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The Contribution of Agricultural Manufacturing in the Egyptian Economic Growth: Kaldor's Hypotheses

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Authors' contributions

This work was carried out in collaboration among all authors. Authors AAEE and MMH and MIY designed the study, performed the statistical analysis, and wrote the first draft of the manuscript. Authors MMH and MIY collected the data. Authors AAEE and MMH and MIY managed the analyses of the study. All authors read and approved the final manuscript.

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ABSTRACT

This research uses a Kaldor's hypotheses to estimate the contribution of the agricultural manufacturing sector to increase the economic growth of the Egyptian agricultural sector during the period 1997-2018. It based on the three "hypotheses" of growth. Kaldor model depends on three hypotheses related to the relationship between the growth of manufacturing sector and the economic growth. The study used the growth rate, dummy variable, Ordinary Least Square (OLS) test, and used CUSUM squares test and Chow breakpoint test. In addition to, testing the stability of time series depended on E-view 11.0. The food, beverage, tobacco industries and textiles industry are the largest two sectors in the Egyptian agricultural manufacturing industries, as they represent about 83.58% of the total value of the agricultural manufacturing industries output during the period 1997-2018. The results shows that the increase of real growth rates of food, beverage, tobacco industries and textile production lead to increasing in the real growth rate of agricultural output. According to CUSUM Sq test and Chow test, the year 2003 is considered as the switch point for the

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study variables. Also, if the real agricultural manufacturing production growth rate increases, the real agricultural manufacturing labor productivity growth rate will increase. And if the real growth rate of agricultural manufacturing production value increases, the real growth rate of agricultural non-manufacturing labor productivity will increase. The results of the research assist decision-makers in the field of manufacturing industry and agriculture in Egypt, especially in the stages of economic development.

Keywords: Agricultural manufacturing; Egypt; economic growth; kaldor hypotheses; Cusum Sq; chow breakpoint test.

1. INTRODUCTION

Increasing the rate of economic growth and reducing poverty are among the biggest challenges facing the Egyptian economy. The slow growth rates in the agricultural sector in Egypt and the challenges it faces indicate the importance of this sector in the Egyptian economy. Egypt achieved high growth rates during the past three decades, with the contribution of the agricultural sector, the textile sector and the food sector, in addition to the tourism sector, but this growth was not sufficient.

Manufacturing industries are a major driver of development in many developing countries, and one of the most effective tools in transforming the economy from activities with low added value to those that achieve rapid growth rates and provide an increased possibility for sustainable development. After the United Nations Industrial Development Organization (UNIDO) 2013 report, the importance of the manufacturing sector increased in the economies of developing countries. This report clarified the importance of manufacturing industries in generating job opportunities especially in developing countries, which amounted to 470 million jobs worldwide in the year 2013. 2009, and he expected those opportunities to increase to reach 500 million in 2013, and the report indicated that huge opportunities are available to developing countries in terms of the ability to excel in manufacturing industries and generate sustainable opportunities for productivity, especially those associated with the food, clothing, and textile industries.

According to the indicators of the Central Agency for Public Mobilization and Statistics (Egypt in figures for the year 2014), the Egyptian economy is one of the most diversified economies in the Middle East region, as the sectors of agriculture, industry, tourism, and services participate in almost close proportions in its basic composition. The average number of the workforce in Egypt is about 27 million people, according to 2017 estimates, about 2,619 thousand of them work in the manufacturing industry, or about 11% of the total workforce.

There is no doubt that the advancement of agricultural industrialization has a multiplier effect on many other sectors, as it contributes to raising the added value of agricultural crops and reducing losses from them, as well as preserving the health and safety of the citizen by providing safe and healthy food products, in addition to protecting Environment and recycling agricultural waste, in addition to the fact that agricultural industrialization is by its nature a labor-intensive industry that contributes to creating productive specialization and increasing exports. The potential of the agricultural industrialization sector is enormous, as the percentage of agricultural crops used in industry is limited to no more than 2-3%, which reveals the opportunities available for expansion in these industries, in addition to the fact that the exploitation of these capabilities would increase investment in the sector. Agriculture, increasing farmers' return, creating more job opportunities, and adding new energies are important to increase the agricultural economic growth. Agricultural industrialization achieves many goals, including increasing the rate of economic growth, increasing exports, replacing imports, and creating new job opportunities that lead to raising the standard of living.

There is a different between agricultural manufacturing firm and agricultural producing establishments. Agricultural establishment is a business place that produces seeds and plants or a part of it. It can be for Animal shelters, storages for grain and agricultural crops preservation, production of plants, oils and vegetables, and facilities for agricultural machinery. While the agricultural manufacturing firm is the place that produce food production such as pasta, juices, processed meat and other products that suitable for human use.

Manufacturing industries are the places that transform goods, materials into new products by using physical, chemical or mechanical. Manufacturing firm such as Food, Beverage and tobacco product, Textile, Wood product and Paper manufacturing.

2. LITERATURE REVIEW

Kaldor's intellectual contributions are an important theoretical basis for considering the manufacturing sector as the leader in economic growth. Many economic studies have based on it. The following is a brief review of some recent studies.

2.1 Studies about Egypt

Nasser [1] concluded that the number of labors, wages, productivity of labor, and sales are not stability in in both Bisco Misr Company and in Alexandria Flour Mills and Bakeries Company during the study period (1995–2012), that led to instability of its production. the most important factors affecting wheat acreage were the monetary prices of wheat straw and horse beans farm prices. while the most important factors determining wheat production capacity was monetary prices is the wheat acreage of the previous year. The real prices of wheat straw were having positive effect while, the horse beans were having negative effect, and wheat acreage in previous year was have positive effect. Ghanem [2] evaluated the economic efficiency of the Egyptian rice mills public sector during the period 2003-2014. The study used Data Envelopment Analysis (DEA) and Stochastic Frontier Approach (SFA). The most important results were that rice mills Domyat and Belqas and Kafer El-Sheikh have economic efficiency equal 1. While in rice mills Gharbia, Dakahlia and Behiera were inefficiency by 40%, 49.3%, 38% (efficiency = 0.401, 0.507, and 0.622) respectively. Abdel Radi study [3] found that the total number of workers decreased by 0.4% yearly during 2006-2017. The marketing difficulties was about third of idle capacity with average 32.58%. The worker wage increased by 13.2% yearly.

2.2 Foreign Studies

Keho [4] supporting the first Kaldor's hypothesis. The study estimated 11 ECOWAS member countries depending on autoregressive distributed lag, causality test and co-integration during the period from 1970-2014. The most important result was that the increase in manufacturing output leads to the increasing in economic growth and non-manufacturing sector. Alexiou and Tsaliki [5] estimated the Kaldorian contention that manufacturing is the main engine of growth' in the Mediterranean Region. It concluded that resources must be poured into the manufacture sector to raise growth rates. Hamri and Shazali [6] based on Kaldor's growth hypotheses on the Asian economy growth during the last 30 years. The study concluded that the growth of the manufacturing sector absorbs labor from other sectors to raise the productivity in these sectors. Dasgupta [7] showed that the manufacture sector is one of the most important sectors in the Indian economic growth. In Pakistan Khan and Siddiqi [8] support the efficiency of Kaldor's first and third hypotheses while the second hypothesis was supported in the rate of returns. This indicates the importance of the manufacture sector in economic growth.

By focusing on applying Kaldor's hypotheses in the agricultural sector, Awudu and Peter [9] and Wells and Thirlwall [10] found that there is a relationship between the agriculture growth and the economy in Africa. the results showed that there in a relationship between the agricultural and non-agricultural sectors. The growth of GDP was due to the growth of the manufacturing sector than the agricultural or service sectors. Nseera [11] showed that agriculture and textiles are the most important sectors of the economy. It is mean that the investment in agriculture and textiles sectors have the ability to push the economic growth more than any other sectors. In addition to, the agricultural sector has a big effect on the value added. While Kafando [12] concluded that the agricultural sector was not the important sector that push the industrial development of the leading industrial countries in South and North Africa.

2.3 Kaldor's Framework

The economic growth models aim mainly to answer the following question "why the economic growth rates differ from a country to other?" One of this models that attempted to answer this question and analyze the economic growth causes was "Kaldor Growth Model" or what is known in the economic literature, "Kaldor's growth hypotheses."

Kaldor hypotheses differs from the new classical models in focusing on both the demand and supply sides, not only the supply side, so Kaldor

starting point was the close relationship between economic growth and capital accumulation on one hand, and the national income distribution on the other hand. According to this framework, Kaldor analyzed the economic growth in each short and long run. Kaldor adopted his model from an important economic fact, which is that the rate of economic growth depends on the rate of capital accumulation, the rate of capital accumulation depends on saving, and the income distribution determines ultimately the economic growth rate [13].

Kaldor approach depends on three hypotheses related to the relationship between the manufacturing sector growth and the economic growth. In [14] studied the economic growth of 12 advanced industrial countries from the Economic Cooperation and Development Organization members during the period 53/1954 – 63/1964. Kaldor noted the existence of a correlation - over time - between the standard of living levels and the resources devoted to industrial activity proportion, at least up to a certain level of income, (and that only New Zealand, Australia and Canada achieved high economic growth rates mainly depending on agriculture), and based on these realistic foundations, Kaldor formulated his three hypotheses**:**

2.3.1 The first hypothesis

There is a positive strong correlation between the industrial output growth rate and the economic growth rate. This hypothesis can be formulated in another way as follows: GDP growth is faster when the increasing of industrial output growth is relatively more than the growth in GDP and this hypothesis was tested through the following regression equation:

$$Q_t = \alpha_1 + \beta_1 M_t + \mu_{1t}, \qquad \beta_1 > 0$$

Where:

Q_t = the growth rate of GDP.
M_t = the growth rate of manufacturing sector output.

2.3.2 The second hypothesis

Based on Verdoorn's hypothesis (1949). There is a positive effect of labor productivity growth on economic growth, Kaldor formulated the second hypothesis, which indicates that the growth rate of labor productivity in the industrial sector is positively correlated with the growth rate of industrial output. This hypothesis was tested through the following regression equation:

$$PM_t = \alpha_2 + \beta_2 M_t + \mu_{2t}, \qquad \beta_2 > 0$$

Where:

PM_t = the growth rate of productivity in the manufacturing sector.

Verdoorn's hypothesis attributed this to the economics of scale, the most important of which are specialization, division of labor, and low costs of production. There is an increase in the return to scale in the industrial sector, this may be constant or variable through the resulting effect of output growth on capital accumulation and technical progress.

2.3.3 The third hypothesis

From Kaldor's point of view, the growth of manufacturing output affects the productivity of other non- manufacturing economic sectors positively. This law was tested through the following regression equation:

$$P_t = \alpha_3 + \beta_3 M_t + \mu_{3t}, \qquad \beta_3 > 0$$

Where:

$\boldsymbol{P_t}$= the growth rate of productivity in the other non- manufacturing economic sectors.

Kaldor explained the direct relationship between the growth of manufacturing output and the productivity of other non- manufacturing economic sectors that economies which suffering from the duality of their economic sectors (Dual Economy) it can be noted that the wage differentials between the advanced manufacturing sector and other less advanced non- manufacturing sectors leads to the transfer of labor from those sectors that have less productive, especially the agricultural sector, to the more advanced manufacturing sector, which means there is an increase in the average productivity of labor in the less developed sectors, and the productivity of this labor in the manufacturing sector, which leads to increasing of gross domestic product, and thus achieving more economic growth [15].

This research applied three Kaldor's growth hypotheses on the Egyptian agricultural manufacturing sector in as following:

The First hypothesis:

$$g_{AGDP} = a_1 + b_1 g_{am}$$

Where:

g_{AGDP}= the growth rate of AGDP.
g_{am} = the growth rate of agricultural manufacturing sector output.
Which means faster growth of output leads to faster growth of productivity, that causes the increasing of price and non- price competitiveness to achieve faster growth of output.

The second hypothesis:

There are two main ways of testing Kaldor's second hypothesis or Verdoorn's hypothesis. The faster growth of output causes a faster growth of productivity.

The first hypothesis:

$$p_{am} = a_1 + b_1 g_{am}$$

Where:

p_{am}= the agricultural manufacturing productivity growth rate.
g_{am} = the agricultural manufacturing production growth rate.

The second hypothesis:

$$e_{am} = a_2 + b_2 g_{am}$$

Where:

e_{am}= the agricultural manufacturing employment growth rate
Which means faster growth of productivity leads to faster growth of exports, and faster growth of output.

The third hypothesis:

$$e_{om} = a_2 + b_2 g_{am}$$

Where:

e_{om}= the employment growth rate in agricultural sector except agricultural manufacturing employment.

2.4 Data

The research applied the Kaldor's hypotheses. It based on the annual growth rate of the related variables after converting the values from their current values to their real values by using the Index (PI 2005 = 100), which are the Real growth rate of the Agricultural Gross Domestic Product (gRAGDP), the Real growth rate of Food, Beverage and Tobacco industries (gRFOD), the Real growth rate of Textiles (gRTXT), the Real growth rate of labor productivity of the agricultural manufacturing sector (gRALPM), the Real growth rate of agricultural manufacturing production (gRAPM), and the Real growth rate of labor productivity of the agricultural non-manufacturing sector (gRALPNM). The data were collected from the Central Agency for Public Mobilization and Statistics; Statistical Yearbook Publications, Bulletins of Employment and Wage Statistics and Industrial Production Bulletins during the period 1997-2018.

3. FINDINGS AND DISCUSSION

3.1 Performance of the Agricultural Manufacturing Sectors

The agricultural sector is considered a major sector of the economic development in Egypt. The agricultural gross domestic product (AGDP) represents about 11.5% of the Egyptian GDP and includes about 21.5% of the total workers in Egypt, or nearly a quarter of the total employment in 2018. While the Agricultural manufacturing sector is one of the important agricultural sectors, as it represents about 42.22% of the AGDP and includes about 5.53% of the total agricultural employment during the period 1997-2018.

This part of the research explains the statistical data and methods that used to estimate Kaldor's model in Egyptian agriculture. The agricultural manufacturing sector was divided into 7 sub-sectors, which are the food, beverage and tobacco industries, textiles industry, the garment sector, the leather industry and its products, the sector of manufacturing wood and its products, the manufacture of paper and its products, and finally the sector of furniture and wood products.

Fig.1 shows the food, beverage and tobacco industries, and textiles industry are the two largest sectors in the Egyptian agricultural manufacturing industries, as they represent about 83.58% of the total value of the agricultural manufacturing industries output during the period 1997-2018, while the remaining five sectors representing the equivalent of about only 6.42% of the value of the total agricultural

manufacturing industries in Egypt during the same period. According to the previous, this research focused on those sectors as the two main pillars of the manufacturing industries in Egypt. As well as, estimating the causal relationship between growth rate of those two sectors and the growth rate of the agricultural gross domestic product (AGDP).

3.2 Kaldor's First Hypothesis Analysis

The Egyptian agricultural output represents about 11.5% of the Egyptian GDP as mentioned previously, in addition, the agricultural sector in Egypt is a vital sector and is considered a pillar to boost economic growth and supplies the industrial sector with raw material. The following equation gives evidence of a strong positive relationship between the growth rate of real gross domestic product (gRGDP) and the growth rate of real agricultural output (gRAGDP) in Egypt during the period 1997-2018.

$$gRGDP = 3.81 + 0.83\ gRAGDP \quad (1)$$
$$(2.79)^{***} \quad (4.14)^{***}$$

R^2=0.60 F= 17.13^{***}

Kaldor first hypothesis in the agricultural manufacturing sector is depending on the relationship between the growth rate of real agricultural output (gRAGDP) as a dependent variable and real growth rate of Food, Beverage and Tobacco industries production value (gRFOD), and real growth rate of textile industry production value (gRTXT). The null hypothesis represents the increasing in the gRFOD, and gRTXT that lead to an increase in the gRAGDP. The results of unit root test by using Augmented Dickey-Fuller (ADF) test were performed to detect the stationary of the time series variables of the study, and the results showed that all the variables are stationary at the level. Equations 2 and 3 showed the linear regression results during the period 1997-2018 as the following:

$$gRAGDP = 1.29 + 0.28\ gRFOD \quad (2)$$
$$(1.03)^{n.s} \quad (2.80)^{***}$$

R^2 = 0.48 Log Likelihood = -69.06 D.W. = 2.11 F = 7.86^{**}

Akaike info criterion = 6.46 Schwarz criterion = 6.56 Hanan-Quinn criterion = 6.48

$$gRAGDP = 2.37 + 0.17\ gRTXT \quad (3)$$
$$(1.84)^{*} \quad (2.26)^{**}$$

R^2= 0.51 Log Likelihood= -94.27 D.W.= 2.07 F= 5.11^{**}

Akaike info criterion= 9.73 Schwarz criterion = 9.82 Hanan-Quinn criterion = 9.75

From the previous equations, if the real growth rates of Food, Beverage and Tobacco industries and textile industry production value increase by 1%, the growth rate of real agricultural output (gRAGDP) will increase by 0.28% and 0.17% respectively.

3.3 Structural Point

Table No.1 shows CUSUM Sq test and Chow test results to detect the structural /switch point (2003), for real growth rate of Food, Beverage and Tobacco industries production value (gRFOD) and real growth rate of textile industry production value (gRTXT) and based on F static significant at 5%.

According to CUSUM Sq test and Chow test results, the year 2003 considered as the switch point for the study variables, thus by adding a dummy variable to divide the time series into two periods, the first one is 1997-2002, takes 0, while the second one is 2003-2018, takes 1. Therefore, the linear regression relationships between the growth rate of real agricultural output (gRAGDP) as a dependent variable and real growth rate of Food, Beverage and Tobacco industries production value (gRFOD) and real growth rate of textile industry production value (gRTXT)in equations 4, and 5 with the existing of the dummy variable (D) as following:

$$gRAGDP = 4.33 + 0.28\ gRFOD - 4.17\ D \quad (4)$$
$$(1.86)^{*} \quad (2.86)^{***} \quad (-1.80)^{*}$$

R^{-2} = 0.49 Log Likelihood= -67.77 D.W.=2.06 F= 5.38^{***}

Akaike info criterion = 6.43 Schwarz criterion = 6.58 Hanan-Quinn criterion = 6.47

$$gRAGDP = 5.63 + 0.19\ gRTXT - 4.19\ D \quad (5)$$
$$(2.12)^{**} \quad (1.81)^{*} \quad (-1.89)^{*}$$

R^{-2} = 0.40 Log Likelihood = -70.40 D.W. = 2.12 F = 2.12^{*}

Akaike info criterion= 6.67 Schwarz criterion = 6.82 Hanan-Quinn criterion = 6.71

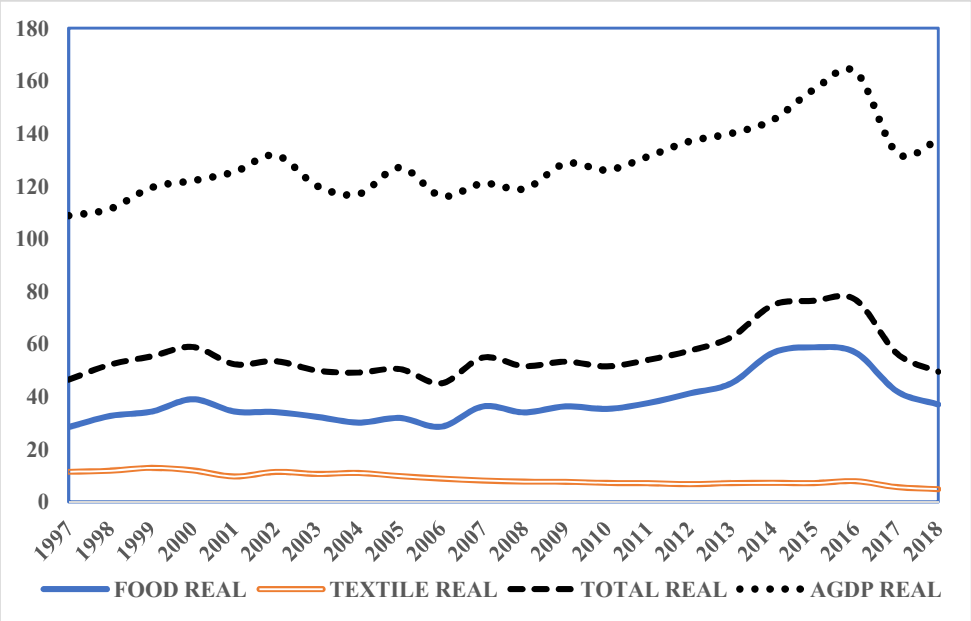


Fig. 1. The real food, beverage and tobacco industries, real textiles industry, real total agricultural manufacturing industries, and real agricultural gross domestic product in Egypt through the period 1997-2018

3.4 Kaldor's Second Hypothesis Analysis

Kaldor's second hypothesis in the agricultural manufacturing sector depended on the relationship between the real growth rate of agricultural manufacturing labor productivity (gRALPM) as a dependent variable and real growth rate of agricultural manufacturing production (gRAPM). The null hypothesis is that the increasing in the gRAPM leads to increase the gRALPM. The results of unit root test by using Augmented Dickey-Fuller (ADF) test were performed to detect the stationary of the study variables time series, and the results indicated that all the variables are stationary at the level. Equations 6 showed the linear regression results for the period 1997-2018 as the following:

$$gRALPM = 7.62 + 0.84\ gRAPM \quad (6)$$
$$(0.93)^{ns}\ (1.71)^{*}$$

R^2 = 0.33 Log Likelihood = -110.42 D.W.= 1.96 F = 2.91*

Akaike info criterion = 10.22 Schwarz criterion = 10.32 Hanan-Quinn criterion = 10.24

From the previous equations, if the real growth rate of agricultural manufacturing production value (gRAPM) increases by 1%, the growth rate of agricultural manufacturing labor productivity will increase by 0.84%.

3.5 Structural Point

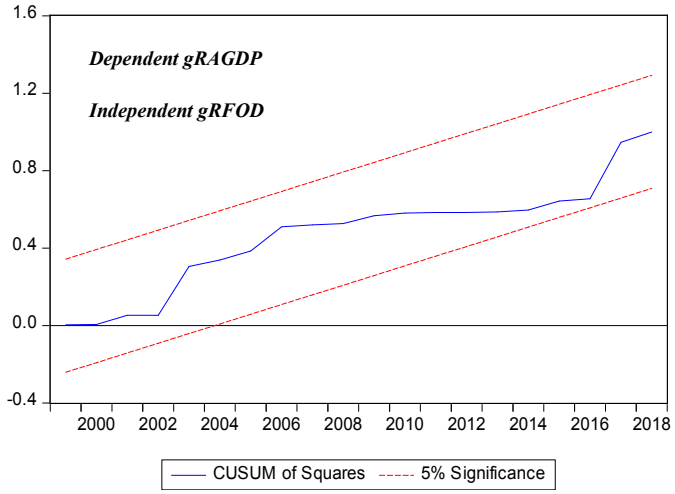
Table No.2 shows CUSUM Sq test and Multiple breakpoint tests results to detect the structural /switch point, which indicated that there was no break point for the real growth rate of agricultural manufacturing labor productivity (gRALPM) based on F static non-significant.

3.6 Kaldor's Third Hypothesis Results

Kaldor's third hypothesis in the agricultural manufacturing sector depended on the relationship between the real agricultural non-manufacturing labor productivity growth rate (gRALPNM) as a dependent variable and real growth rate of agricultural manufacturing production value (gRAPM). The null hypothesis is that the increasing in the gRAPM leads to increase the gRALPNM. The results of unit root test by using Augmented Dickey-Fuller (ADF) test were performed to detect the stationary of the study variables time series, and the results indicated that all the variables are stationary at the level. Equations 7 showed the linear regression results for the period 1997-2018 as the following:

Table 1. gRFOD, and gRTXT CUSUM squares test and Chow test through 1997-2018

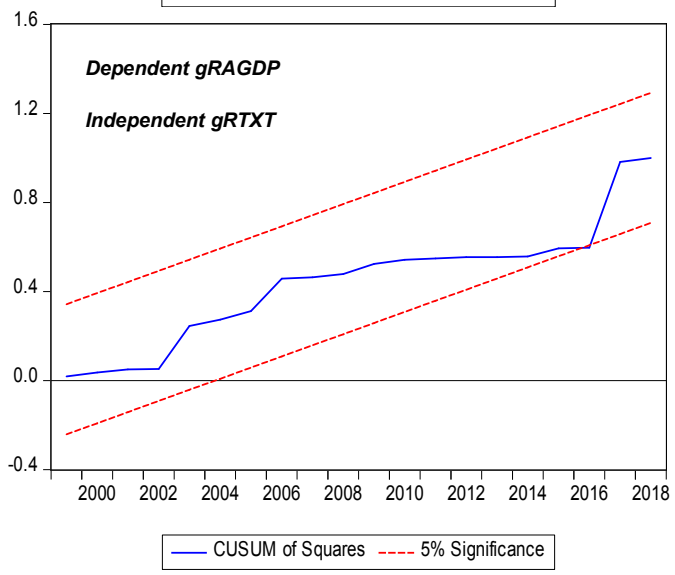
CUSUM Squares



Chow test

Chow Breakpoint Test: 2003
Null Hypothesis: No breaks at specified breakpoints
Equation Sample: 1997 2018

F-statistic	3.822	Prob. F (2.18)	0.041
Log likelihood ratio	7.788	Prob.Chi-Square (2)	0.020
Wald Statistic	7.645	Prob. Chi-Square (2)	0.022



Chow Breakpoint Test: 2003
Null Hypothesis: No breaks at specified breakpoints

Equation Sample: 1997 2018

F-statistic	3.827	Prob. F (2.18)	0.041
Log likelihood ratio	7.796	Prob. ChiSquare (2)	0.020
Wald Statistic	7.655	Prob. Chi-Square (2)	0.022

Source: E-views 11 output

gRALPNM = 7.62 + 0.66 gRAPM (7)
(6.25)* (3.08)***

R^2 = 0.52 Log Likelihood = -92.19 D.W.= 1.91 F = 9.50***

Akaike info criterion = 8.56 Schwarz criterion = 8.66 Hanan-Quinn criterion = 8.59

From the previous equations, if the real growth rate of agricultural manufacturing production value (gRAPM) increases by 1%, the growth rate of agricultural non-manufacturing labor productivity will increase by 0.66%.

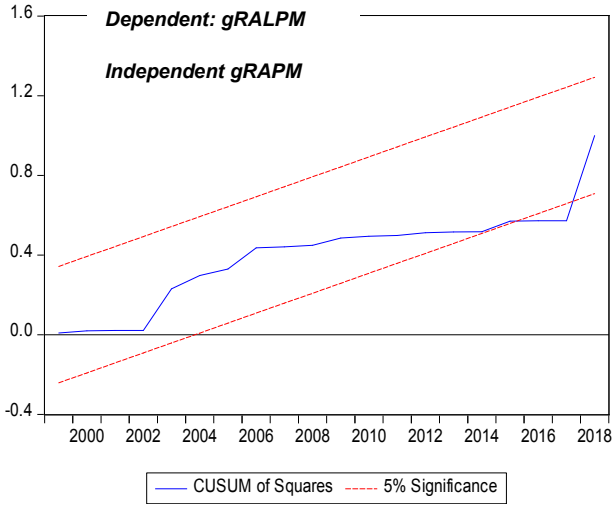
3.7 Structural Point

Table No.3 shows CUSUM Sq test and Multiple breakpoint tests results to detect the structural /switch point, which indicated that there was no break point for real growth rate of agricultural manufacturing production value (gRAPM) based on F static non-significant.

According to the comparison between the research results and literatures review's conclusions, this research confirms the consistency between the recent study results and literatures review's results.

Table 2. gRALPM CUSUM squares test and Multiple breakpoint tests 1997-2018

CUSUM Squares



Multiple breakpoint tests

Bai-Perron tests of L+1 vs. L sequentially determined breaks
Sample: 1997 2018
Included observations: 22
Breaking variables: gRALPM C
Break test options: Trimming 0.15, Max. breaks 5, Sig. level 0.05

Sequential F-statistic determined breaks: 0

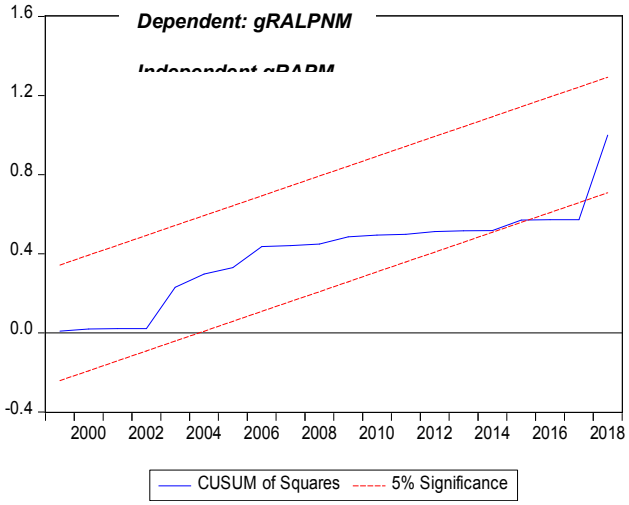
Break Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1	0.474404	0.948807	11.47

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

Source: E-views 11 output.

Table 3. gRAPM CUSUM squares test and Multiple breakpoint tests 1997-2018

CUSUM Squares



Multiple breakpoint tests

Multiple breakpoint tests
Bai-Perron tests of L+1 vs. L sequentially determined breaks
Sample: 1997 2018
Included observations: 22
Breaking variables: gRAPM C
Break test options: Trimming 0.15, Max. breaks 5, Sig. level 0.05

Sequential F-statistic determined breaks: 0

Break Test	F-statistic	Scaled F-statistic	Critical Value**
0 vs. 1	2.147609	4.295217	11.47

* Significant at the 0.05 level.
** Bai-Perron (Econometric Journal, 2003) critical values.

Source: E-views 11 output.

4. CONCLUSIONS AND POLICY IMPLICATIONS

Manufacturing industries are a major driver of development in many developing countries, 'manufacturing is the engine of growth'. The Egyptian economy is one of the most diversified economies in the Middle East region. There is no doubt that the advancement of agricultural industrialization has a multiplier effect on many other sectors, as it contributes to raising the added value of agricultural crops and reducing

losses from them, as well as preserving the health and safety of the citizen by providing safe and healthy food products, in addition to protecting Environment and recycling agricultural waste.

Kaldor model depends on three hypotheses related to the relationship between the manufacturing sector growth and the economic growth. This research applied three Kaldor's growth hypotheses on the Egyptian agricultural manufacturing sector.
The agricultural sector is considered a major sector of the economic development in Egypt. The agricultural gross domestic product (AGDP) represents about 11.5% of the Egyptian GDP and includes about 21.5% of the total workers in Egypt, or nearly a quarter of the total employment in 2018. While the Agricultural manufacturing sector is one of the important agricultural sectors, as it represents about 42.22% of the AGDP and includes about 5.53% of the total agricultural employment during the period 1997-2018.

The food, beverage and tobacco industries, and textiles industry are the two largest sectors in the Egyptian agricultural manufacturing industries. So, this research focused on those sectors as the two main pillars of the manufacturing industries in Egypt. As well as, estimating the causal relationship between growth rate of those two sectors and the growth rate of the agricultural gross domestic product (AGDP).

The methodology used to investigate the Kaldor's hypotheses produced evidence on the basis of which manufacturing is indeed the 'engine of growth'. Specifically, manufacturing output growth, contributes significantly to total output growth as well as to the productivity. There is a strong positive relationship between the growth rate of real gross domestic product and the growth rate of real agricultural output in Egypt during the period 1997-2018. This explained that the Egyptian agricultural output represents about 11.5% of the Egyptian GDP, in addition to the fact that the agricultural sector in Egypt is a vital sector and is considered a pillar to boost economic growth and supplies the industrial sector with raw material.

The results showed that the real growth rates of food, beverage and tobacco industries and textile industry production value increase by 1%, the growth rate of real agricultural output will increase by 0.28% and 0.17% respectively. According to CUSUM Sq test and Chow test results, the year 2003 considered as the switch point for the study variables. For Kaldor's second hypothesis the results showed that if the real growth rate of agricultural manufacturing production value (gRAPM) increases by 1%, the growth rate of agricultural manufacturing labor productivity will increase by 0.84%, and there was no break point for the real growth rate of agricultural manufacturing labor productivity based on F static non-significant. The results also showed that if the real growth rate of agricultural manufacturing production value increases by 1%, the growth rate of agricultural non-manufacturing labor productivity will increase by 0.66%, and there was no break point for the real growth rate of agricultural manufacturing labor productivity based on F static non-significant.

5. RECOMMENDATIONS

5.1 Based on the Study Results, the Study Recommends the Following

1- More attention to conducting studies in the future, through which it is possible to determine the most productive manufacturing industries, and to contribute to raising the productivity of other sectors in Egypt, in a way that helps in drawing plans and policies for economic development.
2- Encouraging the innovations and increase the interest in R&D in the agricultural manufacturing sector, in a way that serves the goals of the national economy that leads to increasing the agricultural and industrial output, raising the economic growth rate and contributing to building a knowledge-based economy.
3- Adopting economic policies that would contribute to stimulating investment in the Egyptian agricultural manufacturing sector, whereas leading to an increase in non-oil exports and diversification of income sources.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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