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# Performance of Egyptian Cotton Exports in the Global Markets

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***Authors' contributions***

*This work was carried out in collaboration between both authors. Author MAE designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors MAE and DZ managed the analyses of the study. Author MAE managed the literature searches. Both authors read and approved the final manuscript.*

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## ABSTRACT

This study focuses on the performance of Egyptian Cotton Exports in the global markets, and the important situation of those Exports in these Markets. ,The results show that quantity and value of Egyptian cotton Exports to the global markets has taken a decreasing trend during the study period, Also, we show that the relative importance of value of Egyptian cotton Exports when compared to value of Total Exports has taken a decreasing, the relative importance of value of Egyptian cotton Exports when compared to value of Agricultural Exports has taken a decreasing, quantity, value and import price of cotton imports has taken an increasing trend during the study period, Also the results show that value of cotton spinning Exports has taken an increasing trend , quantity and value of the cotton textile Exports has taken an increasing trend, quantity and value of the cotton knitwear products Exports has taken an increasing trend, quantity and value of the Cotton clothing Exports has taken an increasing trend, quantity and value of the Medical cotton Exports has taken an increasing trend, quantity of the manufactured cotton products Exports has

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taken an increasing trend of 8.08 thousand tons, by 5.13% from the annual average of quantity of the manufactured cotton products Exports during the study period, Value of the manufactured cotton products Exports has taken an increasing trend of 81.2 million US$, by 5.91% of the annual average of Value of the manufactured cotton products Exports during the study period .

*Keywords: Cotton; exports; quantity; imports; performance; egyptian; global markets; percentage; spinning; textile; knitwear; medical cotton.*

## 1. INTRODUCTION

Foreign trade is an important indicator of economic development, because it is an essential source of foreign exchange needed to import the requirements of economic development, such as the purchase of machinery, equipment, raw materials and intermediate goods [1], and Exports of the agricultural sector in general and Egyptian cotton Exports in particular are a very important part of Egyptian foreign trade, as these Egyptian Exports have a comparative advantage and a competitive advantage in the global markets, and this study focuses on the performance of Egyptian cotton Exports in the global markets, and the important situation of those Exports in these Markets. Egypt is known as an exporter of high-quality cotton, which has an international reputation in special features that attract niche market consumers. Cotton plays a dominant role in the country's economy by meeting the domestic and export demands, contributing significantly to agriculture, industry, employment, and export earnings [2]. The 2017 statistics show that Egyptian cotton provided a cash income to roughly 266 million US$ for small farmers. Also, the cotton industry labor force totals to about 6 million [3]. With the increasing importance of Egyptian cotton at the domestic and international levels, the government pays great importance to and constantly seeks to improve both quantity and quality of cotton. This ensures the competitiveness of Egyptian cotton in the international markets [4]. However, the share of Egyptian cotton exports (ECE) in the world cotton exports has dropped from 1.10 percent in 2000 to 0.70 percent in 2017. The total quantity of ECE has also fallen from 63.22 million tons in 2000 to 56.64 million tons in 2017 [5].

## 2. MATERIALS AND METHODS

This part of the study was based on the quantitative and descriptive method for studying performance of Egyptian cotton exports in the global markets, through studying that development and trends of quantity and value of Egyptian cotton exports, development and trends of quantity and value of cotton imports, development and trends of quantity and value of cotton spinning exports, cotton textile exports, cotton knitwear products exports, cotton clothes exports and medical cotton exports. through the application of the simple linear regression model can provide us that quantity and value of Egyptian cotton exports has a decreasing or an increasing during the study period [6].

### 2.1 Simple Linear Regression Model

Regression models describe the relationship between variables by fitting a line to the observed data. Linear regression models use a straight line, while logistic and nonlinear regression models use a curved line. Regression allows you to estimate how a dependent variable change as the independent variable change. Simple linear regression is used to estimate the relationship between two quantitative variables. we can use simple linear regression when we want to know:

1. How strong the relationship is between two variables?
2. The value of the dependent variable at a certain value of the independent variable.

#### 2.1.1 Assumptions of simple linear regression model

Simple linear regression is a parametric test, meaning that it makes certain assumptions about the data. These assumptions are:

1. Homogeneity of variance: the size of the error in our prediction doesn't change significantly across the values of the independent variable.
2. Independence of observations: the observations in the dataset were collected using statistically valid sampling methods, and there are no hidden relationships among observations.

3. Normality: The data follows a normal distribution.
4. The relationship between the independent and dependent variable is linear: the line of best fit through the data points is a straight line.

#### 2.1.2 The formula for a simple linear regression model

$$Y = B_0 + B_1 X + E$$

Where, Y is the predicted value of the dependent variable (y) for any given value of the independent variable (x), $B_0$ is the intercept, the predicted value of y when the x is 0, $B_1$ is the regression coefficient, X is the independent variable, E is the error of the estimate.

## 3. SOURCES OF DATA

The study relied on published and unpublished secondary data from various sources, including cotton arbitration testing general organization, the Ministry of Agriculture and Land Reclamation (MALR), the Central Agency for Public Mobilization and Statistics (CAPMAS), the National Planning Institute, websites of Food and Agriculture Organization of the United Nations (FAO), the United Nations and the World Bank, in addition to other sites specialized in publishing data statistics. The research also used some references and analyses relevant to the study subject.

## 4. RESULTS AND DISCUSSION

### 4.1 Development and Trends of Quantity and Value of Egyptian Cotton Exports

#### 4.1.1 Quantity of Egyptian cotton exports

Data of the Table 1 show that quantity of Egyptian cotton Exports to the global markets reached its a minimum of 15441 tons in 2009, reached its a maximum of 196822 tons in 2003 [7], as the annual average of quantity of Egyptian cotton Exports of 80236 tons during the period 2000-2017. Data of the Table 2 - Equation 1, Fig. 1 - shows that quantity of Egyptian cotton Exports to the global markets has taken a decreasing trend of 6399 tons, by 7.98% of the annual average of quantity of Egyptian cotton Exports during the study period [8], confirmed the Statistical Significance of the regression coefficient and the model as a whole at a Statistical Significance level 0.01, value of the determination coefficient showed that 40% of the changes in quantity of Egyptian cotton Exports is due to the time variable [9].

#### 4.1.2 Value of Egyptian cotton exports

Data of the Table 1 show that value of Egyptian cotton Exports to the global markets reached its a minimum of 83952 thousand US$ in 2015, reached its a maximum of 483023 thousand US$ in 2004, , as the annual average of value of Egyptian cotton Exports of 182816 thousand US$ during the period 2000-2017 [10]. Data of the Table 2 - Equation 2, Fig. 2 - shows that value of Egyptian cotton Exports to the global markets has taken a decreasing trend of 11461 thousand US$ , by 6.27% of the annual average of value of Egyptian cotton Exports during the study period [11], confirmed the Statistical Significance of the regression coefficient at a statistical significance level 0.01, confirmed the Statistical Significance of the model as a whole at a statistical significance level 0.05, value of the determination coefficient showed that 31% of the changes in value of Egyptian cotton Exports is due to the time variable [12].

#### 4.1.3 Export price

Data of the Table 1 show that Export price of Egyptian cotton to the global markets reached its a minimum of 1192 thousand US$ in 2007, reached its a maximum of 5666 thousand US$ in 2009, as the annual average of Export price of 2621 thousand US$ during the period 2000-2017 [13]. Data of the Table 2 - Equation 3 - showed that the Statistical Significance of any of the estimated models of Egyptian cotton Exports price has been not confirmed during the period 2000-2017.

#### 4.1.4 The relative importance of value of Egyptian cotton exports

Data of the Table 3 show that the relative importance of value of Egyptian cotton Exports when compared to value of Total Exports has taken a decreasing, As the relative importance of value of Egyptian cotton Exports reached its a minimum of 87 million US$ in 2014, by 0.32% of value of Total Exports, as value of Total Exports of 26852 million US$ in the same year, reached its a maximum of 330 million US$ in 2002, by 4.96% of value of Total Export, as value of Total Exports of 6643 million US$ in the same year, the annual average of value of Egyptian Cotton Exports of 183 million US$, by 1.47% of the

annual average of value of Total Exports during the period 2000-2017 [14]. Data of the same table shows that the relative importance of value of Egyptian cotton Exports when compared to value of Agricultural Exports has taken a decreasing, As the relative importance of value of Egyptian cotton Exports reached its a minimum of 92 million US$ in 2017, by 1.85% of value of Agricultural Exports, As value of Agricultural Exports of 4993 million US$ in the same year, reached its a maximum of 330 million US$ in 2002, by 42.27% of value of Agricultural Exports, As value of Agricultural Exports of 772 million US$ in the same year, the annual average of value of Egyptian Cotton Exports of 183 million US$, by 13.69% of the annual average of value of Agricultural Exports during the period 2000-2017 [15].

Data of the Table 4 - Equation 1, Fig. 3. - shows that the relative importance of value of Egyptian cotton Exports when compared to value of Total Exports has taken a decreasing trend of 0.218 million US$ , by 14.83% of the annual average of the relative importance during the period 2000-2017, confirmed the Statistical Significance of the regression coefficient and the model as a whole at a Statistical Significance level 0.01, the value of the determination coefficient showed that 53% of the changes in the relative importance of value of Egyptian cotton Exports when compared to value of Total Exports is due to the time variable. Data of the same table - Equation 2, Fig. 4. - shows that the relative importance of value of Egyptian cotton Exports when compared to value of Agricultural Exports has taken a decreasing trend of 2.27 million US$ , by 16.58% of the annual average of the relative importance during the period 2000-2017, confirmed the Statistical Significance of the regression coefficient and the model as a whole at a Statistical Significance level 0.01, the value of the determination coefficient showed that 71% of the changes in the relative importance of value of Egyptian cotton Exports when compared to value of Agricultural Exports is due to the time variable [16].

## 4.2 Development and Trends of Quantity and Value of Cotton Imports

### 4.2.1 Quantity of cotton imports

Data of the Table 5 show that quantity of cotton imports reached its a minimum of 2074 tons in 2002, reached its a maximum of 123452 tons in 2017, as the annual average of quantity of cotton imports by 46700 tons during the period 2000-2017 [17]. Data of the Table 6 - Equation 1, Fig. 5 - show that quantity of cotton imports has taken an increasing trend of 4378 tons , by 9.37% of the annual average of quantity of cotton imports, confirmed the Statistical Significance of the regression coefficient and the model as a whole at a Statistical Significance level 0.01, the value of the determination coefficient showed that 50% of the changes in quantity of cotton imports is due the time variable [18].

### 4.2.2 Value of Cotton Imports

Data of the Table 5 show that value of cotton imports reached its a minimum of 4158 thousand US$ in 2002, reached its a maximum of 236963 thousand US$ in 2017, as the annual average of value of cotton imports of 97321 thousand US$ during the period 2000-2017. Data of the Table 6 - Equation 2, Fig. 6. - show that value of cotton imports has taken an increasing trend of 10249 thousand US$, by 10.53% of the annual average of value of cotton imports, confirmed the Statistical Significance of the regression coefficient and the model as a whole at a Statistical Significance level 0.01, the value of the determination coefficient showed that 70% of the changes in value of cotton imports is due to the time variable [19].

### 4.2.3 Import price

Data of the Table 5 show that import price of cotton reached its a minimum of 0.95 thousand US$ in 2001, reached its a maximum of 3.36 thousand US$ in 2011, as the annual average of import price of cotton of 2.13 thousand US$ during the period 2000-2017. Data of the Table 6 - Equation 3, Fig. 7. - show that import price of cotton has taken an increasing trend of 0.053 thousand US$ , by 9.37% of the annual average of import price of cotton, confirmed the Statistical Significance of the regression coefficient and the model as a whole at a Statistical Significance level 0.01, the value of the determination coefficient showed that 60% of the changes in the import price of cotton is due to the time variable [20].

## 4.3 Relationship of Exports and Imports of Cotton

### 4.3.1 Percentage of quantity of exports and imports of cotton

Data of the Table 7 show that Percentage of quantity of Exports and Imports of Cotton

reached its a minimum of 1.29% in 2002, reached its a maximum of 276.68% in 2017, as the annual average of 101.72% during the period 2000-2017. Data of the Table 8 – Equation 1, Fig. 8. - shows that Percentage of quantity of Exports and Imports of Cotton has taken an increasing trend of 14.1%, by 13.86% of the annual average of that percentage, confirmed the Statistical Significance of the regression coefficient and the model as a whole at a Statistical Significance level 0.01, the value of the determination coefficient showed that 60% of the changes in Percentage of quantity of Exports and Imports of Cotton is due to the time variable [21].

#### 4.3.2 Percentage of value of exports and imports of cotton

Data of the Table 7 show that Percentage of Value of Exports and Imports of Cotton reached its a minimum of 1.26% in 2002, reached its a maximum of 256.85 % in 2017, as the annual average of 79.84 % during the period 2000-2017. Data of the Table 8 - Equation 2, Fig. 9. - shows that Percentage of Value of Exports and Imports of Cotton has taken an increasing trend of 11.8%, by 14.78% of the annual average of that percentage, confirmed the Statistical Significance of the regression coefficient and the model as a whole at a Statistical Significance level 0.01, the value of the determination coefficient showed that 72% of the changes in Percentage of Value of Exports and Imports of Cotton is due to the time variable.

#### 4.3.3 Percentage of price of export and import of cotton

Data of the Table 7 show that Percentage of Price of Export and Import of cotton reached its a minimum of 41.67% in 2002, reached its a maximum of 257.98 % in 2007, as the annual average of 90.29 % during the period 2000-2017. Data of the Table 8 - Equation 3 - showed that the Statistical Significance of any of the estimated models of Percentage of Price of Export and Import of cotton has been not confirmed during the period 2000-2017 [22].

We conclude from the results of Relationship of Exports and Imports of Cotton that there is a marked increase in imports of cotton over time, so it is necessary to review the Egyptian agricultural policy to increase the cultivated area of the cotton crop to increase the total of production and thus increase the dependence on domestic production of Egyptian cotton to reduce quantity of imports of cotton and increase quantity of Exports to the global markets [23].

**Table 1. Development and trends of quantity and value of Egyptian cotton exports during the period 2000-2017**

| Years | Quantity | Value | Export price |
|---|---|---|---|
| 2000 | 63222 | 132272 | 2092 |
| 2001 | 81609 | 186003 | 2279 |
| 2002 | 161120 | 329698 | 2046 |
| 2003 | 196822 | 365865 | 1859 |
| 2004 | 183727 | 483023 | 2629 |
| 2005 | 96749 | 180547 | 1866 |
| 2006 | 55189 | 132800 | 2406 |
| 2007 | 128335 | 152969 | 1192 |
| 2008 | 97172 | 185365 | 1908 |
| 2009 | 15441 | 87494 | 5666 |
| 2010 | 54638 | 137353 | 2514 |
| 2011 | 61217 | 264332 | 4318 |
| 2012 | 57733 | 163698 | 2835 |
| 2013 | 42027 | 135669 | 3228 |
| 2014 | 24759 | 86519 | 3494 |
| 2015 | 36940 | 83952 | 2273 |
| 2016 | 30906 | 90875 | 2940 |
| 2017 | 56636 | 92258 | 1629 |
| **Average** | **80236** | **182816** | **2621** |

*(Quantity: tons, Value: 1000 US$)*

*Source: Websites of Food and Agriculture Organization of the United Nations (FAO)*

**Table 2. General temporal trend of quantity and value of Egyptian cotton exports during the period 2000-2017**

| Eq. No | Dependent variable | Model equations | Annual average | Amount of change | Annual change rate% | $R^2$ | F |
|---|---|---|---|---|---|---|---|
| (1) | Quantity | Yt = 141026 - 6399 X (-3.26) ** | 80236 | -6399 | -7.98 | 0.40 | 10.61** |
| (2) | Value | Yt= 291697 - 11461 X (-2.66) ** | 182816 | -11461 | -6.27 | 0.31 | 7.09* |
| (3) | Export price | Yt = 2107 + 54.1 X (1.14) | 2621 | 54.1 | 2.06 | 0.08 | 1.29 |

*Ŷt: Refers to the estimated value of the referred dependent variable; X t refers to the temporal factor as t = 1, 2, 3, ……., 18 years. Values between brackets under the coefficients of regression refer to the calculated value of "t". (**) Significant at the 0.01 level, (*) Significant at the 0.05 level, (-): descending annual change.*
*Source: The data are collected and estimated from Table 1*

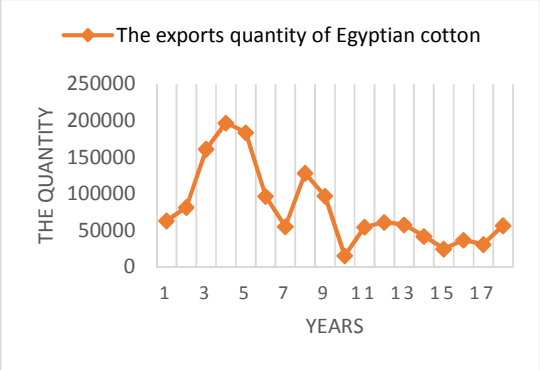


**Fig. 1. Quantity of Egyptian cotton exports**

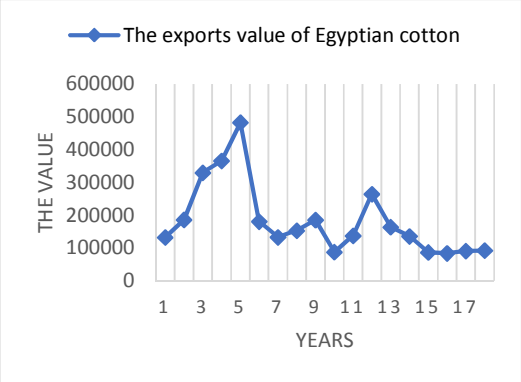


**Fig. 2. Value of Egyptian cotton exports**

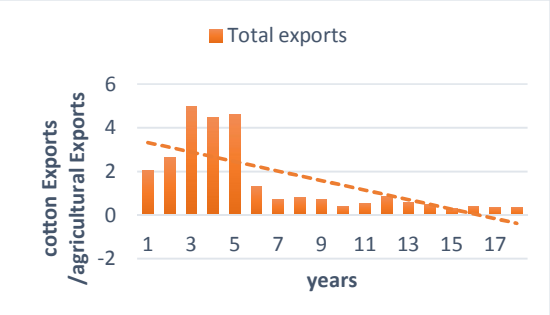


**Fig. 3. Total exports**

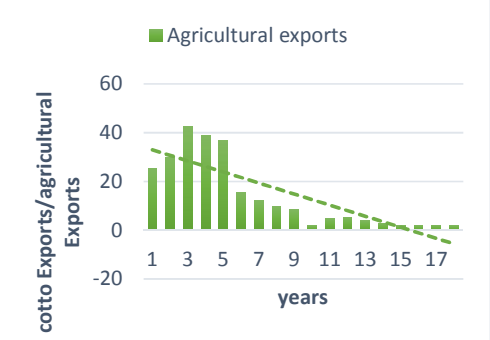


**Fig. 4. Agricultural exports**

## 4.4 Development and Trends of Quantity and Value of the Cotton Spinning Exports

### 4.4.1 Quantity of the cotton spinning exports

Data of the Table 1 in the Annex show that quantity of cotton spinning Exports to the global markets reached its a minimum of 25.2 thousand tons in 2016, reaching its a maximum of 52.31 thousand tons in 2010, as the annual average of 33.36 thousand tons during the period 2000-2017. Data of the Table 9 - Equation 1- show that the Statistical Significance of any of the estimated models of quantity of cotton spinning Exports has been not confirmed during the period 2000-2017.

#### 4.4.2 Value of the cotton spinning exports

Data of the Table 1 in the Annex show that value of cotton spinning Exports to the global markets reached its a minimum 108.74 million US$ in 2003, reaching its a maximum of 308.98 million US$ in 2011, as the annual average of 185.42 million US$ during the period 2000-2017. Data of the Table 9 - Equation 2, Fig. 10 - shows that value of cotton spinning Exports has taken an increasing trend of 6.88 million US$, by 3.71% of the annual average of value of Cotton spinning Exports during the study period, confirmed the Statistical Significance of the regression coefficient and the model as a whole at a Statistical Significance level 0.01, the value of the determination coefficient showed that 35% of the changes in value of cotton spinning Exports is due to the time variable.

### 4.5 Development and Trends of Quantity and Value of the Cotton Textile Exports

#### 4.5.1 Quantity of the cotton textile exports

Data of the Table 1 in the Annex show that quantity of the cotton textile Exports to the global markets reached its a minimum 4.57 thousand tons in 2009, reaching its a maximum of 33.9 thousand tons in 2017, as the annual average of 11 thousand tons during the period 2000-2017.

**Table 3. The Relative Importance of Value of Egyptian Cotton Exports During the Period 2000-2017**

| Years | Total exports (1) | Agricultural exports (2) | Cotton exports (3) | % 3/1 | % 3/2 |
|---|---|---|---|---|---|
| 2000 | 6388 | 518 | 132 | 2.07 | 25.53 |
| 2001 | 7068 | 620 | 186 | 2.63 | 29.98 |
| 2002 | 6643 | 772 | 330 | 4.96 | 42.72 |
| 2003 | 8205 | 938 | 366 | 4.46 | 39.02 |
| 2004 | 10453 | 1314 | 483 | 4.62 | 36.75 |
| 2005 | 13833 | 1168 | 181 | 1.31 | 15.46 |
| 2006 | 18455 | 1086 | 133 | 0.72 | 12.22 |
| 2007 | 19224 | 1563 | 153 | 0.80 | 9.78 |
| 2008 | 26224 | 2177 | 185 | 0.71 | 8.52 |
| 2009 | 23062 | 4407 | 87 | 0.38 | 1.99 |
| 2010 | 26438 | 2918 | 137 | 0.52 | 4.71 |
| 2011 | 31570 | 5094 | 264 | 0.84 | 5.19 |
| 2012 | 29397 | 4141 | 164 | 0.56 | 3.95 |
| 2013 | 28492 | 4867 | 136 | 0.48 | 2.79 |
| 2014 | 26852 | 4438 | 87 | 0.32 | 1.95 |
| 2015 | 21349 | 4391 | 84 | 0.39 | 1.91 |
| 2016 | 25468 | 4407 | 91 | 0.36 | 2.06 |
| 2017 | 25604 | 4993 | 92 | 0.36 | 1.85 |
| **Average** | **19707** | **2767** | **183** | **1.47** | **13.69** |

*Source: Websites of Food and Agriculture Organization of the United Nations (FAO)*
*(Million US$)*

**Table 4. General temporal trend of the relative importance of value of Egyptian cotton exports during the period 2000-2017**

| Eq. No | Dependent variable | Model equations | Annual average | Amount of change | Annual chang rate% | $R^2$ | F |
|---|---|---|---|---|---|---|---|
| (1) | Total exports | Yt = 3.54 - 0.218 X (-4.23) ** | 1.47 | -0.218 | -14.83 | 0.53 | 17.86** |
| (2) | Agricultural exports | Yt = 35.3 - 2.27 X (-6.26) ** | 13.69 | -2.27 | -16.58 | 0.71 | 39.24** |

*Ŷt: Refers to the estimated value of the referred dependent variable; X t refers to the temporal factor as t = 1, 2, 3, ……., 18 years. Values between brackets under the coefficients of regression refer to the calculated value of "t". (**) Significant at the 0.01 level, (*) Significant at the 0.05 level, (-): descending annual change*
*Source: The data are collected and estimated from Table 3*

**Table 5. Development and trends of quantity and value of cotton imports during the period 2000-2017**

| Years | Quantity | Value | Imports Price |
|---|---|---|---|
| 2000 | 8060 | 8348 | 1.04 |
| 2001 | 22993 | 21849 | 0.95 |
| 2002 | 2074 | 4158 | 2.00 |
| 2003 | 8302 | 15053 | 1.81 |
| 2004 | 82178 | 93360 | 1.14 |
| 2005 | 21121 | 51032 | 2.42 |
| 2006 | 39776 | 71367 | 1.79 |
| 2007 | 22739 | 69772 | 3.07 |
| 2008 | 74164 | 143195 | 1.93 |
| 2009 | 41263 | 130605 | 3.17 |
| 2010 | 45422 | 120574 | 2.65 |
| 2011 | 43649 | 146760 | 3.36 |
| 2012 | 16919 | 46530 | 2.75 |
| 2013 | 70866 | 169917 | 2.40 |
| 2014 | 68502 | 157324 | 2.30 |
| 2015 | 84970 | 143588 | 1.69 |
| 2016 | 64145 | 121386 | 1.89 |
| 2017 | 123452 | 236963 | 1.92 |
| **Average** | **46700** | **97321** | **2.13** |

*Source: Websites of Food and Agriculture Organization of the United Nations (FAO) (Quantity: tons, Value: 1000 US$)*

**Table 6. General temporal trend of quantity and value of cotton imports during the period 2000-2017**

| Eq. No | Dependent variable | Model equations | Annual average | Amount of change | Annual chang rate% | $R^2$ | F |
|---|---|---|---|---|---|---|---|
| (1) | Quantity | Yt = 5111 + 4378 X<br>(4.02) ** | 46700 | 4378 | 9.37 | O.50 | 16.20** |
| (2) | Value | Yt = - 45 + 10249 X<br>(6.14) ** | 97321 | 10249 | 10.53 | 0.70 | 37.66** |
| (3) | Import Price | Yt = 0.422 + 0.412 X - 0.0189 $X^2$<br>(4.52) ** (-4.05) ** | 2.13 | 0.053 | 2.48 | 0.60 | 11.28** |

*Ŷt: Refers to the estimated value of the referred dependent variable; X t refers to the temporal factor as t = 1, 2, 3, ……., 18 years. Values between brackets under the coefficients of regression refer to the calculated value of "t". (**) Significant at the 0.01 level*

*Source: The data are collected and estimated from Table 5*


**Fig. 5. Quantity of cotton imports**

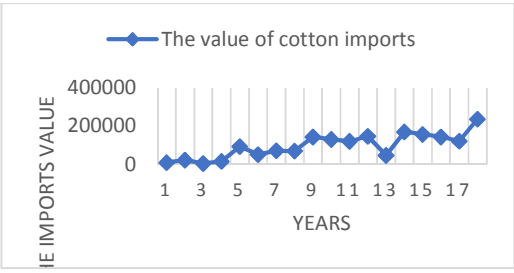


**Fig. 6. Value of cotton imports**

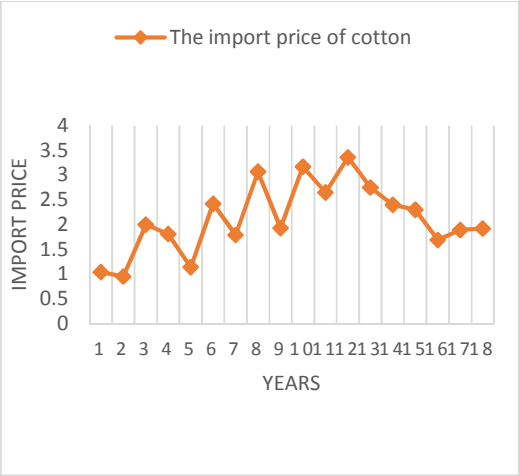


**Fig. 7. Import price of cotton**

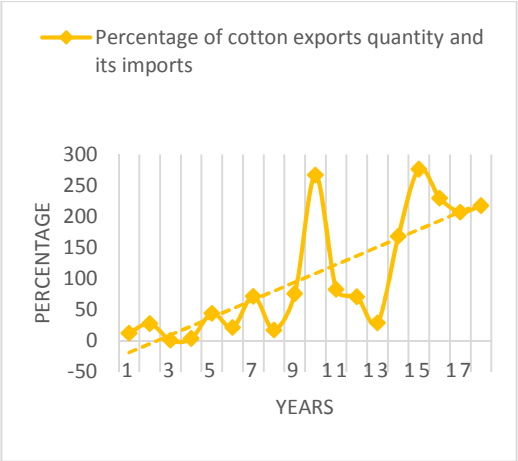


**Fig. 8. Percentage of quantity of exports and imports of cotton**

**Table 7. Relationship of exports and imports of cotton during the period 2000-2017**

| Years | $\%\frac{\text{Imports Quantity}}{\text{Exports Quantity}}$ | $\%\frac{\text{Imports Value}}{\text{Exports Value}}$ | $\%\frac{\text{Import Price}}{\text{Export Price}}$ |
|---|---|---|---|
| 2000 | 12.75 | 6.31 | 49.76 |
| 2001 | 28.17 | 11.75 | 41.67 |
| 2002 | 1.29 | 1.26 | 97.56 |
| 2003 | 4.22 | 4.11 | 97.31 |
| 2004 | 44.73 | 19.33 | 43.35 |
| 2005 | 21.83 | 28.27 | 129.41 |
| 2006 | 72.07 | 53.74 | 74.27 |
| 2007 | 17.72 | 45.61 | 257.98 |
| 2008 | 76.32 | 77.25 | 101.05 |
| 2009 | 267.23 | 149.27 | 55.91 |
| 2010 | 83.13 | 87.78 | 105.58 |
| 2011 | 71.30 | 55.52 | 77.78 |
| 2012 | 29.31 | 28.42 | 96.83 |
| 2013 | 168.62 | 125.24 | 74.30 |
| 2014 | 276.68 | 181.84 | 65.90 |
| 2015 | 230.02 | 171.04 | 74.45 |
| 2016 | 207.55 | 133.57 | 64.29 |
| 2017 | 217.97 | 256.85 | 117.79 |
| **Average** | **101.72** | **79.84** | **90.29** |

*Source: The data are collected and estimated from table 1, 5*

Data of the Table 9 - Equation 3, Fig. 11. - shows that quantity of the cotton textile Exports has taken an increasing trend of 1.01 thousand tons, by 9.18% of the annual average of quantity of the cotton textile exports during the study period, confirmed the statistical significance of the regression coefficient and the model as a whole at a statistical SIGNIFICANCE level 0.01, the value of the determination coefficient showed that 47% of the changes in quantity of the cotton textile Exports is due to the time variable.

### 4.5.2 Value of the cotton textile exports

Data of the Table 1 in the Annex show that Value of the Cotton textile Exports to the global markets reached its a minimum 19.06 million US$ in 2003, reaching its a maximum of 141.88 million US$ in 2016, as the annual average of 66.11 million US$ during the period 2000-2017. Data of the Table 9 - Equation 4, Fig. 12 - shows that Value of the Cotton textile Exports has taken an increasing trend of 7.25 million US$, by 10.97 % of the annual average of Value of the Cotton

textile Exports during the study period, confirmed the Statistical Significance of the regression coefficient and the model as a whole at a Statistical Significance level 0.01, the value of the determination coefficient showed that 74% of the changes in Value of the Cotton textile Exports is due to the time variable.

## 4.6 Development and Trends of Quantity and Value of the Cotton Knitwear Products Exports

### 4.6.1 Quantity of the cotton knitwear products exports

Data of the Table 1 in the Annex show that quantity of the cotton knitwear products Exports to the global markets reached its a minimum 20.7thousand tons in 2001, reaching its a maximum of 64.9 thousand tons in 2017, as the annual average of 37.50 thousand tons during the period 2000-2017. Data of the Table 9 - Equation 5, Fig. 13. - shows that quantity of the cotton knitwear products Exports has taken an increasing trend of 1.96 thousand tons, by 5.23% of the annual average of quantity of the cotton knitwear products Exports during the study period, confirmed the Statistical Significance of the regression coefficient and the model as a whole at a Statistical Significance level 0.01, the value of the determination coefficient showed that 86% of the changes in quantity of the cotton knitwear products Exports is due to the time variable.

### 4.6.2 Value of the cotton knitwear products exports

Data of the Table 1 in the Annex show that Value of the cotton knitwear products Exports to the global markets reached its a minimum 200.65 million US$ in 2003, reaching its a maximum of 567.48 million US$ in 2017, as the annual average of 405.42 million US$ during the period 2000-2017. Data of the Table 9 - Equation 6, Fig. 14. - shows that Value of the cotton knitwear products Exports has taken an increasing trend of 15.8 million US$, by 3.90% of the annual average of Value of the cotton knitwear products Exports during the study period, confirmed the Statistical Significance of the regression coefficient and the model as a whole at a Statistical Significance level 0.01, the value of the determination coefficient showed that 60% of the changes in Value of the cotton knitwear products Exports is due to the time variable.

## 4.7 Development and Trends of Quantity and Value of the Cotton Clothing Exports

### 4.7.1 Quantity of the cotton clothing exports

Data of the Table 1 in the Annex show that quantity of the Cotton clothing Exports to the global markets reached its a minimum 17.7 thousand tons in 2001, reaching its a maximum of 103.8 thousand tons in 2017, as the annual average of 49.14 thousand tons during the period 2000-2017. Data of the Table 9- Equation 7, Fig. 15. - shows that quantity of the Cotton clothing Exports has taken an increasing trend of 8.06 thousand tons, by 8.26 % of the annual average of quantity of the Cotton clothing Exports during the study period, confirmed the Statistical Significance of the regression coefficient and the model as a whole at a Statistical Significance level 0.01, the value of the determination coefficient showed that 85% of the changes in quantity of the Cotton clothing Exports is due to the time variable.

**Table 8. General temporal trend of relationship of exports and imports of cotton during the period 2000-2017**

| Eq. No | Dependent variable | Model equations | Annual average | Amount of change | Annual change rate% | $R^2$ | F |
|---|---|---|---|---|---|---|---|
| (1) | % Imports Quantity | Yt = - 32.6 + 14.1 X (4.90) ** | 101.72 | 14.1 | 13.86 | 0.60 | 24.05** |
| (2) | % Imports Value | Yt = - 32.0 + 11.8 X (6.42) ** | 79.84 | 11.8 | 14.78 | 0.72 | 41.22** |
| (3) | % Import Price | Yt = 86.2 + 0.43 X (0.19) | 90.29 | 0.43 | 0.48 | 0.02 | 0.04 |

*Ŷt: Refers to the estimated value of the referred dependent variable; X t refers to the temporal factor as t = 1, 2, 3, ……., 18 years. Values between brackets under the coefficients of regression refer to the calculated value of "t". (**) Significant at the 0.01 level, (*) Significant at the 0.05 level, (-): descending annual change*

*Source: The data are collected and estimated from Table 7*

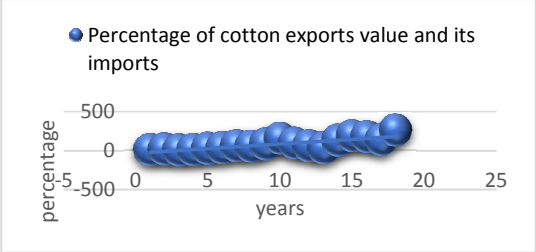


**Fig. 9. Percentage of Value of Exports and Imports of Cotton**

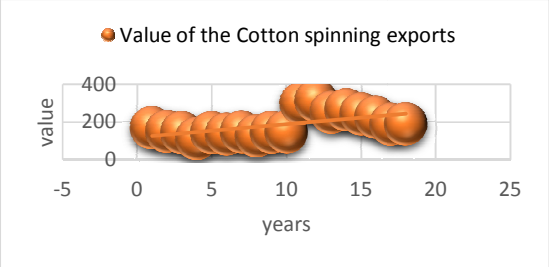


**Fig. 10. Value of cotton spinning exports**

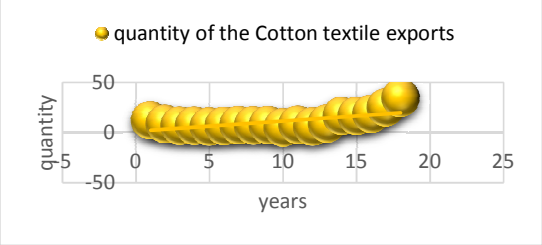


**Fig. 11. Quantity of cotton textile exports**

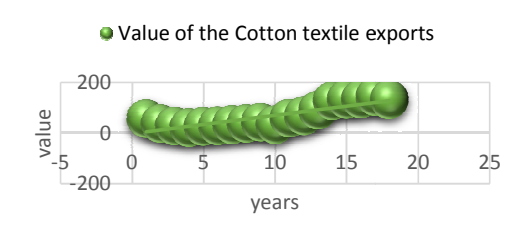


**Fig. 12. Value of cotton textile exports**

### 4.7.2 Value of the cotton clothing exports

Data of the Table 1 in the Annex show that Value of the Cotton clothing Exports to the global markets reached its a minimum 162.37 million US$ in 2003, reaching its a maximum of 851.02 million US$ in 2011, as the annual average of 532.45 million US$ during the period 2000-2017. Data of the Table 9 - Equation 8, Fig. 16. - shows that Value of the Cotton clothing Exports has taken an increasing trend of 39.8 million US$, by 7.47% of the annual average of Value of the Cotton clothing Exports during the study period, confirmed the Statistical Significance of the regression coefficient and the model as a whole at a Statistical Significance level 0.01, the value of the determination coefficient showed that 77 % of the changes in Value of the Cotton clothing Exports is due to the time variable.

## 4.8 Development and Trends of Quantity and Value of the Medical Cotton Exports

### 4.8.1 Quantity of the medical cotton exports

Data of the Table 1 in the Annex show that quantity of the Medical cotton Exports to the global markets reached its a minimum 0.17 thousand tons in 2017, reaching its a maximum of 1.05 thousand tons in 2012, as the annual average of 0.51 thousand tons during the period 2000-2017. Data of the Table 9 - Equation 9, Fig. 17. - shows that quantity of the Medical cotton Exports has taken an increasing trend of 0.059 thousand tons, by 11.6 % of the annual average of quantity of the Medical cotton Exports during the study period, confirmed the Statistical Significance of the regression coefficient and the model as a whole at a Statistical Significance level 0.01, the value of the determination coefficient showed that 67% of the changes in quantity of the Medical cotton Exports is due to the time variable.

### 4.8.2 Value of the medical cotton exports

Data of the Table 1 in the Annex show that Value of the Medical cotton Exports to the global markets reached its a minimum 0.62 million US$ in 2017, reaching its a maximum of 1.86 million US$ in 2013, as the annual average of 1.31 million US$ during the period 2000-2017. Data of the Table 9 - Equation 10, Fig. 18 - shows that Value of the Medical cotton Exports has taken an increasing trend of 0.174 million US$, by 13.3 % of the annual average of Value of the Medical cotton Exports during the study period, confirmed the Statistical Significance of the regression coefficient and the model as a whole at a Statistical Significance level 0.01, the value of the determination coefficient showed that 93 % of the changes in Value of the Medical cotton Exports is due to the time variable.

**Table 9. General temporal trend of quantity and value of the manufactured cotton products exports during the period 2000-2017**

| Eq. No | Dependent variable | Model equations | Annual average | Amount of change | Annual change Rate% | $R^2$ | F |
|---|---|---|---|---|---|---|---|
| (1) | Quantity of Cotton Spinning | Yt = 34.9 - 0.164 X (-0.56) | 33.36 | -0.164 | -0.49 | 0.02 | 0.31 |
| (2) | Value of Cotton Spinning | Yt = 120 + 6.88 X (2.95) ** | 185.42 | 6.88 | 3.71 | 0.35 | 8.72** |
| (3) | Quantity of Cotton Textile | Yt = 1.39 + 1.01 X (3.78) ** | 11 | 1.01 | 9.18 | 0.47 | 14.30** |
| (4) | Value of Cotton textile | Yt= - 2.8 + 7.25 X (6.67) ** | 66.11 | 7.25 | 10.97 | 0.74 | 44.45** |
| (5) | Quantity of knitwear products | Yt = 18.9 + 1.96 X (9.91) ** | 37.5 | 1.96 | 5.23 | 0.86 | 98.27** |
| (6) | Value of knitwear products | Yt = 255 + 15.8 X (4.89) ** | 405.42 | 15.8 | 3.90 | 0.60 | 23.95** |
| (7) | Quantity of Cotton clothing | Yt = 10.6 + 4.06 X (9.51) ** | 49.14 | 4.06 | 8.26 | 0.85 | 90.44** |
| (8) | Value of Cotton clothing | Yt = 154 + 39.8 X (7.25) ** | 532.45 | 39.8 | 7.47 | 0.77 | 52.52** |
| (9) | Quantity of Medical cotton | Yt = 0.579 - 0.143 X + 0.0266 $X^2$ - 0.00112 $X^3$ (-1.93) * (2.96) ** (-3.60) ** | 0.51 | 0.0592 | 11.61 | 0.67 | 9.35** |
| (10) | Value of Medical cotton | Yt = 1.42 - 0.389 X + 0.0681 $X^2$ - 0.00270 $X^3$ (-5.69) ** (8.26) ** (-9.47) ** | 1.31 | 0.174 | 13.28 | 0.93 | 62.97** |
| (11) | Total of manufactured cotton products quantity | Yt = 80.7 + 8.08 X (9.26) ** | 157.47 | 8.08 | 5.13 | 0.84 | 85.68** |
| (12) | Total of manufactured cotton products value | Yt = 602 + 81.2 X (6.99) ** | 1373.18 | 81.2 | 5.91 | 0.75 | 48.87** |

*$\hat{Y}t$: Refers to the estimated value of the referred dependent variable; X t refers to the temporal factor as t = 1, 2, 3, ……., 18 years. Values between brackets under the coefficients of regression refer to the calculated value of "t". (**) Significant at the 0.01 level, (*) Significant at the 0.05 level, (-): descending annual change.*
*Source: The data are collected and estimated from Table 1 in The Annex*


**Fig. 13. Quantity of cotton knitwear products exports**


**Fig. 14. Value of cotton knitwear products exports**


**Fig. 15. Quantity of cotton clothing exports**


**Fig. 16. Value of cotton clothing exports**

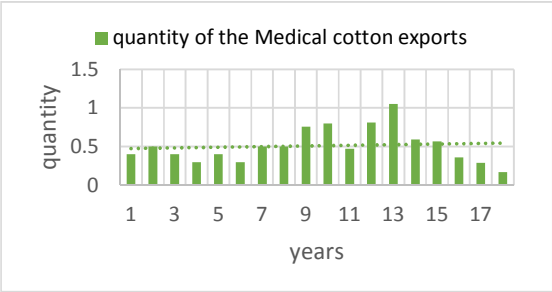


**Fig. 17. Quantity of the medical cotton exports**

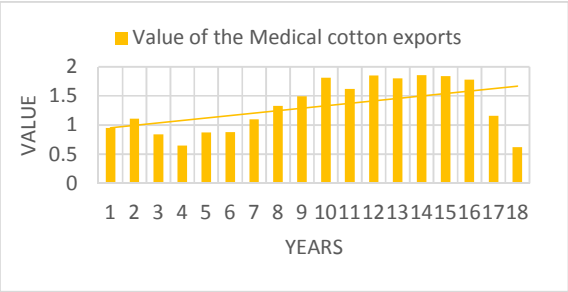


**Fig. 18. Value of the medical cotton exports**


**Fig. 19. Quantity of the manufactured cotton products exports**


**Fig. 20. Value of the manufactured cotton products exports**

## ANNEX

**Table A1. Development and trends of quantity and value of the manufactured cotton products exports during the period 2017-2000**

| Years | Cotton spinning | | | Cotton textile | | | Knitwear products | | | Cotton clothing | | | Medical cotton | | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Q | V | % | Q | V | % | Q | V | % | Q | V | % | Q | V | % | Q | V |
| 2000 | 38.2 | 166.19 | 20.55 | 11.6 | 55.59 | 6.87 | 22.7 | 289.17 | 35.75 | 18.4 | 225.23 | 27.85 | 0.4 | 0.95 | 0.12 | 104.3 | 808.84 |
| 2001 | 35.4 | 146.74 | 20.03 | 8.1 | 35.24 | 4.81 | 20.7 | 251.95 | 34.39 | 17.7 | 222.25 | 30.34 | 0.5 | 1.11 | 0.15 | 95.9 | 732.54 |
| 2002 | 36.3 | 141.34 | 19.72 | 6.4 | 25.78 | 3.60 | 23.5 | 259.80 | 36.24 | 19.5 | 211.13 | 29.45 | 0.4 | 0.84 | 0.12 | 99.2 | 716.89 |
| 2003 | 36.3 | 108.74 | 19.71 | 6.3 | 19.06 | 3.45 | 23.6 | 200.65 | 36.38 | 19.5 | 162.37 | 29.44 | 0.3 | 0.65 | 0.12 | 99.1 | 551.59 |
| 2004 | 32.9 | 141.41 | 16.42 | 5.5 | 23.56 | 2.74 | 30.9 | 327.78 | 38.06 | 25.2 | 249.31 | 28.95 | 0.4 | 0.87 | 0.10 | 114.9 | 861.17 |
| 2005 | 30.7 | 132.54 | 14.74 | 6 | 26.20 | 2.91 | 30.4 | 315.69 | 35.12 | 29 | 288.12 | 32.05 | 0.3 | 0.88 | 0.10 | 116.9 | 899.01 |
| 2006 | 28.7 | 144.18 | 12.42 | 6.9 | 31.01 | 2.67 | 32 | 367.16 | 31.63 | 52.6 | 453.10 | 39.03 | 0.5 | 1.10 | 0.09 | 142.8 | 1160.77 |
| 2007 | 26.1 | 122.62 | 10.00 | 6.7 | 34.87 | 2.84 | 35.4 | 406.18 | 33.13 | 45.5 | 488.04 | 39.81 | 0.5 | 1.33 | 0.11 | 138.9 | 1225.95 |
| 2008 | 26.90 | 141.99 | 8.97 | 6.92 | 40.59 | 2.56 | 41.6 | 492.06 | 31.08 | 54.05 | 645.34 | 40.76 | 0.76 | 1.49 | 0.09 | 169.34 | 1583.10 |
| 2009 | 27.30 | 143.29 | 9.11 | 4.57 | 30.34 | 1.93 | 39.4 | 496.90 | 31.58 | 51.27 | 674.68 | 42.88 | 0.80 | 1.81 | 0.12 | 161.39 | 1573.23 |
| 2010 | 52.31 | 294.60 | 15.53 | 7.27 | 56.55 | 2.98 | 39.5 | 485.17 | 25.58 | 66.04 | 820.91 | 43.28 | 0.47 | 1.62 | 0.09 | 202.86 | 1896.95 |
| 2011 | 35.36 | 308.98 | 14.87 | 5.44 | 65.56 | 3.16 | 47 | 567.48 | 27.31 | 67.25 | 851.02 | 40.96 | 0.81 | 1.85 | 0.09 | 187.56 | 2077.88 |
| 2012 | 34 | 247.68 | 13.68 | 8.30 | 87.27 | 4.82 | 42.2 | 494.30 | 27.30 | 58.69 | 730.44 | 40.34 | 1.05 | 1.80 | 0.10 | 174.26 | 1810.85 |
| 2013 | 38 | 262.00 | 14.00 | 15.90 | 124.46 | 6.65 | 45.2 | 485.52 | 25.95 | 63.48 | 737.78 | 39.43 | 0.59 | 1.86 | 0.10 | 196.29 | 1871.20 |
| 2014 | 33.06 | 240.19 | 13.06 | 15.92 | 130.86 | 7.11 | 47.8 | 523.99 | 28.48 | 58.08 | 672.38 | 36.55 | 0.57 | 1.84 | 0.10 | 188.42 | 1839.57 |
| 2015 | 28.59 | 222.69 | 12.55 | 18.01 | 131.58 | 7.42 | 44.8 | 492.90 | 27.78 | 62.77 | 708.43 | 39.93 | 0.36 | 1.78 | 0.10 | 182.11 | 1774.27 |
| 2016 | 25.2 | 185.87 | 11.40 | 24.3 | 141.88 | 8.71 | 43.4 | 403.00 | 24.73 | 71.76 | 698.12 | 42.83 | 0.29 | 1.16 | 0.07 | 190.73 | 1629.79 |
| 2017 | 35.2 | 186.52 | 10.95 | 33.9 | 129.60 | 7.61 | 64.9 | 437.89 | 25.70 | 103.8 | 745.49 | 43.76 | 0.17 | 0.62 | 0.04 | 269.5 | 1703.69 |
| **Average** | **33.36** | **185.42** | **14.32** | **11.00** | **66.11** | **4.60** | **37.50** | **405.42** | **30.90** | **49.14** | **532.45** | **37.09** | **0.51** | **1.31** | **0.10** | **157.47** | **1373.18** |

*Source: Textile Consolidation Fund (TCF), General department of external research, quarterly bulletin ,different issues*

## 4.9 Development and Trends of Quantity and Value of The Manufactured Cotton Products Exports

### 4.9.1 Quantity of the manufactured cotton products exports

Data of the Table 1 in the Annex show that quantity of the manufactured cotton products Exports to the global markets reached its a minimum 95.9 thousand tons in 2001, reaching its a maximum of 269.5 thousand tons in 2017, as the annual average of 157.47 thousand tons during the period 2000-2017. Data of the Table 9- Equation 11, Fig. 19 - shows that quantity of the manufactured cotton products Exports has taken an increasing trend of 8.08 thousand tons, by 5.13% from the annual average of quantity of the manufactured cotton products Exports during the study period, confirmed the Statistical Significance of the regression coefficient and the model as a whole at a Statistical Significance level 0.01, the value of the determination coefficient showed that 84% of the changes in quantity of the manufactured cotton products Exports is due to the time variable.

### 4.9.2 Value of the manufactured cotton products exports

Data of the Table 1 in the Annex show that Value of the manufactured cotton products Exports to the global markets reached its a minimum 551.59 million US$ in 2003, reaching its a maximum of 2077.88 million US$ in 2011, as the annual average of 1373.18 million US$ during the period 2000-2017. Data of the Table 9 - Equation 12, Fig. 20. - shows that Value of the manufactured cotton products Exports has taken an increasing trend of 81.2 million US$, by 5.91% of the annual average of Value of the manufactured cotton products Exports during the study period, confirmed the Statistical Significance of the regression coefficient and the model as a whole at a Statistical Significance level 0.01, the value of the determination coefficient showed that 75 % of the changes in Value of the manufactured cotton products Exports is due to the time variable. has taken an increasing trend, quantity of the manufactured cotton products Exports has taken an increasing trend of 8.08 thousand tons, by 5.13% from the annual average of quantity of the manufactured cotton products Exports during the study period, Value of the manufactured cotton products Exports has taken an increasing trend of 81.2 million US$, by 5.91% of the annual average of Value of the manufactured cotton products Exports during the study period.

## 5. CONCLUSIONS AND RECOMMENDATIONS

Exports of the agricultural sector in general and Egyptian cotton Exports in particular are a very important part of Egyptian foreign trade, as these Egyptian Exports have a comparative advantage and a competitive advantage in the global markets, and this part of the study focuses on the performance of Egyptian cotton Exports in the global markets, and the important situation of those Exports in these Markets. The results show that quantity and value of Egyptian cotton Exports to the global markets has taken a decreasing trend during the study period, Also, we show that the relative importance of value of Egyptian cotton Exports when compared to value of Total Exports has taken a decreasing, the relative importance of value of Egyptian cotton Exports when compared to value of Agricultural Exports has taken a decreasing, quantity, value and import price of cotton imports has taken an increasing trend during the study period, Also the results show that value of cotton spinning Exports has taken an increasing trend, quantity and value of the cotton textile Exports has taken an increasing trend, quantity and value of the cotton knitwear products Exports has taken an increasing trend, quantity and value of the Cotton clothing Exports has taken an increasing trend, quantity and value of the Medical cotton Exports

### Based on The Study Results, We Recommend the Following

I. Reducing the price of Egyptian cotton exports to international markets to increase the competitiveness of Egyptian cotton exports in those markets.
II. Egyptian cotton exports must comply with international standards in order to maintain their import markets in addition to obtaining new import markets.
III. Reducing the quantity of cotton imported from international markets by increasing the domestic production of cotton and thus increasing the quantity of exports of that crop. Reducing the prices of exports of spinning and textile, cotton spinning and medical cotton products to global markets to increase the demand for these products in those markets, also increase the competitiveness of Egyptian exports of these products in global markets.

IV. work on return of previous position of Egyptian cotton exports through the reform policy of Egyptian foreign agricultural trade, adoption of modern techniques of production and use of new varieties to achieve high quality specifications required in the international markets.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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