



An Economic study for competitiveness of the Egyptian Potato exports in the foreign markets

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Abstract: Foreign trade plays a major and important role in the Egyptian national economy, as export is considered an essential pillar in providing sources of foreign currency. Export developing is the most important challenges face the Egyptian. The problem of the research is that Egyptian potato exports suffer from fluctuations in both quantity and value in recent years. The research ended to some results, such as: the average quantity of Egyptian production of potatoes amounted to 1.07% of the global production which amounted to about 341 million tons, during (2000-2021). The value of Egyptian potato exports of vegetables amounted to about \$743 million, representing 23% from the total of the Egyptian agricultural exports value. Russian Federation markets Lebanese, they imported about 67.5% from the Egyptian potato exports with value equal to about 66.2% during (2017-2021). Egypt had the greatest market share in Russian, Greece and Lebanese markets, but France had the greatest market share in Italian market. Egypt has an advantage better China, Belarus and Azerbaijan in the Russian Federation market. The price demand elasticity of the Egyptian potato refers to an increase by 1% in Egyptian price by 1% will reduce the demand an Egyptian potatoes in Russian, Italian and French markets to about 1,268%, 2,532% and 1,461%, respectively. This means it is a commodity. Increase price in Greece market by 1% will lead to decrease the demand on the Egyptian potatoes by about 0.196%. It is inelastic commodity.

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Introduction

Foreign trade plays an important role in the Egyptian economy, so it is considered an essential pillar to provide foreign currency, where development exports is the most important challenge that face Egyptian economy to improve balance of payments and increase the national income which contribute in the social development plans thus it leads to raise the standard of living and to achieve the economic development.

We must strive to achieve better opportunities for our exports in the global markets therefore, it is necessary to study the distribution of Egyptian commodities in general and agricultural commodities in particular in various global markets.

The potato crop is one of the most important export vegetable crops in Egypt where the value of exports amounted to about 153 million dollars as an average during the period (2000-2021). which represents about 19.8% from the total value of vegetable exports which amounted to about 743 million dollars from the total value of vegetable exports which reached about 3165 million dollars during the same period.

Research problem

Egyptian potato exports have suffered from fluctuations in both quantity and value in the recent years, which indicates that the Egyptian potato exports suffers from some shortcomings, difficulties and this requires to study the competition in the foreign markets which may lead to increase the market share of the Egyptian exports in some markets.

Research aim

The research aims to clarify the current situation of Egyptian exports of potatoes, and shed light on the most important markets and countries competing with Egypt, therefore, the research will study and analyze the following axes, to achieve this goal:

- Studying the current situation of productivity and production area of potatoes in Egypt during the period (2000-2021).
- Studying the geographical distribution of the quantity and value of Egyptian studying exports of potatoes during the period (2017-2021).
- Studying the competitive situation in the Egyptian export markets of potatoes during the period (2017-2021).

- Estimating the demand for Egyptian exports of potatoes in the most important foreign markets during the period (2008-2021).

Research method and data sources

The research relied on the method of descriptive and quantitative estimating, economic competitive indicators, and analysis the variables of the study, in addition to some references and data sources have been.

Market share model

The market share model ⁽⁹⁾ is based on the fact that the market share of a commodity in a market is affected by the price ratio of the export price of this country in the foreign market and the export prices of other competing countries in this market. Then, the market share is used as a dependent variable and the price ratio of the state and other competing countries in the foreign market as independent variables. The shape of the form takes the following:

$$G_{ij} = b_0 + b_1 P_i + b_2 G_{ijt-1} + b_3$$

Where

G_{ij} market share of country(i) in the external market (j) and calculated

$$G_i = Q_i / Q_j$$

Q_i the quantity of country =(i) exports in the foreign market

Q_j total external market imports =(j) of the good

$$P_i = P_i / P_j$$

p_{ij} State price ratio =i

P_i country's export price = (I)

P_j = the export price of the competing country in the external marketj

G_{ijt-1} market share of country =i in marketj in the previous year-t-1

Almost Ideal Demand System:

Which was presented by Deaton, Mullbauer ^(4,5), and this model is considered a flexible and easy-to-use model, and it is more applied in economic studies, it assumes two assumptions applied in economic studies. First there is no different between commodities according to their sources of import. The second assumption if the prices of commodities change at the same rate, taking consideration the variation in the forms of the different quality of products and customs tariffs, and the different preservation and transportation services for these. Purchase contracts products.

Because of the importance of differentiating between import sources in analyzing the demand for the quantity of imports, some economic studies have suggested using this model, in which differentiation is made between sources of

import of commodities without imposing under complete separation ⁽¹¹⁾.

Assuming that the utility expenditure function U, which assumes a distinction between commodities according to their different sources, the model can be derived as follows:

$$\ln [E(P,U)] = (1-U) \ln [a(P)] + U \ln [b(P)] \quad (1)$$

$$\ln [a(P)] = \ln \left[\sum_k P_k + \frac{1}{2} \sum_k \sum_j p_{kj} P_k P_j \right] \quad (2)$$

$$\ln [b(P)] = \ln [a(P)] + b_0 \prod_k P_k^{\beta_k} \quad (3)$$

,By substituting equations (2 and 3) into equation (1) :the expenditure function can be formulated as follows

$$\ln [E(P,U)] = \ln \left[\sum_k P_k + \frac{1}{2} \sum_k \sum_j p_{kj} P_k P_j + b_0 U \prod_k P_k^{\beta_k} \right] \quad (4)$$

and differentially $\ln[E(P,U)]$ with respect to its price $\ln P_i$ The share of the imported good can be obtained from spending W_i : as follows

$$\frac{\partial \ln [E(P,U)]}{\partial \ln P_i} = \frac{P_i q_i}{E(P,U)} = W_i \quad (5)$$

Therefore , equation (4) can be reformulated as : follows

$$W_i = \frac{P_i q_i}{\sum_k P_k + \frac{1}{2} \sum_k \sum_j p_{kj} P_k P_j + b_0 U \prod_k P_k^{\beta_k}} \quad (6)$$

By solving equation (4) for utility (U) and substituting it into equation (6), the : following can be obtained

$$W_i = \frac{P_i q_i}{\sum_k P_k + \frac{1}{2} \sum_k \sum_j p_{kj} P_k P_j + b_0 U \prod_k P_k^{\beta_k}} \quad (7)$$

:Where

$$\ln (P_{index}) = \ln \left[\sum_k P_k + \frac{1}{2} \sum_k \sum_j p_{kj} P_k P_j \right] \quad (8)$$

The P index is non-linear and faces difficulties in estimation, so it has been replaced by the index engineering Stones Price Index: as follows

$$\ln (P_{spi}) = \sum_i W_i \ln P_i \quad (9)$$

And since W_i refers to the expenditure ratio, and it represents the dependent variable in the equations, the use of this index may cause some immediate problems in the model equations, so the delay periods are used as follows:

$$\ln (P_{spi}) = \sum_i W'_i \ln P_i \quad (10)$$

:Where

$$W'_i = \frac{1}{2} (W_{it} + W_{it-1}) \quad (11)$$

Noting that Pindex can be considered as a linear approximation of the index P_{spi} in the case of a high multicollinearity between prices, and therefore equation (7): becomes as follows

$$W_i = \frac{P_i q_i}{\sum_k P_k + \frac{1}{2} \sum_k \sum_j p_{kj} P_k P_j + b_0 U \prod_k P_k^{\beta_k}} \quad (12)$$

And this is in light of the application of the special conditions of the request to equation (12) which are, represented in

Additivity terms $\sum_{i=1}^m \alpha_i = 1, \sum_{i,j} \beta_{ij} = 0, \sum_{i,i} \gamma_{ii} = 0$
 Homogeneity $\sum_{i,j} \beta_{ij} = 0$
 Symmetry terms $\beta_{ij} = \beta_{ji}$ for $i \neq j$

The importance of these conditions is due to the fact that they make the model compatible with the theory of demand, where the addition conditions guarantee the fulfillment of the condition that the total expenditure = 1 ($\sum \alpha_i W_i = 1$) but conditions of homogeneity guarantee the homogeneity while the conditions of symmetry fulfill the demand function Slutsky condition.

Where: refers to the parameters of the function, P_i is the price of the commodity from the source i , $a_i(\cdot)$, $b_i(\cdot)$ are functions in the parameters of the function and prices, m is the number of commodity export sources, W_i is the share of the imported commodity from spending, P_i , q_i is the price and quantity of the commodity from source i , respectively, E is the total expenditure on the commodity from all sources, P_{index} is the price index, and P_{spi} is the index of stone.

The elasticities⁽¹⁾ of demand are price, cross and spending Own, Cross and Expenditure Elasticity as follows⁽²⁾

price and cross elasticity and take a matrix ($m \times m$)
 Intrinsic price elasticity (diameter of the matrix)
 Cross price elasticity (outside the diagonal)
 (spending flexibility)

$$\text{Own, Cross} = - \frac{\alpha_{ij}}{\alpha_i} + \left(\frac{\gamma_{ij}}{\alpha_i} \right) \frac{W_j}{W_i}$$

($\alpha_{ij} = 1$, where $i = j$)
 ($\alpha_{ij} = 0$, where $i \neq j$)
 $\text{expand} = 1 + \left(\frac{\beta_i}{W_i} \right)$

In order to validate the results, the relationship between spendT elasticities is measured, weighted by the share of the imported commodity in spending, as follows

$$\sum_i W_i \text{ expand} = 1$$

It link has been detected self usin “ Breusch Godfrey ” test, and the error limit inhomogeneity problem

using a testEngel test and to detect the non normal distribution problem of the error limit using a testJarque-Bera test, and in the case of non-significance, there is no standard problem in the equation

to estimate the parameters of the model immediately, for equation (12) Zellner's method was used to solve the equations immediately Seemingly Unrelated Regression (SUR).

Results of the research

First: the development of the current situations of the potato crop

This part of the research deals with the current situation of potato productivity and production of potatoes in Egypt during the period (2000-2021).

Table (1) shows the general average during period (2000-2021) the level of the Republic was about 362 thousand feddans, while the minimum cultivated area was about 561 thousand feddans in 2020, but the lowest cultivated area amounted to about 179 thousand feddans in 2000. Second, trend equations are indicated in table (2) the potato area cultivated took an increasing trend 16 thousand feddans, equivalent to about 4.4% of the general average area.

It is shown from Table (1) the minimum productivity of potatoes was 11 tons, the maximum productivity was about 12.2 tons in 2021, and the lowest productivity reached 9.9 tons in 2000. The trend equations in Table (2) refers by 0.09 tons/feddan, that productivity in the republic has been taken an increasing trend at the level of the significance 1%, and the determination coefficient was about 0.87, which means that about 0.87%.

It was found from the table that the general average of production during (2000-2021) was about 3894 thousand tons (2000-2021). while the minimum was about 6786 thousand tons in 2000, but the lowest reached 1765 with thousand tons in 2000. The trend equations in table (2) indicate that the development the potato production in the Republic has been taken an increasing trend, of the general average of production about 207 thousand tons, represents 31.5% from the total average at the 1% significance.

(1) If price elasticity = zero it is inelastic, less than 1 is inelastic, = 1 is equivalently elastic, greater than 1 is elastic, approaches infinity it is infinitely elastic.

(2) If the cross elasticity is positive, the two commodities are substitutes, and negative, the

commodities are complementary. If the spending elasticity was negative, the commodity was inferior, and positive, it was normal.

Table (1): Promotion of the cultivated area, productivity and production of potato crop during (2000-2021)

year	area (d(thousaacres	Productivity (ton/acre)	production (thousand tons)
2000	179	9.9	1765
2001	190	10.0	1890
2002	197	10.1	1991
2003	197	10.3	2039
2004	248	10.3	2547
2005	301	10.5	3167
2006	220	10.5	2313
2007	257	10.7	2761
2008	327	10.9	3567
2009	330	11.1	3659
2010	335	10.9	3634
2011	391	11.1	4338
2012	422	11.3	4758
2013	381	11.2	4265
2014	410	11.3	4611
2015	437	11.3	4955
2016	377	10.9	4113
2017	415	11.7	4841
2018	437	11.1	4599
2019	423	12.3	5200
2020	561	12.1	6786
2021	524	12.2	6370
average	362	11.0	3894

Source:Ministry of agricultural and Land Reclamation,
Bulletin of Agricultura,Affairs section, various issues.

Table (2): Equations for the general time trend of the area, productivity and production potato crop during (2000-2021).

function par ameter Item	α	β	R2 -	T	average	the %growth	Moral
Area (thousand acres)	159	16.0	0.90	13.6	362	4.4	**
Productivity (ton/acre)	9.86	0.098	0.87	11.70	11.0	0.89	**
Production (thousands of tons)	1442	207	0.90	13.50	3894	5.31	**

Source: ** Significant at the level of 1% Collected and calculated from the results of data analysis in Table No. (1)

Second: Indicators of production and exports

Tables (3 and 4) show that the average quantity of Egypt's production of Egyptian potatoes amounted to 3.7 million tons, represents about 1.07% of the international production which reached to about 341 million tons, during the period (2000-2021).

With regard to the value of agricultural exports, 743 million dollars, from the average value of Egyptian agricultural this represents about 23% from exports during the same period (2000-2021). it was found that

the Egyptian exports of potatoes with regard to the value 153 million dollars represents 19.8% from the total average of the agricultural vegetables during the period (2000-2021). It is clear from Tables 3 and 4 that the average quantity of Egyptian exports was about 434.5 thousand tons.

Related to the export price it reached 338 dollars per ton, by general increasing about 12.4 dollars per ton, during the same period.

Table (3) the relative importance of Egyptian potato production and export during the period (2000-2021).

year	potato production			Agricultural exports (million dollars)		vegetables from agriculture %	Egyptian exports of potatoes				
	world	Egypt	%	agricultural	vegetables		export value		export amount		Egyptian export price \$/ton
	million tons	million tons		million dollars	million dollars		Million dollars	of vegetables %	thous and tons	exports/pr oduction	
2000	322.8	1.77	0.55	1918.0	162.3	8.46	26.7	16.42	157	8.85	170.2
2001	305.5	1.90	0.62	1581.1	195.6	12.37	29.8	15.21	186	9.75	160.4
2002	309.8	1.99	0.64	2048.3	236.2	11.53	42.6	18.05	229	11.55	185.8
2003	307.6	2.04	0.66	2006.6	287.1	14.31	44.0	15.32	296	14.53	148.4
2004	328.1	2.55	0.78	2201.1	388.4	17.65	67.1	17.26	381	14.97	175.9
2005	317.7	3.17	1.00	1730.3	368.0	21.27	77.5	21.05	392	12.38	197.5
2006	307.6	2.31	0.75	1764.6	392.3	22.23	65.2	16.61	367	15.87	177.5
2007	313.2	2.76	0.88	2004.6	462.2	23.06	107.9	23.35	390	14.12	276.9
2008	327.2	3.57	1.09	3635.5	620.0	17.06	163.1	26.31	378	10.61	431.1
2009	330.8	3.66	1.11	4674.7	764.9	16.36	145.4	19.01	215	5.88	676.1
2010	328.7	3.64	1.11	3746.7	833.8	22.25	131.9	15.82	300	8.23	439.7
2011	369.0	4.34	1.18	4404.0	973.6	22.11	250.7	25.74	637	14.69	393.2
2012	362.0	4.76	1.31	5268.0	1071.2	20.33	127.3	11.89	263	5.53	484.3
2013	366.2	4.27	1.17	4444.9	1036.8	23.33	205.9	19.86	428	10.03	481.2
2014	370.0	4.61	1.25	3640.5	1246.8	34.25	326.8	26.21	685	14.85	477.3
2015	366.1	4.96	1.35	3709.1	1134.1	30.58	231.7	20.43	595	12.01	389.2
2016	354.0	4.11	1.16	3566.7	950.4	26.65	147.1	15.48	408	9.92	360.8
2017	370.1	4.84	1.31	3880.2	1068.6	27.54	272.1	25.47	808	16.69	336.7
2018	365.7	4.96	1.36	4204.8	906.1	21.55	206.9	22.84	725	14.62	285.4
2019	354.8	5.20	1.47	2886.0	1103.7	38.24	266.2	24.12	685	13.17	388.7
2020	359.1	5.22	1.45	3114.8	1063.2	34.13	221.9	20.88	561	10.76	395.4
2021	363.3	5.23	1.44	3000.4	1087.6	36.25	200.2	18.41	472	9.03	423.7
average	340.9	3.72	1.07	3165	743.31	23.48	152.63	19.81	434.5	11.7	338.9

Source: collected and calculated from the central agency for public mobilization and statistics

WWW.FAO.Org/faostat/ar/#data

WWW.Trademap.Org

Table (4) trend equations for the development of the Egyptian potato production and export potato during the period (2000-2021)

function parameter Item	α	β	R2 -	T	average	growth %	significant
World production (million tons)	303.8	3.22	0.72	7.23	340.9	0.94	**
Egypt production (million tons)	1.65	0.17	0.91	14.71	3.7	4.8	**
The value of Egyptian agricultural exports(million dollars)	2009.5	99.68	0.34	3.22	3165	3.16	**
The value of Egyptian vegetable exports(million dollars)	155.6	51.1	0.83	10.06	743.3	6.87	**
The value of Egyptian exports of potatoes (million dollars)	20.9	11.45	0.70	6.89	152.6	7.50	**
The quantity of Egyptian exports of potatoes(million tons)	184.4	21.74	0.56	5.06	434.5	5.0	**
Egyptian potato export price (dollar (ton /	195.3	12.48	0.33	3.18	338.9	3.6	**

Source: ** Significant at 5% Calculated from Table (3)

Third: Geographical distribution of Egyptian potatoes exports

Studying foreign markets has a great importance, in order to recognize the markets which, have large import capacity to expand the exports to these countries or to direct them, to other countries. Related to the foreign markets Russian market comes at first for potato exports from Egypt reached 135 thousand tons represents 31% with a value average about 48.8 million dollars represents 32%.The second order comes Italian market with quantity average about 58 thousand tons, represent 13.4% with a value

average 19.9 million dollars, represents 13% during the same period, then come Greece, Lebanon, Germany and the United Arab Emirates markets with a quantity average about 58,43,37,17 thousand tons, reprehensively, but the value average reached 19.5, 12.8, 11.6, 6.6 million dollars for these markets represents about 12.8%, 8.4%, 7.6%, 4.3% from the total average of the Egyptian exports value. As a conclusion the most important markets are Russian, Italian, Greece and Lebanese where they imported about 67.5% from the total Egyptian potato exports during the period (2017-2021).

Table (5) Geographical distribution of the quantity and value of Egyptian potato exports to the world during the period (2017-2021)

Country	Export Quantity		Export Value	
	Thousand ton	RelativityImportance	Thousand ton	RelativityImportance
Russia Federal	134.6	31.0	48.8	32.0
Italia	58.1	13.4	19.9	13.0
Greece	58.0	13.3	19.5	12.8
Lebanon	42.5	9.8	12.8	8.4
Germany	37.4	8.6	11.6	7.6
UAE	17.5	4.0	6.6	4.3
The kingdom United	14.9	3.4	5.9	3.9
Kuwait	12.7	2.9	5.1	3.4
Iraq	7.6	1.7	2.5	1.6
Solvania	7.2	1.7	2.7	1.7
Amman	7.0	1.6	2.5	1.6
Holland	6.0	1.4	2.2	1.4
Ukraine	5.4	1.2	1.9	1.2
Turkey	3.8	0.9	3.1	2.0
Belarus	1.5	0.3	0.4	0.2
Countries other	20.4	4.7	14.9	9.8
world	434.5	100.0	152.6	100.0

Source: Collected and calculated from the Central Agency for Public Mobilization and Statistics.

Fourth: The competitive position of Egyptian potato exports in the most important foreign markets

This part of the study aims to identify the competitive position of Egyptian potatoes in (Russian Federation, Italy, Greece, Lebanon) the most important foreign markets.

Russian Federation market

Table (6) shows the competitive position of potato exports in the Russian market, where the total amount of potato imports from the Russian Federation amounted to about 46 thousand tons, and the import price was 399 dollar per ton.

it was also found that Egypt ranks first as the quantity of its exports among the countries exporting potatoes to this market, of the average 259 thousand tons, about 56.5% from world number of Russian imports then Azerbaijan with quantity reached about 66.4 thousand tons and export price reached about 449 dollars per ton. Belarus and China, where in the third and fourth order with market share arrived to about 9.0%, 7.5% respectively during the same period.

Italian market:

It was obvious from table (6) that the total Italian imports of potatoes from Egypt reached 63 thousand tons, an average during (2017-2021) with price 330 dollars/ton. France is considered the first exporter to Italy market with a quantity about 273 thousand tons, represents 43.3% from the total imports of Italy and France's export price per ton was about \$297.3, which represents about 90% of the average import price of the crop for this market, and its market share about 20.3% in the about 128-thousand-ton Italian market. In the third and fourth order were Netherlands and Egypt where their market share was about 12.4% and 7.6% respectively in the Italian market and price ratio 155%, 144%, respectively.

France and Germany have price comparative advantage in the Italian market.

Greece market:

Table (6) shows that the total quantity of Greece imports of potatoes amounted to about 174 thousand tons, and the price of Greece importing a ton of potatoes was about 414 dollar per ton during the period (2017-2021). Egypt is the first exporter potatoes to the Greece market, the Egyptian potato exports reached 86 thousand tons represents about 49.3% from the average of total Greece imports, the price export was about 313.9-dollar per ton. Then came France the second order with quantity about 30 thousand tons, and market share 17.2% then Cyprus and Nederland with market share reached 16.4% and 7.9% and price ratio about 141% and 145%, respectively. As a conclusion Egypt and Franca have a comparative price advantage in the Greece market.

4- The Lebanese market:

It is clear from Table (6) it with regard to imports of Lebanon market and was about 73 thousand tons, of potatoes and import price about 452 dollar / ton during the period (2017-2021), and it was also shown that Egypt ranks first with quantity reached 50 thousand, represents 69% from Lebanese total imports of potatoes and the amounted to 352 dollar/ton, represents 78% from the price average of the competing to this market, Then the Netherlands in second place with a quantity amounted to about 13.9 thousand tons, and market share 19% and export price about 676 dollar per ton, with market share about 5% and 3% and price ratio about 150% and 164% respectively. As a result, from previous it appears that Egypt has a comparative price advantage in the Lebanese market. As a result, from previous explanation Egypt has the biggest market share in Russian, Greece and Lebanese markets.

Table (6) the competitive situation in the Egyptian export markets for Potatoes during the period (2017-2021)

Item market importer	most important Countries competing in market	Quantity Exports thousands tons	Market share	Price dollar/ten	of Average price import%
Russia	Egypt	259.9	56.5	376.9	94.3
	Azerbaijan	66.4	14.4	449.8	112.5
	Belarus	41.4	9.0	247.4	61.9
	China	34.4	7.5	456.7	114.3
	Remainder Countries the scientist	58.0	12.6	525.0	131.3
	Total imports market	460.0	100.0	399.7	100.0
Italia	Egypt	47.5	7.5	476.1	144.2
	France	273.5	43.3	297.3	90.0
	Germany	128.2	20.3	222.6	67.4
	Holland	78.3	12.4	513.3	155.5
	Remainder Countries the scientist	104.2	16.5	344.8	104.4
	Total imports market	631.7	100.0	330.2	100.0
Greece	Egypt	86.2	49.3	313.9	75.8
	France	30.0	17.2	374.2	90.3
	Cyprus	28.8	16.4	585.2	141.2
	Holland	13.9	7.9	601.4	145.1
	Remainder Countries the scientist	16.0	9.2	561.4	135.5
	Total imports market	174.9	100.0	414.4	100.0
Lebanon	Egypt	50.8	69.4	352.6	78.0
	Holland	13.9	19.1	676.2	149.5
	France	3.7	5.0	681.7	150.8
	Belgium	22.	3.0	745.5	164.9
	Remainder Countries the scientist	2.6	3.5	624.3	138.1
	Total imports market	73.2	100.0	452.1	100.0

Source: Collected and calculated from the Central Agency for Public Mobilization and Statistics.

Fifth: the market participation model

The market participation model is used to determine the most important factors that may affect the market share of Egyptian potato exports in the most important markets importing Egyptian potatoes in the world, and then work on the possibility of increasing the participation rate in this market. of potatoes in the most important import markets during the period (2008-2021) the most important countries to which Egypt exports potatoes are Russia, Italy, Greece and Lebanon.

The model includes the percentage of the Egyptian market share and Lebanese exports of potatoes in relation to the quantity of market imports of potatoes from the world as dependent variable (y_i), and each of the price ratio between the Egyptian export price and the export price of competing countries to Egypt In foreign markets (P), The variable of the quantity market participation rate for potatoes in previous year ($t-1$) and time (T) as independent variables affecting the market participation rate.

Russian market:

The model contains the ratio of the quantity of Egyptian exports of potatoes to the Russian market to the quantity of Russian imports of potatoes from the world as a dependent variable (y_i), and each of the price ratio of Egyptian exports of potatoes to Russian market in relation to the export price of the most important competitive countries China, Belarus and Azerbaijan (p), the market participation rate of Egyptian potatoes in the Russian market in Russian market in the previous year (y_{t-1}) and time (T) as independent variables during the period (2008-2021).

Table (7) shows the results of estimating the market participation model for, where the statistical significance of the Egyptian potatoes in the Russian market at 5% and the effect of each of the Egyptian export price of potatoes. It explains that 87 % of the change in the market share in Russian market, and the calculated (F) value of indicates the suitability of the linear mathematical equations to explain this relationship (Egypt/China), (Egypt/Azerbaijan) and

(Egypt/Belarus) price variable. Where a change of 1% leads to a change in the market share of Egyptian potatoes in the Russian market by 0.003%, 0.59%, and 0.10%, respectively.

Italian market

It is clear from the model that the ratio of the quantity of Egyptian potatoes exports related to the imports of potatoes from the world in the Italian market as a dependent variable (yi), and each of the price ratio of Egyptian potatoes exports in relation to the export price of the most important complete countries in Italian market Netherlands, Germany and France (p), and the percentage of market participation of Egyptian potatoes in the Italian market in the previous year (yt-1), and time (t) as independent variables during the period (2008-2021).

Table (7) shows the results of estimating the market participation model for Egyptian potatoes in the Italian market. The model statistical significance at export price 1% to the average of export price for Netherland, Germany and France to Italian market, and time which explains about 90% of the change 5% significance level. And the calculated market share in the Italian market (F) value indicates that the linear mathematical equations are appropriate to explain this relationship. The relative price variable for each of Egypt/Netherlands, Egypt/Germany and Egypt/France agrees with the economic logic and where change by

140 leads to a change in the market participation rate of Egyptian potatoes Russian market by 0.21%, 0.23%, and 0.49%, respectively.

Lebanese market

The model contains the ratio of Egyptian potato exports to Lebanese imports of potatoes from the world as a dependent variable (yi), and each of the price ratio of Egyptian exports to the Lebanese market in relation to the export price of the most important competing countries in this market, Netherlands, France and Belgium (P), moreover market share of Egyptian potatoes in the Lebanese market in the previous year (y t-1) and time (T) as variables independent during the period (2008-2021). Table (7) shows the results of estimating the market participation model at level 5% in for Egyptian export price in relation to Lebanese export price, the results explains 33% from the change in the market share of potatoes in the Lebanese market, value indicates the suitability of the linear mathematical equations to explain this relationship. The relative price variable for each of (Egypt/Netherlands), (Egypt/France), and (Egypt/Belgium) agrees with the economic logic. A change in the market participation rate of Egyptian potatoes by 1% leads to a change in the market of the Egyptian potato to about 0.88%, 0.32%, and 0.12%, respectively in the Lebanese market.

Table (7) Estimating the parameters of the market participation model for Egyptian potato exports in the most important markets during the period (2008-2021)

Competitive countries parameters		α	Egypt China	Egypt Belarus	Egypt Azerbaijan	Egypt Holland	Egypt Germany	Egypt France	Egypt Belgium	Egypt Cyprus	market share of the previous year	time	R ²	F
			P1	P2	P3	P4	P5	P6	P7	P8	GT _{t-1}	T		
United Russia	linear	3,579	0.133 (0.201)	-0.492 (-3,519)*	1.829 - (-4,091)*						-0.013 (-0.063)	0.043 (1.357)	0.87	11.10
Italia	linear	0.303			0.169 - (-2,397)*	0.064 (1.794)*	-0.061 (-1.963)*				0.288 (1.199)	-0.009 (-3,371)*	0.90	14.50
Greece	linear	2,615			-0.883 (-0.121)		4,378 (.869)			-6,329 (-1.029)	-0.245 (-0.532)	0.067 (1.281)	0.54	19.20
Lebanon	linear	0.699				4,410 - (-0.356)		9,260 (3,138)*	-4,835 (-0.485)		0.068 (0.170)	0.098 (1.194)	0.33	0.80

** Significant 1% * Significant at 5%

The value in brackets is the calculated t

Source: Collected and calculated from the Central Agency for Public Mobilization and Statistics

Source: UN Comtrade Database <<http://comtrade.un.org/>>.

Sixth: matrix of the price ratio the export prices of competing countries in foreign markets

Relative price is considered the one of the important basic in the influence on competitive position of the commodity in the global market, where every state trip through loading its exports prices comparative to competitor prices indicator position

competitive price has been estimated through the price ratio between export price of the state and export price of the other competing country. If the price ratio is less than one this means there is a competitive price advantage. the Egyptian export price of potatoes has been estimated in the most important foreign markets as following:

Russia market

Table (8) shows the price ratio of competing countries Russian market. The most important competing countries Egypt are China and Belarus and Azerbaijan the ratio of export price of Egyptian potatoes to the export price of China and Belarus and Azerbaijan amounted to about 0.96, 0.37 and 0.98, respectively, during (2008-2021).

The Chinese export price related to Egypt, Belarus and Azerbaijan amounted to 1.04, 0.39, 1.01, respectively, and the Azerbaijan price related to Egypt, China and Belarus amounted to about 1.02, 0.98 and 0.38, respectively, during (2008-2021).

Italian market:

It was found that the most important countries competing with in Egypt in exporting potatoes the

Italian market France, Germany and the Netherlands. The ratio of the Egyptian potato export price to the export price of France, Germany and Netherlands amounted to about 0.6, 0.5 and 1.0, respectively, during the period (2008-2021). The ratio of French export price of potatoes to the export price of Egypt, Germany and Netherlands is about 1.7, 0.8 and 1.7, respectively. The ratio of the export price of German potatoes to the export price of Egypt, France and Netherlands about 2.1, 1.2 and 2.1, respectively. The ratio of Netherland export price of potatoes to the export price of Egypt, France and Germany amounted to 1.01, 0.6 and 0.5 respectively. From the previous results it was found that Egypt has a price advantage comparing with France and Germany in the Italian market.

Table (8) Matrix of the price ratio of two competing countries for potato exporting Russian Federation market during the period (2008-2021)

State	Egypt	China	Belarus	Azerbaijan
Egypt	1.0	1.04	2.6	1.02
China	0.96	1.0	2.5	0.98
Belarus	0.37	0.39	1.0	0.38
Azerbaijan	0.98	1.01	2.6	1.0

Source: <http://WWW.FAO.Org/>

Greece market:

It was found that the most important competitive countries for Egypt in Greece market are France, Cyprus and the Netherlands. The ratio of the export price of Egyptian potatoes to the export price of France, Cyprus and Netherlands about 0.09, 1.7 and 1.5, respectively. The ratio of the export price of French potatoes to the export price of Egypt, Cyprus and Netherlands about 1.1, 1.7 and 1.5, respectively. The ratio of the export price of Cyprus to Egypt, France and the Netherlands was about 0.6, 0.6 and 0.8 respectively. The export price German potatoes to the export price of Egypt, France and Cyprus 0.7, 0.6 and 1.2, respectively. Previous results it was found that Egyptian exports of potatoes have a price advantage compared to French export price in Greece market.

Table (9) Matrix of the price ratio of the competing countries in the export potatoes in the Italian market during the period (2008-2021)

The state	Egypt	France	Germany	Netherland
Egypt	1.0	1.7	2.1	1.01
France	0.6	1.0	1.2	0.6
Germany	0.5	0.8	1.0	0.5
Netherland	1.0	1.7	2.1	1.0

Source: <http://WWW.FAO.Org/>

Table (10) Matrix of the price ratio of the competing countries in exporting Potatoes in Greece during (2008-2021)

State	Egypt	France	Cyprus	Holland
Egypt	1.0	1.01	0.6	0.7
France	0.9	1.0	0.6	0.6
Cyprus	1.7	1.7	1.0	1.2
Netherland	1.5	1.5	0.8	1.0

Source: <http://WWW.FAO.Org/>

Lebanese market

It was found that the most important countries in Lebanese market competing with Egypt in exporting potatoes to this market are France, Belgium and the Netherlands.

The ratio of Egyptian export price was about 1.6, 1.8 and 1.8 respectively. The ratio of export price of French potatoes to Egypt, Belgium and the Netherlands was about 0.6, 1.1 and 1.1 respectively. By

the same method the ratio of the export price of Belgian to Egypt, France and the Netherlands was about 0.5, 0.9, 1.0, respectively, and the ratio of the export price of German potatoes to the export price of Egypt, France and Belgium was about 0.5, 0.9, 0.9, respectively, during (2008-2021). From the Previous. It is found that Egyptian not advantage in the Lebanese market.

Table (11) Matrix of the price ratio of the competing countries in the exporting potatoes in Lebanese market during the period (2008-2021)

State	Egypt	France	Belgium	Netherland
Egypt	1.0	0.6	0.5	0.5
France	1.6	1.0	0.9	0.9
Belgium	1.8	1.1	1.0	0.9
Netherland	1.8	1.1	1.0	1.0

Source: <http://WWW.Fao.Org/>

Seventh: Estimating Almost Ideal demand system (AIDS) on Egyptian potatoes exports in the foreign markets A- Market of Russian Federation

Table 12 and 13 show that there are no estimation problems such autocorrelation and heterogeneity that could affect the efficiency of the model, heterogeneity.

As for the price elasticity of demand for Egyptian potato exports in the Russian Federation market, it refers to an increase in Egyptian export price by 1% will reduce the demand for Egyptian potatoes to about 1.268% in Russian market.

Table (12) parameters of almost Ideal demand system of potatoes in the Russian market during the period (2008-2021)

State	Egypt			China			Belarus			Azerbaijan		
	Coeffi .	t-stat.	Prob.	Coeffi .	t-stat.	Prob.	Coeffi .	t-stat.	Prob.	Coeffi .	t-stat.	Prob.
	0.2333	0.1415	0.8910	-44.0590	-2.0743	0.0717	10.4131	2.3171	0.0491	7.9072	2.4608	0.0393
LnP ₁	0.4942	1.7986	0.1098	-0.4365	-0.1234	0.9049	-1.7846	-2.3835	0.0443	1.0393	1.9412	0.0882
LnP ₂	-0.5075	-1.7663	0.1153	8.6561	2.3389	0.0475	1.1880	1.5171	0.1677	-1.4278	-2.5501	0.0342
LnP ₃	-0.0189	-0.7633	0.4672	-0.2527	-0.7916	0.4514	1.5346	22.7212	0.0000	0.0076	0.1567	0.8793
LnP ₄	0.6330	2.1134	0.0675	1.3406	0.3475	0.7372	-2.0651	-2.5300	0.0353	0.2508	0.4298	0.6787
Ln(E/P _{sp})	1.2766	10.6534	0.0000	-0.6571	-0.4258	0.6815	1.0686	3.2724	0.0113	0.5437	2.3289	0.0482
Adj. RSq .	0.96618			0.23347			0.99583			0.51276		

Adjusted.R².modified coefficient of determination, Source: [www. Comtrade.un.org](http://www.Comtrade.un.org)

Table (13) price cross and expenditure elasticity of demand for potatoes in the Russian market during (2008-2021)

The state	Price and cross elasticity				Flexibility	Wi
	Egypt	China	Belarus	Azerbaijan		
Egypt	-1.268	2,186	-25.96	-1.323	1,011	58.01
China	-0.370	1,174	-3,476	-0.469	1,080	16.74
Belarus	-0.077	0.135	-0.632	-0.088	0.413	3.52
Azerbaijan	-0.474	0.956	-10.21	-0.532	1,012	21.73
Form validation $\sum w_i \text{ expand}=100$						100.00

Source: Collected and calculated from Table (12)

With regard to the cross-elasticity of demand, it indicates that the price of export potatoes has changed from the competing countries to Egypt in the Russian market, (China, Belarus and Azerbaijan) leading to a change in demand by about 2.18%, -25.9%, -1.32% for other competing countries, respectively. Cross elasticity of demand for the competing countries of Egypt indicates that an increasing by 1% leads to a change in demand to about -0.370%, -0.077%, -0.474%, respectively. The negative sign of cross elasticity indicates to an existence of a complementary relationship in the case of high export prices of China, Belarus and Azerbaijan. It was found that an increase in the real spending on potatoes in the Russian market by 1% leads to an increase in spending on Egyptian potatoes by about 1.011%. This means it is a necessary commodity in this market.

The Italian market

Table 14 and 15 shows the results of the Almost Ideal Demand system on the Egyptian potatoes in the Italian market, show that there are no estimation problems that could affect the efficiency they of the model, such as autocorrelation. It was found that world

test was in significance of a connected the conditions of addition. Homogeneity and symmetry. As for the price elasticity of demand for Egyptian exports of potatoes in the Italian market, it indicates that an increase in Egyptian price by about 1% leads to a decrease in the demand for potatoes in the Italian market by about 2,532%. This means that it is a commodity with elastic demand in this market. With regard to the cross elasticity, it was found that a change, it indicates that the change in the export price of potatoes from the competing countries of Egypt by 1% (France, Germany and the Netherlands) by about -0.353%, -3,084, 0.492%, respectively. Cross elasticity of demand for the competing countries of Egypt indicates that an increase in Egyptian price by 1% leads to a change in demand by -7,127%, -2,145%, -3,093%, respectively. Positive sign indicates to a complementary relationship in the case of high export prices of France, Germany and the Netherlands. With regard to the spending elasticity of demand, it was found that an increase in total real spending on Egyptian potatoes to 1.077%. It is necessary commodity in this market.

Table (14) Parameters of Almost Ideal Demand System a potato in the Italian market during the period (2008-2021)

The state	Egypt			France			Germany			Netherland		
	Coeffi .	t-stat.	Prob.	Coeffi	t-stat.	Prob.	Coeffi	t-stat.	Prob.	Coeffi	t-stat.	Prob.
α	-16.2857	-1.0172	0.3388	-0.3522	-0.1048	0.9191	0.8483	0.0903	0.9303	7.4345	2.0113	0.0791
LnP ₁	0.8524	0.9716	0.3597	0.1917	1.0411	0.3283	-0.1084	-0.2107	0.8384	-0.2698	-1.3317	0.2196
LnP ₂	-0.8712	-0.8288	0.4313	0.7776	3.5250	0.0078	0.5743	0.9311	0.3790	0.3578	1.4743	0.1786
LnP ₃	0.3123	0.1499	0.8846	0.4235	0.9684	0.3612	-0.4040	-0.3304	0.7496	0.5009	1.0412	0.3282
LnP ₄	1.3421	0.6593	0.5282	-0.3586	-0.8393	0.4256	0.6722	0.5628	0.5890	0.2137	0.4547	0.6614
Ln(E/P _{sp})	2.5815	1.2191	0.2575	0.9608	2.1622	0.0626	0.7623	0.6136	0.5565	-0.1971	-0.4031	0.6974
Adj. RSq .	0.10691			0.85562			0.00150			0.69126		

Source: WWW. Comtrade.UN.Org

Table (15) Price, cross and expenditure elasticities of demand for potatoes in the Italian market during the period (2008-2021)

The state	Price and cross elasticity				Flexibility tunneling	Wi
	Egypt	France	Germany	Netherland		
Egypt	-2,532	-0.353	-3,084	0.492	1,077	17.30
France	-7.127	-0.944	-0.835	0.164	0.992	46.85
Germany	-2.145	-0.294	-0.192	0.035	1,046	14.48
Netherland	-3,093	-0.441	-1,074	0.206	1,009	21.37
Form validation	$\sum w_i \text{ expand} = 100$					100.00

Source: calculated from table (14)

Greece market:

Table 16 and 17 shows the results of Almost Ideal Demand System there are no estimation problems that on export of potatoes in the Greece market could affect the efficiency of the model, heterogeneity, or autocorrelation moreover, the model confirmed expect for some equations. for Egyptian potato exports by 1% leads to a decrease in the demand on the Egyptian, potatoes in Greece market to about 0.196%, this means that is a commodity with inelastic demand. Cross elasticity of demand, with regard to competing countries of Egypt indicated that and

increase in Egyptian price by 1% leads to a change in demand -0.098%, -0.031%, -0.096%, respectively, for France, Cyprus and the Netherlands.

Negative sign indicates to the existence of a complementary relationship in the case of high export prices of France, Cyprus and the Netherlands, there is on competition. It was found that an increase in the total expenditure spending elasticity of demand by 1% leads to an increase in spending on potatoes in the Greece market by about 1.014%. This indicates that it is a necessary commodity in this market.

Table (16) Parameters of the Almost Ideal Demand System on potatoes in Lebanon market during (2008-2021)

state	Egypt			France			Cyprus			Netherlands		
	Coeffi .	t-stat.	Prob.	Coeffi .	t-stat.	Prob.	Coeffi .	t-stat.	Prob.	Coeffi .	t-stat.	Prob.
α	4.0315	0.4963	0.6331	6.0073	1.4841	0.1761	-10.9851	-1.1618	0.2788	1.7862	0.5363	0.6063
LnP ₁	1.4994	1.6158	0.1448	0.5336	1.1540	0.2818	-0.1434	-0.1327	0.8977	0.1230	0.3233	0.7547
LnP ₂	0.0772	0.1090	0.9159	0.8241	2.3365	0.0477	-0.4574	-0.5551	0.5940	-0.0113	-0.0390	0.9699
LnP ₃	-1.3562	-0.9474	0.3712	0.4523	0.6341	0.5437	3.9487	2.3699	0.0453	0.3227	0.5499	0.5974
LnP ₄	0.6979	0.4552	0.6611	-1.4274	-1.8685	0.0986	-0.6236	-0.3495	0.7358	1.0255	1.6316	0.1414
Ln(E/P _{spi})	0.2271	0.4336	0.6760	0.2938	1.1256	0.2930	0.0805	0.1320	0.8983	-0.4256	-1.9822	0.0828
Adj. RSq .	0.03648			0.32954			0.55655			0.76565		

Source : WWW. Comtrade.Un.Org

Table (17) Price, cross-elasticity, and expenditure elasticities of potato demand in the Greece market during the period (2008-2021)

state	Price and cross elasticity				Flexibility	Wi
	Egypt	France	Cyprus	Netherlands	Expenditure	
Egypt	-0.196	-0.618	-0.852	0.948	1,014	49.71
France	-0.098	-0.255	-0.554	0.406	0.933	21.62
Cyprus	-0.031	-0.076	0.5700	0.118	0.897	6.07
Netherlands	-0.096	-0.375	-0.681	0.471	1,045	22.60
Validation Form					$\sum w_i \text{expand} = 100$	100.00

Source: calculated from table (16)

Lebanese market

Table 17 and 18 show Almost Ideal Demand System on the potatoes exports in Lebanese market. There is no problem that could affect the efficiency, heterogeneity and autocorrelation of the model significance expect for some equations such as and the validation of the model was confirmed. The price elasticity of demand for Egyptian potato Exports in Lebanon market 1.461% elasticity when the price increases 1% that leads to a decrease in the demand for potatoes in the Lebanese market Greece market by

about which means that it is a commodity with elastic demand. With regard to cross of competing countries in Egypt, if it changes by 1% in the Lebanese market exports from would about lead to a change in demand for France, Cyprus and the Netherlands are to about -8.382%, -7.795%, -0.073%, respectively. Cross-elasticity of demand for the competing countries with Egypt also indicates that an increase in Egyptian price by 1% leads to a change in demand to about 0.167%, -0.137%, and -1.11%, respectively, and the negative sign refers to complementary relationship.

With regard to the expenditure elasticity of demand, it was found that an increase of the spending on potatoes in the Lebanese market by 1% will increase spending

on Egyptian potatoes by about 0.975%. This mean it is a regular commodity in this market.

Table (17) Parameters of the Almost Ideal Demand System model for potatoes in the Lebanese market during the period (2008-2021)

The state	Egypt			France			Belgium			Holland		
	Coeffi .	t-stat.	Prob.	Coeffi .	t-stat.	Prob.	Coeffi .	t-stat.	Prob.	Coeffi .	t-stat.	Prob.
α	-2.9795	1.7262	-0.5052	-22.6622	-1.3192	0.2236	-5.4565	-0.4492	0.6652	6.5153	0.5608	0.5903
LnP ₁	0.8873	-0.3269	1.6031	1.1255	0.6980	0.5050	-0.1823	-0.1599	0.8769	-0.2281	-0.2092	0.8395
LnP ₂	0.3548	0.9923	0.2396	5.1500	1.1940	0.2667	2.1614	0.7087	0.4987	-1.3151	-0.4509	0.6641
LnP ₃	1.1214	0.0009	1.2662	3.1276	1.2123	0.2600	-1.3431	-0.7362	0.4826	-2.0579	-1.1795	0.2721
LnP ₄	-1.2761	-0.5325	-0.7589	-5.3740	-1.0972	0.3045	0.8830	0.2550	0.8052	3.9686	1.1981	0.2652
Ln(E/P _{spi})	1.4791	-0.0931	7.3422	1.1457	1.9524	0.0867	0.6968	1.6794	0.1316	0.0482	0.1213	0.9064
Adj. RSq	0.89018			0.22596			0.24526			0.29793		

Source : www.comtrade.un.org

Table (18) Price, cross-elasticity, and expenditure elasticities of potato demand in the Lebanese market during the period (2008-2021)

The state	Price and cross elasticity				Flexibility	Wi
	Egypt	France	Belgium	Holland	tunneling	
Egypt	-1,461	-8,382	-7,795	-0.073	0.975	51.37
France	-0.167	-0.263	-0.301	-0.012	0.079	5.84
Belgium	-0.137	-0.505	-0.974	-0.013	1,182	4.84
Holland	-1.111	-13,428	-4,034	0.056	1,104	37.95
Form validation					$\sum w_i \text{ expand} = 100$	100.00

Source: calculated from table (18)

Recommendations

- Paying attention to the Russian market and benefiting from developing the political and economic relations between Russia and Egypt, especially in agriculture to increase potato exports.
- Some aspects must be taken into account in terms of the standard specifications of production required in (Lebanon, Greece, Italian and Russia) markets. It is to get important to get the advantage time for the demand for potatoes with, potential increasing Egyptian potato exports to the European market.
- Working on increasing and improving the production by encouraging breeding research to invent new varieties that are disease resistant and early high yielding compatible with the needs of the foreign markets.

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