

Determinants of foreign demand for Egyptian exports of grapes in its most important foreign markets

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Abstract

This research aimed to identify the determinants of foreign demand for Egyptian exports of grapes in its most important foreign markets. The results of the research showed that the Egyptian exports of grapes concentrated during the months May, June, and July of each year, and about 70.1% of the Egyptian grape exports during the period (2010- 2020) were concentrated in only five countries: United Kingdom, Netherlands, Germany, Russian Federation, and Saudi Arabia. The positive impact of the amount of Egyptian production of grape, the dollar exchange rate, and the population of the importing country on the amount of Egyptian grape exports to all study countries. The positive effect was also shown for each of The Italian export price in the German market, the total German imports of grapes on the amount of Egyptian exports to the German market, as well as the Chilean export price to the Russian market, and the apparent consumption of grapes in the Russian market on the amount of Egyptian exports to the Russian market, as well as the export price of Turkey and Chile In the Saudi market, and Saudi Arabia's total imports of grapes on the amount of Egyptian exports to the Saudi market, while the negative impact of the Egyptian export price to the United Kingdom, and the United Kingdom's production of grapes on the amount of Egyptian exports to the United Kingdom, as well as the production of Saudi Arabia of grapes on the amount of Egyptian exports to the Saudi market.

Keywords: *The current situation of exports, Seasonal evidence, Geographical distribution, The determinants of foreign demand.*

Date of Submission: 10-06-2022

Date of Acceptance: 25-06-2022

I. Introduction

Grapes are one of the important export crops in Egypt. It ranked second in the list of Egyptian agricultural exports after oranges. The average value of Egyptian exports of it during the period (2015-2020) amounted to about \$230.2 million, representing about 8% of the average value of Egyptian agricultural exports during the study period. Which amounted to about 2.890 billion dollars, and Egypt ranked thirteenth in the world in exporting grapes during that period, with an average representing about 2.3% of the average value of global exports of grapes during the study period, which amounted to about 9.912 billion dollars.

Research problem

The research problem is represented in the fluctuation and instability of Egyptian exports of grapes to the most important importing countries from year to year, which leads to fluctuation and instability of returns from them, Its exports are also characterized by geographical concentration in a limited number of countries, which may represent a great risk that may affect the return on foreign currency from these exports when any economic, social or political changes occur in these countries that may affect the volume of demand for Egyptian exports of grapes, which requires identifying the determinants of foreign demand for them in these markets.

Research objective

The research aims to identify the determinants of external demand for Egyptian exports of grapes in its most important foreign markets, to find out how to maintain these markets and to develop and increase Egyptian exports to them.

Research method and data sources

The research relied on both descriptive and quantitative methods of analysis, such as regression and correlation methods, instability coefficients, and geographic concentration coefficients.

The research relied on published and unpublished data issued by the Ministry of Agriculture and Land Reclamation, the Central Agency for Public Mobilization and Statistics, the website of the Central Agency for Public Mobilization and Statistics www.capmas.gov.eg, the website of the International Trade Center www.trademap.org, the website For United Nations database www.comtrad.un.org, FAO website www.faostat.org, World Bank website www.databank.worldbank.org

II. Research Results

First: The current situation of Egyptian exports of grapes:

Table No. (1) indicates the fluctuation of the quantity, value and price of Egyptian grape exports during the period (2010-2020), as the quantity of Egyptian grape exports ranged between a minimum of about 60.1 thousand tons in 2010, and a maximum of about 128.2 thousand tons in 2020, with a relative number of about 213.3%, and the average amount of Egyptian exports of grapes during that period was about 94.3 thousand tons, which represents about 6% of the average amount of grape production in Egypt during that period, which amounted to about 1.569 million tons. The value of Egyptian grape exports ranged between a minimum of about 152.7 million dollars in 2010, and a maximum of about 251.9 million dollars in 2020, with a relative number of about 164.9%. The average value of Egyptian grape exports during the study period was about 211.7 million dollars. The export price of a ton of grapes ranged between a minimum of about 1,935 thousand dollars in 2017, with a relative number estimated at 76.1%, and a maximum in 2011 of about 2,878 thousand dollars, with a relative number of about 113.3%, and its average during the study period was about 2,246 thousand dollars.

Table (1): Evolution of the quantity, value and price of Egyptian exports of grapes during the period (2010-2020)

Years	Export Quantity			Export Value			Export Price		
	Quantity in thousand tons	Relative number %	Instability coefficients	Value in millions of dollars	Relative number %	Instability coefficients	Price in thousand dollars / ton	Relative number %	Instability coefficients
2010	60.1	100.0	4.11	152.7	100.0	14.16	2.541	100.0	6.62
2011	70.5	117.4	2.18	203.1	133.0	9.99	2.878	113.3	9.22
2012	81.4	135.5	8.08	218.3	142.9	14.04	2.680	105.5	4.93
2013	74.1	123.3	9.23	178.4	116.8	9.99	2.407	94.7	2.47
2014	89.8	149.3	2.09	206.6	135.3	0.79	2.302	90.6	3.69
2015	90.4	150.5	4.12	218.6	143.2	3.23	2.418	95.1	4.99
2016	103.8	172.7	3.18	216.5	141.8	0.93	2.086	82.1	5.94
2017	118.2	196.7	10.54	228.7	149.8	1.51	1.935	76.1	9.30
2018	103.5	172.1	8.61	212.1	138.9	8.61	2.050	80.7	0.29
2019	117.1	194.8	2.07	242.4	158.8	1.49	2.071	81.5	4.92
2020	128.2	213.3	1.83	251.9	164.9	2.56	1.965	77.3	4.23
Average	94.3		4.15	211.7		3.79	2.246		4.03

whereas:

$$\text{coefficient of instability} = \frac{\sqrt{\frac{\sum (Y - \bar{Y})^2}{n}}}{\bar{Y}} \times 100$$

Source: Collected and calculated from the website of the Central Agency for Public Mobilization and Statistics www.capmas.gov.eg.

Table No. (2) indicates that both the quantity and value of Egyptian exports of grapes took an increasing general trend during the period (2010-2020), and the annual increase for each of them, respectively, amounted to about 6.3 thousand tons, 6.8 million dollars, which represent, respectively, about 6.7%, 3.2% of the annual average for each, while the export price per ton of grapes took a general decreasing trend during the study period, and its annual decrease amounted to about 83 dollars, which represents about 3.7% of its annual average. The coefficient of determination indicates that about 92.3%, 66%, and 78.8% of the changes occurring in the quantity, value and price of Egyptian exports of grapes during the study period are due to changes whose impact reflects the time factor.

Table No. (1) shows that the Egyptian exports of grapes were characterized by relative stability during the period (2010-2020), as the geometric mean of the instability coefficients of the quantity and value of its exports, respectively, amounted to about 4.15% and 3.79%, and the geometric mean of the instability coefficients of its export prices reached About 4.03%.

Table (2): Equations of the general time trend of the evolution of the quantity, value and price of Egyptian exports of grapes during the period (2010-2020)

	Dependent Variable	The equation	The average	R ²	F	Amount of change	Annual rate of % change
1	Export Quantity thousand tons	$\hat{Y}_i = 56.35 + 6.322 X_i$ (13.68)** (10.41)**	94.3	0.923	108.4**	6.322	6.70
2	Export Value Million dollars	$\hat{Y}_i = 171.11 + 6.774 X_i$ (15.55)** (4.176)**	211.7	0.660	17.44**	6.774	3.20
3	Export Price Thousand dollars/ ton	$\hat{Y}_i = 2.803 - 0.083 X_i$ (28.67)** (-5.777)**	2.246	0.788	33.38**	-0.083	-3.70

Whereas:

\hat{Y}_i : indicates the estimated value of the dependent variable in year i.

X_i : time variable i: 1, 2, 3,11.

The values between () are the computed "t" values.

* : indicates significance at 0.05

** : indicates significance at 0.01.

Source: Calculated from Table No (1).

Second: The seasonal index of Egyptian exports of grapes and the most important competing countries:

Table No. (3) shows that Egyptian exports of grapes are concentrated in the months of May, June, and July of each year, as the amount of monthly exports during these three months increased from the average during the period (2016-2020), which amounted to about 15,752 thousand tons, respectively, by about 133.6 %, 370.1%, 337.5%, due to the compatibility of these months with the Egyptian production of grapes. The amount of monthly exports ranged between a minimum of about 5 tons in February, with a seasonal index of about 0.03%, and a maximum of about 74.1 thousand tons in June, with a seasonal index of about 470.1%.

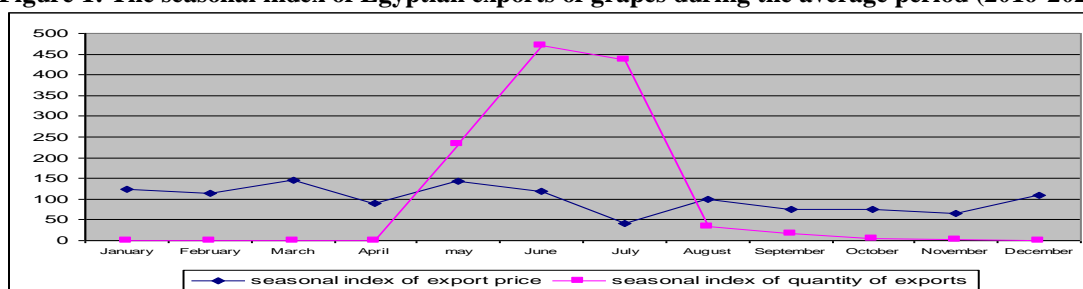
Table No. (4) shows the seasonal index of the exports of the most important countries competing for the Egyptian exports of grapes in their most important foreign markets, as it shows that the Egyptian exports of grapes were concentrated during the three months from May to July only, Only, and the Egyptian export dates partially coincided with the export dates of some competing countries such as Chile, which agreed with it in May, and with Italy and Spain, which agreed with them in July, and also coincided with the export dates of Turkey, whose exports cover almost the whole year, while there was no agreement between the Egyptian export dates and the export dates of Peru, South Africa, India, Uzbekistan, Greece, Lebanon, Moldova, which may give a comparative advantage and high competitiveness to the Egyptian exports of grapes in foreign markets due to the different Egyptian export dates from most its competitors.

Table (3): The seasonal index of Egyptian exports of grapes during the average period (2016-2020)

Months	Quantity of exports		Value of exports		Export price	
	Average in Thousand Tons	Seasonal Index %	Average in millions of dollars	Seasonal Index %	Average in thousands of dollars/ton	Seasonal Index %
January	0.013	0.1	0.021	0.1	1.649	124.5
February	0.005	0.0	0.008	0.0	1.519	114.6
March	0.061	0.4	0.117	0.6	1.924	145.2
April	0.022	0.1	0.026	0.1	1.179	89.0
May	36.796	233.6	69.871	359.0	1.899	143.3
June	74.055	470.1	115.983	595.9	1.566	118.2
July	68.921	437.5	36.701	188.6	0.533	40.2
August	5.524	35.1	7.225	37.1	1.308	98.7
September	2.544	16.1	2.526	13.0	0.993	75.0
October	0.745	4.7	0.753	3.9	1.011	76.3
November	0.252	1.6	0.221	1.1	0.876	66.1
December	0.083	0.5	0.121	0.6	1.446	109.1
Monthly average	15.752	100	19.464	100	1.325	100

Source: Collected and calculated from the website of the Central Agency for Public Mobilization and Statistics www.capmas.gov.eg.

Figure 1: The seasonal index of Egyptian exports of grapes during the average period (2016-2020)



Source: Data in Table No. (3).

Table (4): The seasonal index of Egyptian exports of grapes and the most important competing countries during the average period (2016-2020)

Months	Egypt	Chile	Italy	Spain	Turkey	Peru	South Africa	India	Uzbekistan	Greece	Lebanon	Moldova
January	0.1	63.1	2.4	22.9	61.9	540.0	261.0	33.3	8.1	33.0	195.4	99.9
February	0.0	185.9	1.5	12.2	64.2	270.0	266.7	118.0	7.7	25.3	53.4	62.9
March	0.4	279.2	2.4	14.7	69.1	43.2	303.8	148.7	7.0	30.0	0.0	35.8
April	0.1	374.4	2.1	18.5	70.5	3.3	102.1	0.0	3.0	28.6	12.4	13.1
May	233.6	153.2	5.2	12.2	66.5	3.3	22.8	0.0	3.8	21.7	0.0	0.9
June	470.1	33.0	42.9	17.3	66.1	3.7	16.6	0.0	4.1	28.7	0.0	0.0
July	437.5	18.6	123.1	158.1	69.8	8.8	17.8	0.0	35.9	47.2	0.0	0.0
August	35.1	15.6	212.0	245.8	133.3	10.7	15.3	0.0	145.8	240.7	103.6	5.3
September	16.1	15.0	278.3	271.0	182.1	16.9	16.3	0.0	188.0	342.5	178.8	44.1
October	4.7	21.2	312.7	229.5	178.1	0.0	21.6	0.0	150.8	237.1	254.8	71.9
November	1.6	19.8	186.7	140.4	141.0	0.0	30.1	0.0	101.4	98.7	195.7	118.8
December	0.5	21.0	30.7	57.4	97.5	0.0	125.8	0.0	37.4	46.4	205.9	78.6

Source: Compiled and calculated from:

- International Trade Center website www.trademap.org
- United Nations database website www.comtrade.un.org

Third: Geographical distribution of Egyptian exports of grapes:

Table No. (5) shows that the Egyptian exports of grapes were characterized by geographical concentration during the period (2010-2020), where the coefficient of geographical concentration for both the quantity and value of the Egyptian exports of grapes, respectively, amounted to about 35%, 37.6%, and it was found that about 70.1% Of the amount of Egyptian exports of grapes, it was concentrated in only five countries: the United Kingdom, Netherlands, Germany, the Russian Federation, and Saudi Arabia, which may represent a great risk that may affect the return on foreign currencies in the event of any economic, social or political changes in these countries It may affect its demand for Egyptian exports of grapes, so it is necessary to exert the necessary efforts to preserve these markets and open new markets for these exports.

The United Kingdom ranked first in the list of countries importing Egyptian grapes during the period (2010-2020), as the average quantity of Egyptian exports of grapes to this market amounted to about 22 thousand tons, representing about 23.3% of the total amount of Egyptian exports of grapes during that period. Its average value amounted to about 55.9 million dollars, representing about 26.4% of the total value of Egyptian exports of grapes during that period, followed by the Netherlands, which came in second place, where the average amount of Egyptian exports to it amounted to about 16.5 thousand tons, representing about 17.5% of the total amount of Egyptian exports of grapes during that period, and its average value amounted to about 39.8 million dollars, representing about 18.8% of the total value of Egyptian grape exports during that period, then came Germany, where the average amount of Egyptian exports to it amounted to about 12.7 thousand tons, representing about 13.5% of the total amount of Egyptian exports of grapes during that period, and its average value amounted to about 33.3 million dollars, representing about 15.7% of the total value of Egyptian exports of grapes during that period, then came the Russian Federation, Saudi Arabia, the Emirates, Italy, Kuwait, Oman, Malaysia, South Africa, and Singapore, in the following places, where the average amount of Egyptian exports to each of them represented, respectively, about 10%, 5.8%, 4.4%, 3.2%, 2.3%, 2.3%, 2.3%, 2.1%, 1.5% of the total amount of Egyptian exports of grapes during that period, and the average value of each of them represented, respectively, about 7.6%, 3.1%, 2.8%, 3.6%, 1.5%, 1.6%, 1.6%, 2%, 1.3% of the total value of Egyptian exports of grapes during that period.

Table (5): Geographical distribution of Egyptian exports of grapes during the average period (2010-2020)

The most important importing countries	Quantity of exports		Value of exports		Export price in thousands of dollars/ton
	Average in Thousand Tons	Relative % importance	Average in millions of dollars	Relative % importance	
United kingdom	22.0	23.3	55.9	26.4	2.541
Netherlands	16.5	17.5	39.8	18.8	2.412
Germany	12.7	13.5	33.3	15.7	2.622
United Russia	9.4	10.0	16.1	7.6	1.713
Saudi Arabia	5.4	5.8	6.7	3.1	1.241
Emirates	4.1	4.4	6.0	2.8	1.463
Italy	3.0	3.2	7.5	3.6	2.500
Kuwait	2.2	2.3	3.1	1.5	1.409
Oman	2.2	2.3	3.3	1.6	1.500
Malaysia	2.1	2.3	3.5	1.6	1.667
South Africa	2.0	2.1	4.2	2.0	2.100
Singapore	1.4	1.5	2.8	1.3	2.000
other countries*	11.3	12.0	29.6	14.0	2.619
Total	94.3	100	211.7	100	2.541
Geographical concentration factor**	35.0		37.6		

Where: Other countries* include Sudan, Libya, Slovenia, Kenya, Hong Kong, Bahrain, Mauritius, Indonesia, Nigeria, Ukraine, Austria, France, Qatar, Denmark, Norway, Belgium, China, India, Poland, Ghana, Switzerland, Uganda, Ireland, Sri Lanka, Senegal, Romania, Morocco, Spain, Luxembourg, Iraq, Jordan, Benin and others.

Geographical concentration factor** =

$$100 \times \sqrt{\frac{\sum (\text{amount or value of exports to the country } a / \text{total quantity or value of exports})^2}{\sum (\text{amount or value of exports to the country } a / \text{total quantity or value of exports})^2}}$$

Source: Collected and calculated from the website of the Central Agency for Public Mobilization and Statistics www.capmas.gov.eg.

Fourth: The effect of the most important determinants of foreign demand on the Egyptian exports of grapes in its most important foreign markets:

To identify the impact of the most important determinants of external demand on the Egyptian exports of grapes in its most important foreign markets, a simple regression method was used between the amount of Egyptian exports of grapes in its most important foreign markets during the period (2010-2020) and the most important variables believed to affect them in order to avoid the effects of the problem of multicollinearity and the strong correlation between the independent variables, which leads to the difficulty of obtaining a correct estimate of the impact of each of these variables on the dependent variable through the multiple regression relationship, then the stepwise method was relied on for all the variables combined to determine the most important factors determining the demand for Egyptian exports of grapes in its different markets.

The most important determinants of foreign demand were divided into three groups. The first group was represented by the variables specific to the exporting country (Egypt), which are the total Egyptian production of grapes, the Egyptian export price, and the exchange rate. According to the economic logic, it is expected that the effect of the total Egyptian production of grapes and the exchange rate will be positive, while the effect of the Egyptian export price will be negative according to the law of demand. The second group was represented in the variables related to the export prices of the most important competing countries within the foreign market, and it is expected that their impact will be positive as they are the prices of alternative commodities according to the law of demand. The third and final group was represented in the variables specific to the importing country, represented in the total market imports of grapes, its population, and its average per capita income. It is expected that the impact of these variables will be positive on the amount of Egyptian exports, in addition to its local production of grapes, and its impact is expected to be negative.

1- The most important determinants of foreign demand for Egyptian exports of grapes in the United Kingdom:

- Variables specific to Egypt: Equations (1), (2), (3) in Table No. (6), whose results were in agreement with the economic and statistical logic, indicate that an increase in the amount of Egyptian production of grape by 10% leads to an increase in the amount of its exports to The United Kingdom by 8.19%, while an increase in the Egyptian export price to the United Kingdom by 10% leads to a decrease in the amount of its exports to this market by 5.93%, while an increase in the dollar exchange rate by 10%, leads to an increase in the amount of Egyptian exports to the United Kingdom by 1.91%, the increase in the dollar exchange rate meaning a decrease in the value

of the pound this gives a comparative advantage to Egyptian exports, as its relative price decreases compared to its competing countries.

Table (6): The impact of the most important factors determining the demand for Egyptian exports of grapes in the United Kingdom market during the period (2010-2020)

	Independent Variable	The equation	The average	R ²	F	Elasticity
1	Egyptian production quantity In million tons	$\hat{Y}_i = 3.962 + 11.48 X_{i1}$ (0.576) (2.634)*	1.569	0.435	6.936*	0.819
2	Egyptian export price in thousand dollars / ton	$\hat{Y}_i = 35.012 - 5.065 X_{i2}$ (6.829)** (-2.604)*	2.574	0.430	6.783*	-0.593
3	Exchange rate in pounds/dollars	$\hat{Y}_i = 17.779 + 0.391 X_{i3}$ (11.65)** (3.028)**	10.724	0.505	9.171**	0.191
4	Turkish export price in thousand dollars / ton	$\hat{Y}_i = 28.18 - 2.951 X_{i4}$ (3.708)** (-0.822)	2.103	0.070	0.675	-
5	Chilean export price in thousand dollars / ton	$\hat{Y}_i = 32.280 - 4.414 X_{i5}$ (2.793)* (-0.894)	2.335	0.082	0.800	-
6	Spanish export price in thousand dollars / ton	$\hat{Y}_i = 38.21 - 6.170 X_{i6}$ (3.93)** (-1.676)	2.632	0.238	2.808	-
7	Total UK imports in thousand tons	$\hat{Y}_i = -31.95 + 0.146 X_{i7}$ (-1.022) (1.725)	368.8	0.249	2.977	-
8	The population of the United Kingdom in millions of people	$\hat{Y}_i = -75.63 + 1.500 X_{i8}$ (-2.924)* (3.774)**	65.069	0.613	14.24**	4.44
9	The average per capita income in the UK in thousand dollars	$\hat{Y}_i = 36.41 - 0.340 X_{i9}$ (1.017) (-0.403)	42.091	0.018	0.163	-
10	UK production of grapes in thousand tons	$\hat{Y}_i = 26.938 - 10.601 X_{i10}$ (19.53)** (-3.931)**	0.468	0.632	15.46**	-0.226

Whereas:

\hat{Y}_i

indicates the estimated value of the Egyptian exports of grapes to the United Kingdom in year i.

The average quantity of Egyptian grape exports to the United Kingdom during the period (2010-2020) was estimated at 22 thousand tons.

X_i : the independent variable i denotes time: 1, 2, 3,,11.

The values between () are the computed "t" values.

* : indicates significance at 0.05

** : indicates significance at 0.01.

$$\text{Elasticity of the linear function} = \text{regression coefficient} \times \frac{\text{mean of the independent variable}}{\text{mean of the dependent variable}}$$

Source: Compiled and calculated from:

- International Trade Center website www.trademap.org
- United Nations database website www.comtrade.un.org
- The World Bank website www.databank.worldbank.org
- Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Central Administration of Agricultural Economy, **Agricultural Statistics Bulletin**, various issues.

- Prices of the most important competing countries inside the foreign market: The most important countries competing with Egypt in the United Kingdom were Turkey, South Africa, Chile, Spain, and Greece. The export dates of South Africa and Greece differ from the Egyptian export dates, so their exports are not considered competitors or substitutes for Egyptian grapes in the United Kingdom market due to the incompatibility between them in the export dates, so the analysis was limited to the prices of Turkey, Chile, and Spain only, which agreed

Partially with the Egyptian export dates. Equations (4), (5), (6) in Table (6) indicate that the impact of the export price of Turkey, Chile and Spain on the amount of Egyptian exports to the United Kingdom has not been proven to be significant. Therefore, the exports of these countries are not considered a substitute for Egyptian grapes in The United Kingdom, this may be due to the high Egyptian export price compared to the export prices of these countries, which was estimated at 2.574 thousand dollars / ton, while the average export price of Turkey, Chile, and Spain, respectively, was estimated at 2.102, 2.335 and 2.533 thousand dollars / ton.

- Variables specific to the importing country (United Kingdom): Equations (8), (10) in Table No. (6), whose results are in agreement with the economic and statistical logic, indicate that an increase in the population of the United Kingdom by 10% leads to an increase in the amount of Egyptian exports of grapes To the United Kingdom by 44.4%, which reflects the great importance of the Egyptian exports of grapes in this market and its suitability to the tastes of consumers in this market, while an increase in the United Kingdom's production of grapes by 10% leads to a decrease in the quantity of Egyptian exports of grapes to the United Kingdom by 2.26%, while the effect of both the total UK imports of grapes, and its average per capita income was not significant on the amount of Egyptian exports of grapes to the United Kingdom, as shown by equations (7), (9).

In order to determine the most important factors determining the United Kingdom's demand for Egyptian exports of grapes, through a multiple regression relationship between it and all the previous independent variables combined using the stepwise method, it was found that the total United Kingdom production of grapes (x10) is the most important factor affecting the amount of Egyptian exports of grapes to the United Kingdom, where about 63.2% of the changes in the quantity of Egyptian exports of grapes to the United Kingdom during the period (2010-2020) are due to the change in the total production of grapes in the United Kingdom (x10), as shown by the following equ

$$\hat{Y}_i = 26.938 - 10.601 X_{i9}$$

(19.53)** (-3.931)**

$$R^2 = 0.632 \qquad F = 15.46**$$

2-The most important determinants of foreign demand for Egyptian exports of grapes in the Dutch market:

- Variables specific to Egypt: The two equations No. (1) and (3) in Table No. (7), whose results were consistent with the economic and statistical logic, indicate that an increase in the amount of Egyptian production of grape by 10% leads to an increase in the amount of its exports to Netherlands by 19.22%, while an increase in the dollar exchange rate by 10%, leads to an increase in the amount of Egyptian exports to Netherlands by 4.07%, while the effect of the Egyptian export price per ton of grapes to the Dutch market was not significant on the quantity of its exports to this market, as shown by equation No. (2).

- Prices of the most important competing countries inside the foreign market: The most important countries competing with Egypt in the Dutch market were South Africa, Chile, India, Peru, and Turkey. The export dates of South Africa, India and Peru differ from the Egyptian export dates, so their exports are not considered competitors or substitutes for Egyptian grapes in the Dutch market due to the incompatibility between them in the export dates, so the analysis was limited to the prices of Chile and Turkey only, which agreed Partially with the Egyptian export dates. Equation No. (4) in Table No. (7) indicates that the impact of the export price of Chile on the quantity of Egyptian exports to the Dutch market is not significant. Therefore, its exports are not considered a substitute for Egyptian grapes in this market, while Equation No. (6), whose result is inconsistent with The economic logic indicates that an increase in the Turkish export price to the Dutch market by 10% leads to a decrease in the amount of Egyptian exports to this market by 11.08%, which indicates a complementary relationship between Egyptian exports and Turkish exports of grapes to the Dutch market, which may be due to the fact that Turkish exports of grapes to the Dutch market cover almost the whole year, while Egyptian exports to it are concentrated in the months of May, June, and July only.

- Variables specific to the importing country (Netherlands): The result of equation No. (7) in Table No. (7), was in agreement with the economic and statistical logic, this equation indicates that an increase in the population of the Netherlands by 10% leads to an increase in the quantity of Egyptian grape exports to the Dutch market by 113%, while the result of equation No. (8) is inconsistent with the economic logic, indicates that an increase in the average Dutch per capita income by 10% leads to a decrease in the quantity of Egyptian exports of grapes to the Dutch market by 277.2%, which indicates that the Egyptian grapes are among the low-quality commodities for the Dutch consumer, and his demand for them decreases when his income increases, while, the effect of the total Netherlands imports of grapes, and the Netherlands' grape production was insignificant on the quantity of Egyptian exports of grapes to the Dutch market, as shown by the two equations Nos. (6), (9).

Table (7): The impact of the most important factors determining the demand for Egyptian exports of grapes in the Dutch market during the period (2010-2020)

	Independent Variable	The equation	The average	R ²	F	Elasticity
1	Egyptian production quantity In million tons	$\hat{LnY}_i = 7.050 + 1.922 LnX_{i1}$ (5.840)** (4.965)**	1.548	0.733	24.65**	1.922
2	Egyptian export price in thousand dollars / ton	$\hat{Y}_i = 29.375 - 5.287 X_{i2}$ (3.346)** (-1.472)	2.428	0.194	2.168	-
3	Exchange rate in pounds/dollars	$\hat{LnY}_i = 6.442 + 0.407 LnX_{i3}$ (6.349)** (5.968)**	10.724	0.798	35.62**	0.407
4	Chilean export price in thousand dollars / ton	$\hat{Y}_i = 25.461 - 3.791 X_{i4}$ (2.030) (-0.714)	2.354	0.054	0.510	-
5	Turkish export price in thousand dollars / ton	$\hat{Y}_i = 34.86 - 9.093 X_{i5}$ (5.532)** (-2.932)*	2.015	0.489	8.595*	-1.108
6	Total Netherlands imports in thousand tons	$\hat{Y}_i = 10.961 + 0.015 X_{i6}$ (0.582) (0.296)	367.3	0.010	0.088	-
7	The population of Netherlands in millions of people	$\hat{Y}_i = -170.38 + 11.004 X_{i7}$ (4.485)** (4.921)**	16.987	0.729	24.21**	11.30
8	The average per capita income in Netherlands in thousand dollars	$\hat{Y}_i = 62.42 - 0.892 X_{i8}$ (3.468)** (-2.552)*	51.416	0.420	6.514*	-2.772
9	Netherlands production of grapes in thousand tons	$\hat{Y}_i = 14.95 + 0.002 X_{i9}$ (7.569)** (0.955)	835.8	0.092	0.911	-

Whereas:

\hat{Y}_i : indicates the estimated value of the Egyptian exports of grapes to Netherlands in year i.
 The average quantity of Egyptian grape exports to Netherlands during the period (2010-2020) was estimated at 16.5 thousand tons.
 X_i : the independent variable i denotes time: 1, 2, 3,11.
 The values between () are the computed "t" values.
 * : indicates significance at 0.05 ** : indicates significance at 0.01.

$$\text{Elasticity of the linear function} = \text{regression coefficient} \times \frac{\text{mean of the independent variable}}{\text{mean of the dependent variable}}$$

Source: Compiled and calculated from:

- International Trade Center website www.trademap.org
- United Nations database website www.comtrade.un.org
- The World Bank website www.databank.worldbank.org
- Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Central Administration of Agricultural Economy, **Agricultural Statistics Bulletin**, various issues.

In order to determine the most important factors determining the Netherlands' demand for Egyptian exports of grapes, through a multiple regression relationship between it and all the previous independent variables combined using the stepwise method, it was found that the total Egyptian production of grapes (x1) and the dollar exchange rate in Egyptian pounds (x3) are the most important factors affecting the quantity of Egyptian exports of grapes to Netherlands, where about 86.2% of the changes in the amount of Egyptian exports of grapes to Netherlands during the period (2010-2020) are due to the change in the total Egyptian production of grapes (x1), and the exchange rate of the dollar (x3), as shown by the following equation:

$$\hat{Y}_i = -4.052 + 10.527 X_{i1} + 0.401 X_{i3}$$

$$R^2 = 0.890 \quad R^2 = 0.862 \quad F = 32.281^{**}$$

(-0.796) (2.839)* (3.827)**

3- The most important determinants of foreign demand for Egyptian exports of grapes in the German market:

- **Variables specific to Egypt:** The two equations No. (1) and (3) in Table No. (8), whose results were consistent with the economic and statistical logic, indicate that an increase in the amount of Egyptian production of grape by 10% leads to an increase in the amount of its exports to Germany by about 7.39%, while an increase in the dollar exchange rate by 10%, leads to an increase in the amount of Egyptian exports to Germany by 1.45%, while the effect of the Egyptian export price per ton of grapes to the German market was not significant on the quantity of its exports to this market, as shown by equation No. (2).

Table (8): The impact of the most important factors determining the demand for Egyptian exports of grapes in the German market during the period (2010-2020)

	Independent Variable	The equation	The average	R ²	F	Elasticity
1	Egyptian production quantity In million tons	$\hat{Y}_i = 3.275 + 6.066 X_{i1}$ (1.078) (3.102)**	1.548	0.517	9.623**	0.739
2	Egyptian export price In thousand dollars / ton	$\hat{Y}_i = 21.724 - 3.465 X_{i2}$ (4.807)** (-2.010)	2.615	0.310	4.040	-
3	Exchange rate in pounds/dollars	$\hat{Y}_i = 10.822 + 0.172 X_{i3}$ (16.64)** (3.122)**	10.724	0.520	9.747**	0.145
4	Italian export price In thousand dollars / ton	$\hat{Y}_i = 0.573 + 6.254 X_{i4}$ (0.110) (2.314)*	1.933	0.373	5.354*	0.952
5	Turkish export price In thousand dollars / ton	$\hat{Y}_i = 16.512 - 2.010 X_{i5}$ (5.506)** (-1.293)	1.914	0.157	1.671	-
6	Spanish export price In thousand dollars / ton	$\hat{Y}_i = 7.373 + 2.264 X_{i6}$ (1.668) (1.201)	2.337	0.138	1.443	-
7	Chilean export price In thousand dollars / ton	$\hat{Y}_i = 22.328 - 3.912 X_{i7}$ (3.527)** (-1.529)	2.471	0.206	2.338	-
8	Total Germany imports In thousand tons	$\hat{Y}_i = -7.497 + 0.051 X_{i8}$ (-0.901) (2.424)*	399.0	0.395	5.876*	1.602
9	The population of Germany in millions of people	$\hat{Y}_i = -53.348 + 0.807 X_{i9}$ (-2.496)* (3.089)**	81.822	0.515	9.543**	5.199
10	The average per capita income in Germany In thousand dollars	$\hat{Y}_i = 10.362 + 0.050 X_{i10}$ (0.844) (0.188)	46.305	0.004	0.035	-
11	Germany production of grapes In thousand tons	$\hat{Y}_i = 11.053 + 0.001 X_{i11}$ (2.774)* (0.406)	1175.6	0.018	0.165	-

Whereas:

\hat{Y}_i : indicates the estimated value of the Egyptian exports of grapes to the German market in year i.
 The average quantity of Egyptian grape exports to Germany during the period (2010-2020) was estimated at 12.7 thousand tons.
 X_i : the independent variable i denotes time: 1, 2, 3, ,11.
 The values between () are the computed "t" values.
 * : indicates significance at 0.05 ** : indicates significance at 0.01.

$$\text{Elasticity of the linear function} = \text{regression coefficient} \times \frac{\text{mean of the independent variable}}{\text{mean of the dependent variable}}$$

Source: Compiled and calculated from:

- International Trade Center website www.trademap.org
- United Nations database website www.comtrade.un.org
- The World Bank website www.databank.worldbank.org
- Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Central Administration of Agricultural Economy, **Agricultural Statistics Bulletin**, various issues.

- Prices of the most important competing countries inside the foreign market: The most important countries competing with Egypt in Germany were Italy, Turkey, South Africa, Spain, Greece, Chile, and India. The export dates of South Africa, Greece, and India differ from the Egyptian export dates, so their exports are not considered competitors or substitutes for Egyptian grapes in the German market due to the incompatibility between them in the export dates, so the analysis was limited to the prices of Italy, Turkey, Spain, and Chile only, which agreed Partially with the Egyptian export dates. Equation No. (4) in Table No. (8), which was consistent with the economic and statistical logic, indicates that the increase in the Italian export price of grapes to the German market by 10% leads to an increase in the amount of Egyptian exports to the German market by 9.52%, which indicates that Italy is a strong competitor to Egypt in German market and that Italian grapes are a strong alternative to Egyptian grapes in this market, while Equations (5), (6), (7) indicate that the impact of the export price of Turkey, Spain and Chile on the amount of Egyptian exports to the German market has not been proven to be significant. Therefore, the exports of these countries are not considered a substitute for Egyptian grapes in The German market.

- Variables specific to the importing country (Germany): Equations (8), (9) in Table No. (8), whose results are in agreement with the economic and statistical logic, indicate that an increase in Germany's total imports of grapes by 10% leads to an increase in the amount of Egyptian exports of grapes to Germany by 16.02%, and an increase in the population of Germany by 10% leads to an increase in the amount of Egyptian exports of grapes to Germany by 52%, which reflects the great importance of the Egyptian exports of grapes in this market and its suitability to the tastes of consumers in this market, while the effect of both average per capita income in Germany and the total German production of grapes was not significant on the amount of Egyptian exports of grapes to the German market, as shown by equations (10), (11).

In order to determine the most important factors determining the German market's demand for Egyptian exports of grapes, through a multiple regression relationship between it and all the previous independent variables combined using the stepwise method, it was found that the exchange rate of the dollar in Egyptian pounds (x3) is the most important factor affecting the amount of Egyptian exports of grapes to the German market, as about 52% of the changes in the amount of Egyptian exports of grapes to the German market during the period (2010-2020) are due to the change in the exchange rate of the dollar (x3), as shown by the following equation:

$$\hat{Y}_i = 10.822 + 0.172 X_{i3}$$

(16.64)** (3.122)**

$$R^2 = 0.520 \qquad F = 32.281**$$

4- The most important determinants of foreign demand for Egyptian exports of grapes in the Russian market:

- Variables specific to Egypt: The two equations No. (1) and (3) in Table No. (9), whose results were consistent with the economic and statistical logic, indicate that an increase in the amount of Egyptian production of grape by 10% leads to an increase in the amount of its exports to the Russian market by about 40.9%, while an increase in the dollar exchange rate by 10%, leads to an increase in the amount of Egyptian exports to the Russian market by 8.51%, while the effect of the Egyptian export price per ton of grapes to the Russian market was not significant on the quantity of its exports to this market, as shown by equation No. (2).

- Prices of the most important competing countries inside the foreign market: The most important countries competing with Egypt in the Russian market were Turkey, Uzbekistan, the Republic of Moldova, Chile, India, Peru, and South Africa. The export dates of Uzbekistan, the Republic of Moldova, India, Peru, and South Africa differ from the Egyptian export dates, so their exports are not considered competitors or substitutes for Egyptian grapes in the Russian market due to the incompatibility between them in the export dates, so the analysis was limited to the prices of Turkey and Chile only, which agreed Partially with the Egyptian export dates. Equation No. (5) in Table No. (9), which was consistent with the economic and statistical logic, indicates that an increase in the Chilean export price of grapes to the Russian market by 10% leads to an increase in the amount of Egyptian exports to the Russian market by 63.6%, which indicates that Chile is a strong competitor to Egypt in the Russian market and that Chilean grapes are a strong alternative to Egyptian grapes in this market, while Equation No. (4) indicates that the impact of the export price of Turkey on the amount of Egyptian exports to the Russian market has not been proven to be significant. Therefore, the exports of Turkey are not considered a substitute for Egyptian grapes in The Russian market.

- Variables specific to the importing country (Russian Federation): Equations (7), (9) in Table No. (9), whose results are in agreement with the economic and statistical logic, indicate that an increase in the population of Russian Federation by 10% leads to an increase in the amount of Egyptian exports of grapes to Russian Federation by 887%, and the increase in the apparent consumption of grapes in the Russian market by 10% leads to an increase in the amount of Egyptian exports of grapes to this The market by 27.9%, which reflects the great importance of the Egyptian exports of grapes in this market and its suitability to the tastes of consumers in this market, while the effect of the total imports of grapes to the Russian market and the average per capita

income in Russian Federation were not significant on the amount of Egyptian exports of grapes to the Russian market, as shown by equations (6), (8).

In order to determine the most important factors determining the Russian market's demand for Egyptian exports of grapes, through a multiple regression relationship between it and all the previous independent variables combined using the stepwise method, it was found that the exchange rate of the dollar in Egyptian pounds (x3) is the most important factor affecting the amount of Egyptian exports of grapes to the Russian market, as about 78.1% of the changes in the amount of Egyptian exports of grapes to the Russian market during the period (2010-2020) are due to the change in the exchange rate of the dollar (x3), as shown by the following equation:

$$\hat{Y}_i = 1.394 + 0.747 X_{i3}$$

(0.895) (5.666)**

$R^2 = 0.781$ $F = 32.103^{**}$

Table (9): The impact of the most important factors determining the demand for Egyptian exports of grapes in the Russian market during the period (2010-2020)

	Independent Variable	The equation	The average	R ²	F	Elasticity
1	Egyptian production quantity In million tons	$\hat{LnY}_i = 1.434 + 4.087 LnX_{i1}$ (1.981) (3.581)**	1.548	0.588	12.827**	4.087
2	Egyptian export price In thousand dollars / ton	$\hat{Y}_i = -28.47 + 22.36 X_{i2}$ (-1.260) (1.679)	1.693	0.238	2.818	-
3	Exchange rate In pounds/dollars	$\hat{Y}_i = 1.394 + 0.747 X_{i3}$ (0.895) (5.666)**	10.724	0.781	32.103**	0.851
4	Turkish export price In thousand dollars / ton	$\hat{LnY}_i = 9.802 - 0.768 LnX_{i4}$ (4.92)** (-1.163)	1.261	0.131	1.352	-
5	Chilean export price In thousand dollars / ton	$\hat{LnY}_i = 0.379 + 6.357 LnX_{i5}$ (1.418) (4.429)**	1.631	0.686	19.619**	6.357
6	Russia's total imports in thousand tons	$\hat{Y}_i = 19.101 - 0.027 X_{i6}$ (3.061)** (-1.586)	361.5	0.218	2.515	-
7	The population of Russia in millions of people	$\hat{Y}_i = -825.3 + 5.803 X_{i7}$ (-4.143)** (4.190)**	143.8	0.661	**17.555	88.69
8	The average per capita income in Russia in thousand dollars	$\hat{Y}_i = 21.745 - 1.067 X_{i8}$ (2.909)* (-1.674)	11.569	0.237	2.802	-
9	The apparent consumption of grapes in Russia in thousand tons	$\hat{Y}_i = -16.639 + 0.030 X_{i9}$ (-2.102) (3.312)**	873.6	0.549	10.972**	2.785

Whereas:

\hat{Y}_i : indicates the estimated value of the Egyptian exports of grapes to Russia in year i.

The average quantity of Egyptian grape exports to the Russian market during the period (2010-2020) was estimated at 9.4 thousand tons.

X_i : the independent variable i denotes time: 1, 2, 3,, 11.

The values between () are the computed "t" values.

* : indicates significance at 0.05 ** : indicates significance at 0.01.

Elasticity of the linear function = regression coefficient × $\frac{\text{mean of the independent variable}}{\text{mean of the dependent variable}}$

Source: Compiled and calculated from:

- International Trade Center website www.trademap.org
- United Nations database website www.comtrade.un.org
- The World Bank website www.databank.worldbank.org
- Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Central Administration of Agricultural Economy, **Agricultural Statistics Bulletin**, various issues.

5- The most important determinants of foreign demand for Egyptian exports of grapes in the Saudi market:

- **Variables specific to Egypt:** Equations (1), (2), (3) in Table No. (10), whose results were in agreement with the economic and statistical logic, indicate that an increase in the amount of Egyptian production of grape by 10% leads to an increase in the amount of its exports to The Saudi market by 82.1%, while an increase in the Egyptian export price to the Saudi market by 10% leads to a decrease in the amount of its exports to this market by 16.11%, while an increase in the dollar exchange rate by 10%, leads to an increase in the amount of Egyptian exports to the Saudi market by 15.49%.

Table (9): The impact of the most important factors determining the demand for Egyptian exports of grapes in the Saudi market during the period (2010-2020)

	Independent Variable	The equation	The average	R ²	F	Elasticity
1	Egyptian production quantity In million tons	$\hat{LnY}_i = 0.114 + 8.207 LnX_{i1}$ (1.618) (5.873)**	1.548	0.793	34.49**	8.207
2	Egyptian export price in thousand dollars / ton	$\hat{LnY}_i = 6.654 - 1.611 LnX_{i2}$ (3.621)** (-2.838)*	1.468	0.472	8.055*	-1.611
3	Exchange rate In pounds/dollars	$\hat{LnY}_i = 0.118 + 1.549 LnX_{i3}$ (1.243) (4.450)**	10.724	0.688	19.803**	1.549
4	Turkish export price in thousand dollars / ton	$\hat{LnY}_i = 30.63 + 2.491 LnX_{i4}$ (2.528)* (5.508)**	0.459	0.771	30.336**	2.491
5	Chilean export price in thousand dollars / ton	$\hat{LnY}_i = 0.102 + 5.989 LnX_{i5}$ (0.599) (2.212)*	1.848	0.352	4.894*	5.989
6	Saudi Arabia's total imports in thousand tons	$\hat{LnY}_i = 0.0002 + 3.497 LnX_{i6}$ (0.721) (10.363)**	62.349	0.923	**107.39	3.497
7	The population of Saudi Arabia in millions of people	$\hat{Y}_i = -39.443 + 1.427 X_{i7}$ (-4.486)** (5.117)**	31.442	0.744	26.185**	8.262
8	The average per capita income in Saudi Arabia in thousand dollars	$\hat{Y}_i = 9.943 - 0.202 X_{i8}$ (0.707) (-0.320)	22.395	0.011	0.102	-
9	The Saudi production of grapes in thousand tons	$\hat{LnY}_i = 669.5 - 1.174 LnX_{i9}$ (0.615) (-3.177)**	90.011	0.529	10.093**	-1.174

Whereas:

\hat{Y}_i

\hat{Y}_i : indicates the estimated value of the Egyptian exports of grapes to Saudi Arabia in year i.

The average quantity of Egyptian grape exports to the Saudi market during the period (2010-2020) was estimated at 5.4 thousand tons.

X_i : the independent variable i denotes time: 1, 2, 3,,11.

The values between () are the computed "t" values.

* : indicates significance at 0.05

** : indicates significance at 0.01.

$$\text{Elasticity of the linear function} = \text{regression coefficient} \times \frac{\text{mean of the independent variable}}{\text{mean of the dependent variable}}$$

Source: Compiled and calculated from:

- International Trade Center website www.trademap.org
- United Nations database website www.comtrade.un.org
- The World Bank website www.databank.worldbank.org
- Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Central Administration of Agricultural Economy, **Agricultural Statistics Bulletin**, various issues.

- **Prices of the most important competing** competitors or substitutes for Egyptian grapes in the Saudi market due to the incompatibility between them in the export dates, so the analysis was limited to the prices of Turkey and Chile only, which agreed Partially with the Egyptian export dates. Equations No. (4), (5) in Table No. (10), which were consistent with the economic and statistical logic, indicate that an increase in the export price of Turkey and Chile for its grape exports to the Saudi market by 10% leads to an increase in the quantity of Egyptian grape exports to the Saudi market by 24.9%, 59.9%, respectively, which indicate the exports of these two countries are a

strong alternative and **countries inside the foreign market:** The most important countries competing with Egypt in the Saudi market were India, Turkey, Lebanon, South Africa, and Chile. The export dates of India, Lebanon, and South Africa differ from the Egyptian export dates, so their exports are not considered competitor to the Egyptian grapes in the Saudi market.

- Variables specific to the importing country (Saudi Arabia): Equations (6), (7) in Table No. (10), whose results are in agreement with the economic and statistical logic, indicate that an increase in the total Saudi imports of grapes and its population by 10% leads The increase in the amount of Egyptian grape exports to Saudi Arabia, respectively, by 35% and 82.6%, which reflects the great importance of the Egyptian exports of grapes in this market and its suitability to the tastes of consumers in this market, while increasing Saudi production of grapes by 10% leads to a decrease in the quantity of Egyptian grape exports to this market by about 11.7%, as shown by equation No. (9), while the effect of the average per capita income in Saudi Arabia was not significant on the amount of Egyptian exports of grapes to the Saudi market, as shown by equation No (8).

In order to determine the most important factors determining the Saudi market's demand for Egyptian exports of grapes, through a multiple regression relationship between it and all the previous independent variables combined using the stepwise method, it was found that the total Saudi imports of grapes (x6), and its total production of grapes (x9) are the most important factors affecting the amount of exports Egyptian grapes to Saudi Arabia, where about 94.8% of the changes in the amount of Egyptian exports of grapes to Saudi Arabia during the period (2010-2020) are due to the change in both Saudi Arabia's total imports of grapes (x6), and its total production of grapes (x9), as shown by the following equation:

$$\hat{\text{LnY}}_i = -8.813 + 2.896 \text{LnX}_{i6} - 0.386 \text{LnX}_{i9}$$

(-5.018)** (9.049)** (-2.720)*

$R^2 = 0.958$ $R^2 = 0.948$ $F = 92.109^{**}$

III. Recommendations:

In light of the research findings, the following can be recommended:

- 1- Working to reduce the export prices of grapes to both the United Kingdom and Saudi Arabia in order to increase the quantity of exports to them, because of its adverse impact on the quantity of exports to both of them.
- 2- Working to increase the Egyptian production of grapes and improve its quality and specifications because of its positive impact on increasing the quantity of its exports to all the countries of the study.
- 3- Working on liberalizing the exchange rate because of its positive impact on increasing the quantity of Egyptian exports of grapes to all countries of the study.
- 4- Studying the production of grapes from the United Kingdom and Saudi Arabia due to its negative impact on the Egyptian exports of grapes to these two markets.
- 5- A study of population development in the United Kingdom, Holland, Germany, Russia, and Saudi Arabia because of its positive impact on the Egyptian exports of grapes to these markets.
- 6- Studying the total imports of grapes from Germany and Saudi Arabia because of its positive impact on Egyptian exports of grapes to these two markets.
- 7- Studying the apparent Russian consumption of grapes because of its positive impact on the Egyptian exports of grapes to this market.
- 8- Working to reduce the Egyptian export price from the Italian export price in the German market, because Italy is a strong competitor to Egypt in this market.
- 9- Working to reduce the Egyptian export price from the Chilean export price in the Russian market, because Chile is a strong competitor to Egypt in this market.
- 10- Working to reduce the Egyptian export price from the export price of Chile and Turkey in the Saudi market, because both of them are strong competitors to Egypt in this market.

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