literature, we can develop the research hypothesis as follow:

H1: There is a Statistical Relationship between Industrial Development and Economic Growth.

Competitive Industrial Performance Index

The Competitive Industrial Performance (CIP) indicator represents a composite measure for gauging industrial competitiveness across economies. It provides valuable insights into a country's strengths and weaknesses in its national manufacturing sectors [36]. By enhancing competitiveness, economic efficiency in allocating scarce resources can be maximized, ultimately resulting in greater prosperity for the population. There are several ways in which increased industrial competitiveness can contribute to a nation's overall prosperity. For instance, it can attract more investment from domestic and foreign companies and improve the resilience of industries in the face of external shocks, such as sudden surges in commodity prices or global economic downturns [4,32].

Competitiveness is crucial if a country's industrial sector is to prosper [31]. It determines the pace and quality of a country's structural change as its economy develops, as well as the extent to which these changes contribute to the well-being of society [23]. The industrial sector's contribution to prosperity depends on its ability to produce manufactured goods and exchange those goods in global markets and specialization in complex production processes [30]. The CIP index is widely used by international development agencies to classify countries in the context of their development priorities [1]. The global manufacturing classification is based on the analysis of eight indicators that reflect three dimensions: 1) the ability to produce and export manufactured goods, 2) The extent of technological deepening and upgrading, and 3) The impact on the global market. The 2019 edition of the CIP Index evaluates 150 economies, covering about 99% of global manufactured exports and manufacturing value added in 2021, and according to the distribution of CIP scores in the world, the countries that occupy the highest CIP rating For the year 2021, it is Germany (0.404), China (0.374), Ireland (0.341), Korea (0.319), and the United States (0.307). As for the countries that ranked lowest, they were Eritrea, Gambia, Iraq, Tonga, and Yemen. As for the Egyptian economy, it was In the competitive industrial performance index, Egypt ranked 68th globally in the same year, and will maintain this rate in 2023 [12,13,14].

Model Description

To achieve the objective of the study, which is to test the causal relationship between the industrial development and economic growth in the Egyptian economy, the variables of the study were identified, and the model was formulated by making use of previous studies in this field, including [5,7,10], which relied on the Cobb-Douglas model in formulating the relationship. Between the industrial development and economic growth, the Cobb-Douglas function can be expressed in the following mathematical form:

$$y_t = A\ K_t^{\alpha}\ L^{\beta} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

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Y_t refers to the rate of economic growth in the Egyptian economy (measured by real GDP), A refers to the technological level (which is constant), K expresses real capital accumulation, L refers to the labor force, and alpha refers to the coefficient of elasticity of output with respect to real capital accumulation, beta refers to the coefficient of elasticity of output with respect to the labor force.

Since the main objective of the study is to test the relationship between the industrial development and economic growth in Egypt, the real added value of the industrial sector (F) will be added as an explanatory variable to Equation No. (1) to become as follows:

$$y_t = A\ K_t^{\alpha}\ L^{\beta} F_t^{y} \ \ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

The logarithm of both sides of equation (2) is taken to obtain the following linear equation.

$$\log y_t = b_0 + b_1 \log K_t + b_2 \log L_t + b_3 \log F_t + \epsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Equation (3) is used as a basis for testing the relationship between each explanatory variable and economic growth bilaterally in the short and long terms. Since the variables are in their logarithmic value, the partial derivatives express the elasticity of the GDP growth rate with respect to the explanatory variables. b_1 expresses the elasticity of the GDP. The real GDP with respect to real capital accumulation, b_2 expresses the elasticity of real GDP growth with respect to the labor force, b_3 expresses the elasticity of real GDP growth with respect to the value added in the industrial sector, epsilon is the random error term assuming that it achieves traditional statistical properties with an arithmetic mean equal to zero and constant contrast.

Regarding the data on the variables that are used in tests on the state of the Egyptian economy during the period (1990-2022), it was collected from international sources, the World Bank, and the Consumer Price Index CPI (2010 = 100) was used to obtain the real values of those variables. (Real GDP, real capital accumulation, real value added in the industrial sector).

Methodology, Statistics Analysis, and Results

According to the methodology used in the study, the methods used consist of three tests: "unit root tests, cointegration tests, and error correction models.

Unit Root Test for Stationarity of Time Series

The Unit Root Test aims to examine the properties of time series for both labor force (L), which is a real variable, and economic growth as measured by real GDP (y), real capital accumulation (K) and real value added in the industrial sector (F) during The period (1990-2021), in order to identify the extent of its stationarity, and to determine the degree of integration of each variable separately, and despite the multiple unit root tests, the current study will use two tests: the Dickey and Fuller test, and the Philp-Byrne test. (Philip- Perron), and Table (1) shows the results of the ADF unit root test for the study variables.

Table 1. Results of the ADF Unit Root Test for the Levels And First Differences of the Variables

ADF-test & PP-test				
Time series	Level		The first difference	
	Section	Section and general direction	Section	Section and general direction

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	t-Statistic	Prob.*	t-Statistic	Prob.*	t-Statistic	Prob.*	t-Statistic	Prob.*
log(Y)	1.06	1.00	-1.39	0.84	-3.18	0.03	-3.40	0.07
log(L)	-1.70	0.42	-1.25	0.88	-3.41	0.02	-3.74	0.03
log(K)	0.90	0.99	-1.71	0.72	-3.46	0.02	-3.63	0.04
log(F)	0.27	0.97	-1.26	0.88	-4.65	0.00	-4.71	0.00

Table 1 shows the results of the Dickey-Fuller test, which indicate the instability of all-time series for the growth rate of the real GDP, the growth rate of the labor force, the growth rate of real capital accumulation, and the real value added of the industrial sector at the level by a segment or by a segment and a general trend. At a significance level of 15% or less, that is, the null hypothesis was accepted, which states that there is a unit root, meaning that the time series is unstable at the level, whether by a segment or a segment and a general trend. Likewise, the stability of the same time series is observed when taking its initial difference, whether by a segment only or a segment and a general trend at a level. Significance of 7% or less, for the Phillip-Byrne test. Table (2) presents the results of the pp unit root test on the study variables:

Table 2. Results of the (PP) Unit Root Test for the Levels and First Differences of the Variables

ADF-test & PP-test								
Time series	Level				The first difference			
	Section		Section and general direction		Section		Section and general direction	
	t-Statistic	Prob.*	t-Statistic	Prob.*	t-Statistic	Prob.*	t-Statistic	Prob.*
log(Y)	0.77	0.99	-0.95	0.94	-3.19	0.03	-3.21	0.10
log(L)	-2.07	0.26	-0.64	0.97	-3.39	0.02	-3.76	0.03
log(K)	0.96	1.00	-1.21	0.89	-3.44	0.02	-3.30	0.09
log(F)	0.24	0.97	-1.48	0.82	-4.63	0.00	-7.99	0.00

It is clear from Table (2) that the results of the Flip-Perron test agree with the Dickey-Fuller test in the instability of all-time series for the growth rate of real GDP, the growth rate of the labor force, the growth rate of real capital accumulation, and the real value added of the industrial sector at the level by a segment or With a segment and a general trend at a level of significance of 15% or less, that is, the null hypothesis was accepted, which states that there is a unit root, meaning that the time series is not stable at the level, whether with a segment or a segment and a general trend. Also, the stability of the same time series is observed when taking its initial difference, whether by a segment only or a segment and a general trend. Generally, at a significance level of 10% or less.

Results of the Johansen-Geslis Cointegration Test

The Engel-Granger test can be used to determine whether there is cointegration between the variables under study. However, the Engel-Granger test does not aim to determine the number of cointegration vectors present between the variables under study, which is what distinguishes the Johansen test from other cointegration tests, in that Through its ability to test the number of cointegration vectors between the variables under study, the Johansen test is considered a support for the results obtained from the Engel-Granger test, in the event that the Johansen-Juselius Cointegration test proves the presence of a single integration vector between the variables under study, When it is confirmed that there is a single integration vector between the variables under study using the Johansen-Goyar test, then the equations of the error correction models can be estimated, Table (3) shows the results of the Johansen-Goyar test.

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Table 3. Johansen-Jasas Test Results

Trace Test										
possibility		Critical values for a test at 1% significance level		Critical values for a test at a 5% significance level		Statistical or calculated value		Self-worth		Imposing the number of cointegrating vectors (r)
Pro.		Critical Value 1%		Critical Value 5%		Statistic		Eigen Value		
general direction	section	general direction	section	general direction	section	general direction	section	general direction	section	
0.00	0.00	71.48	54.68	63.88	47.86	178.61	172.91	0.99	0.98	nothing
0.01	0.00	49.36	35.46	42.92	29.80	48.37	43.28	0.58	0.56	One at most
0.15	0.02	31.15	19.94	25.87	15.49	21.76	17.60	0.40	0.40	Two at most
0.46	0.17	16.55	6.63	12.52	3.84	6.04	1.90	0.18	0.06	Three at most
Maximal Eigen value Test										
0.00	0.00	37.49	32.72	32.12	27.58	130.23	129.64	0.99	0.98	nothing
0.04	0.01	30.83	25.86	25.82	21.13	26.61	25.68	0.58	0.56	One at most
0.16	0.03	23.98	18.52	19.39	14.26	15.72	15.69	0.40	0.40	Two at most
0.46	0.17	16.55	6.63	12.52	3.84	6.04	1.90	0.18	0.06	Three at most

Source: Prepared by the researcher based on the outputs of the EViews 10 program

The results of Table (3) indicate that all the values calculated for the impact test and the maximum value test exceed the critical values for this test in the first hypothesis at the 5% significance level and the 1% significance level, assuming the presence of a segment or segment with a general trend, which indicates the possibility of rejecting the null hypothesis. (r=0) which states that there is no co-integration and accepting the alternative hypothesis (r\neq0), which means that there is co-integration between the real GDP growth rate and its determinants represented by the real value added from the industrial sector, the labor force, and real capital accumulation.

It is also clear from the results of Table (3) that the second hypothesis is statistically significant at a level of significance (1%), i.e. less than 5%, in the case of the effect test assuming the presence of a section or section and a general trend. It is also clear that the results of the effect test are consistent with the results of the bone value test, as is noted. All calculated Statistical values for the impact test exceed the Critical values for this test with respect to the second hypothesis at a level of significance (1%) assuming the presence of (a cross-section only). This indicates the rejection of the null hypothesis that the number of cointegration vectors does not exceed one, which indicates that there is a second vector for co-integration between the variables of the study. It is also clear that the results of the trace test do not agree with the results of the maximum eigenvalue test. However, if the results of the trace test differ with the results of the maximum eigenvalue test, the value can be relied upon. The results of the impact test, according to what some studies indicate, including [2,8,14,16].

It is also clear from Table (3) that the significance level of the third hypothesis is less than 5% in the case of testing the effect, which indicates the presence of a third vector for cointegration between the variables of the study, assuming a significance level of 5% and the presence of only a cross-section.

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Error Correction Model Estimation Results

The error correction model assumes the existence of two types of relationships between the real GDP growth rate and its determinants: a long-run relationship, and a short-run relationship, which is the immediate or direct relationship that appears between the real GDP growth rate and its determinants in each period and is measured through changes among themselves in every period.

By testing the error correction model, the null hypothesis that there is no causal relationship between the model variables is tested as opposed to the alternative hypothesis that there is a causal relationship between the model variables, where the value of the t-statistic is used for the coefficient of the slowed error correction limit to infer the existence of a long-term causal relationship between the variables. The value of the F-statistic value for the explanatory variables in the error correction equations is used to identify the existence of a causal relationship in the short term between the variables. Error correction equations were estimated for the variables between which a cointegration relationship was found, namely the growth rate of real GDP and real value added in the industrial sector, the growth rate of real total capital accumulation, and the growth rate of the labor force, and the results were prepared in Table (4).

Table 4. Results Of Causality Testing Using Error Correction Models

Estimated regression equation	t-value Short Run	Pro.	t-value Long Run	Pro.	slowdown period	Direction of causality
The equation of the change in the logarithm of real GDP and the change in the logarithm of the value added of the industrial sector						
D(logY)=D(logF)	4.87	0.01	- 0.84	0.41	(1)(1)	D(logY) …. D(logO)
D(logF)=D(logY)	1.73	0.19	- 0.10	0.92	(1)(1)	D(logO) …. D(logY)
The equation of the change in the logarithm of real GDP and labor supply						
D(logY)=D(logL)	5.37	0.00	- 1.99	0.06	(1)(1)	D(logY) …. D(logL)
D(logL)=D(logY)	3.31	0.04	1.56	0.13	(1)(1)	D(logL) …. D(logY)
The equation of the change in the logarithm of real GDP and real capital accumulation						
D(logY)=D(logK)	4.63	0.01	1.44	0.16	(1)(1)	D(logY) …. D(logK)
D(logK)=D(logY)	5.40	0.00	3.09	0.00	(1)(1)	D(logK) …. D(logY)

The results of Table (4) show the causal relationships between real GDP and its determinants in the short and long terms. Regarding the causal relationship between real GDP and the real added value of the industrial sector, it is noted that the value of the t-test for the error correction term coefficient is not statistically significant at the 1% significance level in the equation The change in the growth rate of the real value added of the industrial sector, which means that there is no unidirectional causal relationship in the long run between the real GDP and the real value added of the industrial sector. It is also noted that the calculated F-test value is statistically significant at the 1% level of significance in the equation of the change in the growth rate. Real GDP, which means that there is a unidirectional causal relationship in the short term from the real value added of the industrial sector to the real GDP, meaning that the growth rate of the real value added of the industrial sector causes the real GDP in the short term.

It is also noted from the results of Table (4) to test the causal relationship between real GDP and labor force, that the value of the t test for the slow error correction term coefficient in the two equations of

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DOI: https://doi.org/10.62754/joe.v3i8.4710

change in the growth rate of real GDP does not differ from zero and is not statistically significant, which means that it does not There is a causal relationship in the long run between the supply of labor and the real GDP, and the calculated F test is statistically significant in the equations of the change in the real GDP and the change in work. This means that there is a bidirectional causal relationship in the short run from the supply of labor to the real GDP. From real GDP to labor supply, that is, the causal relationship between real GDP and labor supply is bidirectional in the short run.

Regarding the causal relationship between real GDP and real capital accumulation, it is noted from the results of Table (4) that the value of the t-test for the slow error correction term coefficient in the equation of change in real capital accumulation is different from zero and statistically significant, which means the existence of a unidirectional causal relationship in the long run. From real GDP to real capital accumulation, while in the short term, the significance of the calculated F test value is observed at the 1% level of significance in the equations of the change in real GDP and the change in real capital accumulation, which means that there is a two-way causal relationship in the term. The short term is from real GDP to real capital accumulation, and from real capital accumulation to real GDP. That is, the causal relationship between real GDP and real capital accumulation is unidirectional in the long run and bidirectional in the short run.

Conclusion

The primary objective of this study is to test the statistics relationship between industrial development and economic growth as measured by the real gross domestic product in the Egyptian economy. To achieve this objective, the study was divided into five main parts in addition to the introduction, the second part is an explanation of previous studies, and the third part is the global index of competitive industrial performance. The fourth part explains the study model, the fifth part explains the study methodology, and the sixth part explains the conclusion and recommendations of the study.

The second part explains the previous studies, as it became clear from the previous studies that although they dealt with the relationship between industrialization and economic development, they did not resolve this relationship. Hence, the current study attempted to test the relationship between industrialization and economic growth in Egypt using recent data and a relatively longer period, which is the period (1990-2022), in addition to its attempt to rely on the error correction model in testing the causal relationship, which are considered relatively modern measurement methods.

The fourth part is an explanation of the study model. It included a description of the Cobb-Douglas production function to test the causal relationship between industrial development and economic growth in Egypt, measured by real GDP. As for the fifth part, it included the methodology and results of the study. According to the methodology used in the study, the methods used consist of: Three tests are: unit root tests, cointegration test, and error correction models. Unit root tests were relied upon to ensure the stability of time series. Despite the multiple unit root tests, the current study used two tests: the Dickey-Fuller test (Dickey and Fuller), and the Philip-Perron test, which is the most widely used in econometric studies in general and tests the extent of the existence of cointegration between the real GDP growth rate as an indicator of economic growth and its determinants.

The results of the tests revealed the existence of a unidirectional causal relationship in the short run from the real value added of the industrial sector to the real GDP, that is, the growth rate of the real value added of the industrial sector causes the real GDP in the short run, the causal relationship between the real GDP and supply From working bidirectional in the short run, the causal relationship between real GDP and real capital accumulation is unidirectional in the long run from real GDP to real capital accumulation and bidirectional in the short run, and finally the study recommends the following:

Develop policies that contribute to the development of the industrial sector, in order to provide infrastructure that contributes to achieving economic development.

Working to raise the added value of the industrial sector by developing national strategies and future work

Volume: 3, No: 8, pp. 46 – 57
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.4710

programs that focus on developing the manufacturing sector.

Work to join economic blocs that will support industrial development plans, which will stimulate economic growth and citizen well-being.

Approval of a package of incentives and facilities to attract foreign direct investment in the manufacturing sector, to achieve an improvement in the technical level of industrial production.

Encouraging small and micro projects that carry ideas that contribute to the development of the industrial sector.

Linking the outcomes of education and scientific research to the industrial sector and trying to benefit from scientific research in innovation and creativity.

Encouraging investment and credit facilities directed to the manufacturing sector.

Working to encourage innovation in the industrial sector and enhance the competitiveness of industrial exports.

Acknowledgement

This work was supported by the Deanship of Scientific Research, Vice Presidency for Graduate Studies and Scientific Research, King Faisal University, Saudi Arabia, project no KFU241774.

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Journal of Ecohumanism
2024
Volume: 3, No: 8, pp. 46 – 57
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v3i8.4710

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