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An Economic Study of the Competitiveness of Egyptian Potato Exports

Madiha M.A.S. Tameem [1], Doaa A.B. Ahmed[1], Shymaa A.M. Ahmed[2], Hamada O.A. Rahim[1] and Ahmed A. Hashem[2]

[1]Agriculture Economics Research Institute, Agriculture Research Center, (A.R.C) Giza. Egypt.
[2]Faculty of Agriculture, Sohag University, Egypt.

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ABSTRACT

The potato crop is considered one of the most important vegetable crops which have the ingredients to increase its exports to the foreign markets. In the period 2006- 2022, the volume of potato exports in the world ranged from 7.89 million tons in 2006 to about 12.3 million Ton in 2022, reflecting the increase in the quantity of world exports by about 24.20% from the average international exports during the study period estimated at about 9.8 million tons during the study period, the world price of potato exports has ranged from $ 217 / ton in 2006 to about $ 373 / ton in 2022, reflecting an increase in the price of world exports by about 25.69% from the average international exports during the study period estimated at about 272.76 $/tons during the study, with an annual increase rate of about 0.02% of the world average potato price during the study period, World potato imports show that the average world potato imports were estimated at 5.05 million tons during the study period (2006-2022) and ranged from a minimum of about 7.66 million tons in 2007 to a maximum of 18.75 million tons in 2022, an increase of about 35.9% from the annual average during the study period. The results indicate that the average quantity of Egyptian imports of potatoes was about 92 thousand tons during the study period and ranged between a minimum of about 48 thousand tons in 2006 and a maximum of about 218 thousand tons in 2021, an increase of about 91.66% on the average of Egyptian potato imports during the study period, the direct correlation between the average quantity of potato imports of Egypt during the studied period shows that it increases annually by a statistical certainty of about 0.47 thousand tons representing about 0.51% of the average quantity of Egyptian imports from The yield was 92.000 tons during the study period .The import price of potatoes during the period (2006-2022) ranged between a minimum of about 486 dollars / ton in 2006 and a maximum of about 1023 dollars / ton in 2022, reflecting the increase in the price of Egyptian imports of potatoes 50.7 the average price of potato imports in Egypt, estimated at 679 $ / ton, shows that the average price of potato imports increased annually by a statistical certainty of about 0.16 USD / ton, an increase of about 0.02% average import price of potatoes during the study period As shown by the study of the competitiveness indicators of the Egyptian potato, the markets of the EU countries are considered the main importer of Egyptian potatoes. This indicates that the advantages of the European Union should be constantly improved.

Keywords: potato, import, export, Egypt, market

Introduction

Export is one of the most important economic activities on which the economy of developed countries is based, and Egypt is working hard to increase its exports to other countries, as the requirements of development are contingent on increasing the ability to export to the markets of the outside world and without export, development prospects are limited and job opportunities are reduced and there is no improvement in the standard of living of individuals, and agricultural exports constitute one of the aspects of total exports, which is one of the most important aspects of foreign trade that the state strives to develop in order to fill the deficit in the balance The Egyptian Commercial Bank, as well as serious attempts aimed at increasing the proceeds of Egyptian exports of foreign exchange in order

Corresponding Author: Madiha M.A.S. Tameem, Agriculture Economics Research Institute, Agriculture Research Center, (A.R.C) Giza. Egypt.

to contribute to achieving the goals of economic development and building a strong national economy, and the potato crop is one of the important export crops in Egypt, which can be relied on to increase export revenue, the value of its exports has increased from $ 43.4 million in 2006 to about $ 203.5 million in 2022The potato crop is also considered one of the important crops at the level of local consumption for its high nutritional value and distinctive taste, which is accepted by the Egyptian consumer.

Study problem

From the study of competitiveness indicators of Egyptian potatoes, the markets of the European Union countries are the main importer of Egyptian potatoes, which indicates the need to improve the advantages granted by the European Union, and for the Arab countries, the market share of the Arab countries has dwindled, except Lebanon, which is the main Arab market, and it was also shown that the amount of imports of Russia of Egyptian potatoes is increasing, and despite that, Egypt's market share is still small, it amounted to about 17.13% of the average imports of the Russian market during the average period (2006-2022), and this requires more marketing and research efforts to study these markets to develop and maintain Egyptian exports.

Objective of the research

The study aims to study the current situation of Egyptian potato exports in terms of the number of exports and imports, as well as the geographical distribution of Egypt's exports of potatoes, protection coefficients and the comparative advantages of Egyptian potatoes in the global markets.

Research method and data sources

The research relied on a number of descriptive and analytical research approaches, including inductive, deductive, historical and statistical so that some of them can be used in presentation and characterization and others in the analysis and estimation of secondary data, such as the use of regression analysis method, Policy Analysis Matrix, and the research also relied on published and unpublished secondary data from the Ministry of Agriculture and Land Reclamation and its affiliates And the Central Agency for Public Mobilization and Statistics in addition to the Internet, in addition to studies and research related to the subject of research.

Foreign trade of Egyptian potatoes

This section deals with the development of both international and Egyptian potato exports and imports, the geographical distribution of Egyptian potato exports, in addition to indicators of the comparative advantage and competitiveness of Egyptian potatoes in global markets.

First: World exports and imports of potatoes

1. Quantity of world potato exports

The data of Table (1) indicate that the amount of potato exports in the world during the period (2006-2022) ranged between 7.57 million tons in 2008, and about 12.3 million tons in 2022, and this reflects the increase in the amount of global exports of the crop by 62.48% from 2006, and by about 25.51% from the average global exports during the study period, which is estimated at about 9.8 million tons during the study period.

By studying the estimated model of the general time trend of the quantity of global exports of the potato crop during the study period as shown in Table (2), it was found that the amount of exports increases annually by a statistically confirmed amount of about 3.0 million tons, with an increase rate of about 30.6% of the average amount of global exports of the crop during the study period, and the value of the coefficient of determination indicates that about 79% of the changes that occurred in global exports are due to the time factor, which reflects the economic changes that occurred in those countries. The period and the rest are due to other external factors not estimated in the model.

2. World export price of potatoes

The data in Table (1) indicate that the global export price of potatoes during the period (2006-2022) ranged between $ 166 / ton in 2008 and about $ 379 / ton in 2021, and this reflects the increase in the

price of global exports by 128.3% over the year 2000, and about 38.95% from the average global export price during the study period, which is estimated at about $ 272.76 / ton.

By studying the estimated model of the general time trend of the global export price of the potato crop during the study period as shown in Table (2), it was found that the export price increases annually by a statistically confirmed amount of about 0.063 dollars / ton, with an increase rate of about 0.02% of the average global export price of the crop during the study period, and the value of the coefficient of determination indicates that about 66% of the changes that occurred in the world price of exporting potatoes are due to the time factor, which reflects the economic changes that have occurred. In that period and the rest is due to other external factors not estimated in the model.

3. Value of world exports of potatoes

The data of Table (1) indicate that the value of potato exports during the period (2006-2022) ranged between a minimum of about $ 1256.62 million in 2008, and a maximum of about $ 4616.22 million in 2021, reflecting the increase in the value of global exports by 267.4% from the minimum, and about 66.21% from the average global exports of potatoes during the study period, estimated at about $ 2777.33 million.

By studying the estimated model of the general time trend of the value of exports of the potato crop during the study period as shown in Table (2), it was found that the value of exports increases annually by a statistically confirmed amount of about 0.114 million dollars, representing about 0.004% of the average value of global exports of the crop during the study period, and the value of the coefficient of determination indicates that about 71% of the changes that occurred in the value of global exports are due to the time factor, which reflects the economic changes that occurred in that period, and the rest is due to to other external factors not estimated in the model.

Table 1: Evolution of the Quantity, Price and Value of World Potato Exports and Imports for the Period (2006-2022).

Year	Global Potato Imports			World Potato Exports		
	Value million dollars	Price (USD/ton)	Qty million tons	Value million dollars	Price (USD/ton)	Qty million tons
2006	1762.95	219	8.05	1712.13	217	7.89
2007	1892.02	247	7.66	1880.92	236	7.97
2008	1498.23	179	8.37	1256.62	166	7.57
2009	1561.45	187	8.35	1440.78	177	8.14
2010	1833.93	213	8.61	1620.00	200	8.1
2011	2063.60	220	9.38	1856.40	204	9.1
2012	2363.40	260	9.09	2210.64	244	9.06
2013	2111.34	231	9.14	1875.30	210	8.93
2014	2864.45	295	9.71	2710.50	278	9.75
2015	3773.09	359	10.51	3404.07	327	10.41
2016	2731.41	267	10.23	3412.96	332	10.28
2017	3289.37	343	9.59	3055.78	299	10.22
2018	3754.54	347	10.82	3627.03	319	11.37
2019	4932.72	403	12.24	4560.72	372	12.26
2020	3507.15	309	11.35	3386.56	304	11.14
2021	4740.75	315	15.05	4616.22	379	12.18
2022	6037.50	322	18.75	4587.90	373	12.3
Average	2983.41	277.41	10.41	2777.33	272.76	9.80

Source: http://FAO Trade year Book

Table 2: Equations of the general time trend of the development of the quantity, price and value of international exports, imports and potatoes during the period (2006-2022).

Variables	Unit	A	B	T	R2	Average period	Rate change%
Quantity of world exports	Million tons	20.38-	3.00	**7.67	0.79	9.8	30.61
World export price	USD/ton	7.64-	0.063	**5.6	0.66	272.76	0.02
Value of world exports	Million dollar	1.79-	0.114	**6.46	0.71	2777.33	0.004
Quantity of global imports	Million tons	6.03-	1.49	**4.69	0.58	10.41	14.31
World import price	USD/ton	7.54-	0.061	**4.28	0.53	277.41	0.02
Value of global imports	Million dollar	0.78-	0.193	**5.9	0.69	2983.41	0.01

Source: Compiled and calculated from Table (1) data.

By reviewing the data of Table (1), it was found that the average world imports of potatoes were estimated at about 10.41 million tons during the study period (2006-2022), and ranged from a minimum of about 7.66 million tons in 2007 to a maximum of about 18.75 million tons in 2022, an increase from the average of about 80.11% during the study period.

The general time trend of the average amount of potato imports in the world during the period (2006-2022) shows that the amount of imports increases annually by a statistically confirmed amount of about 1.49 tons, with an increase rate of about 14.31% of the average amount of global imports of the crop during the study period, and the value of the coefficient of determination indicates that about 58% of the changes that occurred in the value of global exports are due to the time factor, which reflects the economic changes that occurred in that period, and the rest is due to other factors External is not estimated in the model.

4. World import price of potatoes

The data of Table (1) indicate that the global import price of potatoes during the period (2006-2022) ranged between a minimum of about $ 179 / ton in 2008, and a maximum of about $ 403 / ton in 2019, and this reflects the increase in the price of global imports by 128.3% from 2008, and about 38.95% from the average price. Global imports during the study period, estimated at 2983.41 dollars/ton.

By studying the estimated model of the general time trend of the global import price of the potato crop during the study period as shown in Table (2), it was found that the price of imports increases annually by a statistically confirmed amount of about 0.061 dollars / ton, with an increase rate of about 0.02% of the average global import price of the crop during the study period, and the value of the coefficient of determination indicates that about 53% of the changes that occurred in the world price of imports Potatoes are due to the time factor, which reflects the economic changes that occurred in that period, and the rest is due to other external factors that are not estimated in the model.

5. The value of world imports of potatoes

The data of Table (1) indicate that the value of global imports of potatoes for the period (2006-2022) ranged from a minimum of about 1498.23 million dollars in 2008, to a maximum of about 6037 million dollars in 2022, reflecting the increase in the value of global imports by 302.9% over 2007. And about 102.3% of the average value of global imports of the crop in the study period, which is estimated at about 2983.41 million dollars.

The estimated model indicates the general time trend of the value of global imports of the potato crop during the study period as shown in Table (2) shows that its value increases annually by a statistically confirmed amount of about 0.193 million dollars at an increase rate of about 0.01% of the average value of global imports of the crop during the study period and the value of the coefficient of determination indicates that about 69% of the changes that occurred in the value of global imports are due to the time factor, which reflects the economic changes that have occurred. In that period and the rest is due to other external factors not estimated in the model.

Second: Egyptian potato exports and imports

1. Quantity of Egyptian potato exports

The data of Table (3) indicate that the quantity of potato exports during the period (2006-2022) fluctuated between a minimum of about 160 thousand tons in 2008, and a maximum of about 640 thousand tons in 2019, an increase of about 300% over 2008 and about 94.5% over the average Egyptian exports of the crop during the study period of about 329 thousand tons.

Table 3: Evolution of the Quantity, Price and Value of Egyptian Potato Exports and Imports for the Period (2006-2022)

Year	Import			Exports		
	Value thousand dollars	Price (USD/ton)	Qty thousand tons	Value thousand dollars	Price (USD/ton)	Qty thousand tons
2006	23328	486	48	43700	190	230
2007	37635	579	65	46800	180	260
2008	44499	489	91	27200	170	160
2009	18550	530	35	30400	160	190
2010	29865	543	55	42780	186	230
2011	41676	604	69	44400	148	300
2012	14651	637	23	66880	176	380
2013	46428	636	73	76830	197	390
2014	29696	512	58	65860	178	370
2015	60720	880	69	108030	277	390
2016	67568	824	82	177200	443	400
2017	89034	781	114	148720	676	220
2018	108486	738	147	130200	434	300
2019	126864	881	144	251520	393	640
2020	89400	745	120	125840	484	260
2021	144534	663	218	206830	481	430
2022	150381	1023	147	232760	529	440
Average	66077	679	92	107409	312	329

Source: http://FAO Trade year Book.

By studying the estimated model of the general time trend of the quantity of exports of the potato crop during the study period as shown in Table (4), it was found that no statistically significant was confirmed during the study period, which indicates that there is a state of relative stability around the annual average during the study period.

2. Export price of Egyptian potatoes

The data of Table (3) indicate that the export price of Egyptian potatoes during the period (2006-2022) may It ranged between $ 160 / ton in 2009 and about 676$ / ton in 2017, reflecting the increase in the price of Egyptian exports by about 332.5% compared to 2001, and about 116.7% from the average price of Egyptian exports of potatoes during the study period, estimated at about $ 312 / ton.

By studying the estimated model of the general time trend of the price of Egyptian exports of the potato crop during the study period as shown in Table (4), it was found that the export price increases annually by a statistically confirmed amount of about 0.11 dollars / ton, with an increase rate of about 0.04% of the average Egyptian export price of the crop during the study period, and the value of the determination coefficient indicates that about 56% of the changes that occurred in the export price of Egyptian potatoes are due to the time factor, which reflects the economic changes that have occurred In that period and the rest is due to other external factors not estimated in the model.

3. The value of Egyptian exports of potatoes

By extrapolating the data of Table (3), it was found that the value of potato exports during the period (2006-2022) ranged between $ 27.2 million in 2008, about $ 232.76 million in 2022, and this reflects the increase in the value of Egyptian exports by about 116.6% over the average value of Egyptian exports of potatoes during the study period, which is estimated at about $ 107.41 million.

By studying the estimated model of the general time trend of the value of exports of the potato crop during the study period as contained in Table (4), it was found that it was not statistically confirmed statistically during the study period, which indicates that there is a state of relative stability around the annual average during the study period.

4. Quantity of Egyptian imports of potatoes

By reviewing the data of Table (3), it was found that the annual average amount of Egyptian imports of potatoes was estimated at about 92 thousand tons during the study period (2006-2022) and ranged between a minimum of about 23 thousand tons in 2012 and a maximum of about 218 thousand tons in 2021, an increase of about 136.9% over the average Egyptian imports. From potatoes during the study period.

By studying the linear relationship between the amount of Egypt's imports of potatoes and the time factor, it was found that the amount of imports increases annually by a statistically confirmed amount of about 0.47 thousand tons, representing about 0.51% of the average amount of Egyptian imports of the crop during the study period, and the value of the determination coefficient indicates that about 65% of the changes that occurred in the amount of Egypt's imports of potatoes are due to the time factor, which reflects the economic changes that occurred in that period, and the rest is due to other external factors. Not estimated in the form as shown in Table (4).

5. Potato import price

The data of Table (3) indicate that the import price of potatoes during the period (2006-2022) ranged between a minimum of about $ 486 / ton in 2006, and a maximum of about $ 1023 / ton in 2022, and this reflects the increase in the price of Egyptian imports of potatoes by about 110.5% from the base year, and about 50.7% from the average price of importing potatoes in Egypt for the study period, estimated at about $ 679 / ton.

By studying the equation of the general time trend estimated for the import price of potatoes during the study period as contained in Table (4), it was found that the import price increases annually by a statistically confirmed amount of about 0.16 dollars / ton, with an increase rate of about 0.02% of the average Egyptian import price of potatoes during the study period. The rest is due to other external factors not estimated in the model.

Table 4: Equations of the general time trend of the evolution of the quantity, price and value of Egyptian exports and imports of potatoes during the period (2006-2022)

Variables	Unit	A	B	T	R2	Average period	Rate of Change %
Quantity of exports	**Thousand tons**	271.1	0.185	1.07	0.07	329	-
Export price	**USD/ton**	0.198	0.11	**4.5	0.56	312	0.04
Value of exports	**Thousand dollars**	239.61	0.973	1.81	0.17	107409	-
Quantity of imports	**Thousand tons**	10.67	0.47	**3.18	0.35	92	0.51
Import price	**USD/ton**	233.17	0.16	*2.6	0.3	679	0.02
Value of imports	**thousand dollars**	215.08	11.97	*2.66	0.31	66077	0.02

Source: Collected and calculated from Table 3 data.

6. Value of Egyptian imports of potatoes

The data of Table (3) shows that the value of Egyptian imports of potatoes during the period (2006-2021) ranged from a minimum of about $ 14.65 million in 2004, to a maximum of about $ 150.38 million in 2014, an increase of about 127% over the average value of Egyptian imports of potatoes during the study period, which is estimated at about $ 66.08 million.

By studying the linear relationship between the value of Egyptian imports of potatoes and the time factor, it was found that the value of imports increases annually by a statistically confirmed amount of about 11.97 thousand dollars, representing about 0.02% of the average value of Egyptian imports of potatoes during the study period, and the value of the determination coefficient indicates that about 71% of the changes that occurred in the value of Egyptian imports of potatoes are due to the time factor,

which reflects the economic changes that occurred in that period, and the rest is due to other external factors. Not estimated in the form, which is shown in Table (4).

Third: Geographical distribution of Egypt's potato exports

By studying the geographical distribution of Egypt's potato exports during the period (2018-2022), and as shown in Table (5), it is found that the European Union countries are the most important importing markets for Egyptian potatoes, as they imported about 185.4 thousand tons, representing about 48.27% of the average Egyptian exports during that period, and its most important markets are Italy and Greece, where the percentage of their imports of Egyptian potatoes reached about 17.11%, 14.93%, respectively, followed by Germany, the United Kingdom, and the Netherlands, and the percentage of their imports reached about 8.19%, 4.88%, and 2.33%, respectively, of the annual average of the study period.

The data of Table (5) also indicate an increase in the number of imports of the Russian market from about 61.28 thousand tons in 2018 to about 322.97 thousand tons in 2022, and the average amount of Russian imports of Egyptian potatoes reached about 112.06 thousand tons, representing about 29.17% of Egypt's average exports, which amounted to about 396.7 thousand tons for the average period.

As for the Arab countries, Lebanon is the main Arab market importing Egyptian potatoes, with an average import of Egyptian potatoes of about 38.14 thousand tons, which is estimated at about 9.93% of the total Egyptian potato exports.

It is noted the fluctuation in the imports of these countries of Egyptian potatoes and this may be due to the fact that most of the importing countries are also exporting countries there is intense competition for Egyptian potatoes from within the European Union itself, it has been found that the competing countries for Egypt in the Italian, German and Greek market are France, Germany, Italy, the Netherlands, Cyprus, Spain.

From the above, it is clear that the European Union is the main importer of Egyptian potatoes, and despite this, the market share of Egyptian exports is small, reaching about 3.9% during the average period (2018-2022), which indicates the need to improve the advantages granted by the European Union by continuing negotiations.

As for the Arab countries, Lebanon is one of the most important importers of Egyptian potatoes, and the market share of other Arab countries is dwindling.

Fourth: The competitiveness of Egyptian potato exports

This part deals with the most important economic indicators of the competitiveness of Egyptian potatoes to measure their competitive position in global markets, and one of the most important and famous competitiveness indicators that can be used is the apparent comparative advantage index, market share, penetration ratio, and the relative price index can be used.

In light of the freedom of trade, the removal of customs barriers and the increase in competition between the products of different countries in foreign markets, we must not rely only on comparative advantage, but also on ability or competitive advantage, and competitive advantage means the production of a commodity at a low cost and of high quality and the presence of services to deliver this commodity to the consumer in a timely manner and in the appropriate form (July 1996).

The studies of the Porter diamond are considered one of the most studies of how to increase the competitiveness of a country's exports, he summarized the factors that lead to increasing the ability of exports to compete globally as follows:

- Factor Production Conditions
- Domestic Demand Conditions
-Related and Supporting Sectors
- Enterprise strategy, industry structure and local competition
- Firm Strategy, Industry Structure and Domestic Competition

It is worth noting that these four determinants work as a system and not individually, and these determinants do not work in a vacuum, as there is the role played by governments through the economic philosophy that they develop, which affects the competitiveness of companies and institutions affiliated with the state.

Table 5: Geographical distribution of Egypt's potato exports during the period (2018-2022).

Years	2018		2019		2020		2021		2022		Average	
Countries	**Quantity**	**%**	**Quantity**	**%**	**Quantity**	**%**	**Quantity**	**%**	**Quantity**	**%**	**Quantity**	**%**
Italy	77.98	20.01	90.82	24.00	30.28	14.08	63.37	21.12	66.08	10.37	65.7	17.11
Greece	59.52	15.27	66.85	17.67	45.04	20.94	57.93	19.31	57.42	9.01	57.35	14.93
England	21.32	5.47	18.91	5.00	13.88	6.45	15.34	5.12	24.19	3.79	18.73	4.88
Germany	38.66	9.92	13.57	3.59	39.75	18.48	29.67	9.89	35.72	5.6	31.47	8.19
Netherlands	6.4	1.64	7.1	1.88	8.16	3.79	12.14	4.05	10.96	1.72	8.95	2.33
The rest of the European Union	4.53	1.16	6.65	1.76	1.5	0.7	3.15	1.05	0.14	0.02	3.19	0.83
European Union	208.4	53.48	203.9	53.89	138.6	64.44	181.6	60.54	194.5	30.51	185.4	48.27
European Union	61.28	15.72	78.59	20.77	29.03	13.5	68.44	22.81	322.97	50.67	112.06	29.17
Lebanon	78.04	20.03	48.84	12.91	22.52	10.47	23.71	7.9	17.6	2.76	38.14	9.93
Other	41.98	10.77	47.05	12.43	24.92	11.59	26.22	8.74	102.37	16.06	48.51	12.63
World	389.7	100	378.3	100	215.08	100	299.96	100	637.43	100	384.11	100

Quantity: Thousand Ton
Source: Collected and compiled from the United Nations web site.

There are many indicators of competitive advantage, but the success of these indicators depends on the degree of their suitability to the developments that have occurred in the global economic arena, from globalization, trade liberalization and opening of markets, as these indicators implicitly assume the inclusion of the concept of competition internally and externally, and are based on markets free of distortions resulting from government interventions, and the most important of these indicators are the following:

1. Revealed comparative advantage (RCA)

It is measured by dividing the relative importance of a country's exports of a product of a particular activity in the total exports of this country by the relative importance of world exports of this product in the total world exports, and the apparent comparative advantage is calculated according to the following formula:

$$\mathbf{RCA_j = (Xej/Xaj) / (Xew/Xaw)}$$

Whereas:

RCA_j : The apparent comparative advantage of the country's exports of product J to the world market within a year.

Xe_j : The relative importance of the value of a country's exports of product J to the world market is represented within a year.

Xa_j :It represents the value of the country's agricultural exports to the world market within a year.

Xew :The value of global exports of product J represents within a year.

Xaw :Represents the value of global agricultural exports in a year.

The state shall have a comparative advantage in the export of the product meaning if the quotient is greater than the correct one and vice versa shall not have a comparative advantage in the export of this product if the quotient is less than the correct one.

Table 6: The apparent comparative advantage of Egyptian potatoes and the most important competing countries in the global market for the period (2018-2022)

Year	Egypt	Israel
2018	23.08	9.49
2019	31.65	7.13
2020	25.79	7.53
2021	20.62	6.36
2022	31.94	6.27
Average	26.62	7.36

Source: Collected and calculated from FAO data

The results of Table (6) showed the apparent comparative advantage of the exports of Egypt and Israel, as Israel is the most important competitor to Egypt's exports of potatoes in the European market, and it was found that the apparent comparative advantage index amounted to 26.6 for Egypt's exports of potatoes in the period (2018-2022), while this indicator reached about 7.37 for Israel, which means that Egypt has an apparent comparative advantage in exporting potatoes to the world, although there is a fluctuation in the relative advantage number between the rise and fall, where the highest number was recorded. The comparative advantage was about 31.9 in 2014.

2. Market Share (Market Share)

This measure reflects the possibility of developing a country's exports of a particular commodity to foreign markets, as increasing the volume of exports is a major goal for any country, and is measured by the share of the country's exports in any of the import markets, provided that the increase or decrease of this percentage over time is related to the extent of improvement or return to competitiveness and the market share is measured by the following equation:

$$\mathbf{M,S = (Xij / Xii)*100}$$

Where:

M,S :The market share of the country (j) in the market of another country.

Xij :Exports of commodity (i) from country (j) to the market of another country.
Xii :The total imports of the other country of commodity (i).

By studying the market shares of Egyptian potatoes in the various markets importing it during the period (2018-2022), it is clear from the data of Table (6), that the markets of Lebanon and Greece top the list of markets importing Egyptian potatoes, with market shares of about 44.02% and 42.63%, respectively, of their total imports of potatoes.

The markets of Russia, Italy and Germany are of particular importance as an importer of Egyptian potatoes, as their market shares were estimated at about 17.13%, 15.10% and 11.29%, respectively, of their total imports of potatoes during the study period, as well as the data of the European Union countries in Table (7) emphasize the importance of working to increase Egyptian exports of potatoes to the European Union market, as the table data showed that the Russian market is one of the promising markets.

Table 7: Market shares of Egyptian potatoes in imported markets for the period (2018-2022**).**
Quantity in thousand tons

Years / Country's	2018	2019	2020	2021	2022	Average
Italy	18.5	18.22	15.27	11.85	12.37	15.1
Greece	46.37	51.44	43.64	44.62	29.96	42.63
England	6.36	4.54	6.39	7.33	7.5	6.15
Germany	9.31	16.68	12.81	8.99	9.19	11.29
Netherlands	0.43	0.71	0.71	1.00	0.38	0.62
European Union	38.72	42.53	43.98	43.22	41.04	41.7
Russia	25.85	18.9	15.71	11.39	17.94	17.13
Lebanon	72.56	59.26	49.05	22.24	16.85	44.02

Source: Compiled and computed from the Central Agency for Mobilization and Statistics, Foreign Trade Database

From the above, it is clear that the markets of European countries importing potatoes are the main importer of Egyptian potatoes, which indicates the need to improve the advantages granted by the European Union continuously negotiations, and for the Arab countries to make more marketing efforts to increase the market share of Egypt, to dwindle the market share of Arab countries except Lebanon, which is the main Arab market, it was also shown that the amount of Russian imports of Egyptian potatoes is increasing, despite that, Egypt's market share is still small, reaching about 17.13% of The average imports of the Russian market during the average period (20-18-2022), and this requires more marketing and research efforts to study these markets to develop and maintain Egyptian exports.

3. Market penetration ratio

The market penetration rate index is one of the most important competitiveness indicators that reflect the share of the exporting country of a particular commodity from the total supply available to the market of a particular import country and this can be estimated through the following formula:

$$MPReij = Meij / (Qij + Mij - Xij)$$

Whereas:
MPReij = The penetration of the country's exports to the EU market of product J in a year.
Meij = Egypt's total exports of commodity J to the EU market during a year.
Qij = Total EU countries' production of commodity J in a year.
Mij = Total EU imports of commodity J in a year.
Xij = Total EU exports of commodity J in a year.

The results of Table (8) showed the penetration rate of Egypt's exports and competitors of the potato crop to the most important potato importing countries, and it was found that the penetration rate of Egyptian potatoes in the period (2018-2022) in the Lebanese market was exceeded, followed by the Greek market, where the penetration rate was estimated at 0.072, 0.06, while it is noted that Israel left

Table 8: Egypt penetration and competition ratio to the most important potato import markets in the period (2018-2022).

Penetration rate	2018		2019		2020		2021		2022		Average	
	Egypt	Israel	Egypt	Israel	Egypt	Israel	Egypt	Israel	Egypt	Israel	Egypt	Israel
Italy	0.042	0.001	0.045	0.001	0.035	0.008	0.034	0.008	0.032	0.005	0.038	0.005
Greece	0.059	0.00	0.072	0.00	0.07	0.00	0.063	0.00	0.055	0.00	0.064	0.00
England	0.004	0.017	0.003	0.017	0.003	0.012	0.003	0.01	0.003	0.009	0.003	0.013
Germany	0.004	0.003	0.007	0.002	0.005	0.002	0.004	0.003	0.004	0.003	0.005	0.002
Netherlands	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.001
European Union	0.004	0.004	0.003	0.004	0.003	0.004	0.003	0.003	0.003	0.003	0.003	0.004
Russia	0.002	0.00	0.003	0.00	0.002	0.001	0.003	0.00	0.008	0.001	0.004	0.001
Lebanon	0.112	0.00	0.072	0.00	0.067	0.00	0.052	0.00	0.034	0.00	0.072	0.00

Source: Compiled and computed from the Central Agency for Mobilization and Statistics. Foreign Trade Database.

these two markets, followed by the Italian market, which reached the penetration rate of Egyptian potatoes about 0.038, while the penetration rate of Israeli potatoes reached about 0.005 0

4. Price competitive position

The competitive position of exports is affected by a set of factors, the most important of which are the relative price, the ability to meet export requirements and the efficiency of marketing operations, and the export price is one of the most important factors that help in the possibility of penetrating more foreign markets, the lower the export price of the country in question than other competing countries, this indicates that there is a price advantage for the commodity from that country and a higher competitiveness, the price competitive position is estimated by finding the price ratio between the Egyptian export price and the export price of the other country If the value of this indicator is less than the correct one, this indicates that Egypt has a price advantage in exporting that crop and vice versa.

By surveying the data of Table (9), it is clear that Egyptian potato exports have a comparative price advantage, as they decreased from the correct one in the average period (2018-2022) for Egypt compared to Spain and the Netherlands, and this ratio was estimated at about 0.76 and 0.79, respectively, meaning that the export price per ton of Egyptian potatoes is less than the export price of its Spanish and Dutch counterparts 34% and 21%, respectively, which gives Egypt a comparative price advantage in front of these countries, which is an incentive to increase its exports from this The crop, while the Egyptian export price of potatoes compared to Belgium, Germany and France increases by about 39%, 18% and 90%, respectively, from the study of these indicators shows that there are opportunities for Egyptian potatoes to meet the needs of importing countries by studying the desired and undesirable needs and specifications of these countries and meeting them to increase Egypt's export quotas and to raise its competitiveness in these markets.

Table 9: The price competitiveness position of Egyptian potatoes compared to the most important competing countries for the period (2018-2022)

Years	Belgium	France	Netherlands	Germany	Spain
2018	1.07	1.24	1.12	2.23	1.00
2019	0.87	0.66	0.51	1.17	0.39
2020	1.2	0.83	0.59	1.45	0.62
2021	1.63	1.28	0.8	1.89	0.7
2022	2.21	1.88	0.93	2.78	1.08
Average	1.396	1.178	0.79	1.904	0.758

Source: Compiled and computed from the Central Agency for Mobilization and Statistics, Foreign Trade Database.

From the above, it is clear that the competitiveness of the Egyptian potato depends on the conditions of production factors, domestic demand, related and supporting sectors, and the structure of the potato industry, as it turned out that the market share and the price competitive position of economic indicators through which competitiveness can be measured, as it turns out that Egypt has a competitive price advantage for Spanish and Dutch potatoes, while it did not have a competitive price advantage for Belgian, German and French potatoes during the study period.

Fifth: Protection coefficients and comparative advantages of Egyptian potatoes

The most important methods of measuring the level of intervention in the potato crop are the estimation of the Policy Analysis Matrix (PAM) for the potato crop, by measuring the nominal protection coefficient of the output, the nominal protection coefficient of the traded inputs, the effective protection coefficient, and the cost factor of local resources after the complete liberalization of the production element markets. Production requirements (seeds, municipal fertilizer, chemical fertilizer and pesticides), and the cost of work (wages of workers, machinery, animals and public expenses), in addition to land rent, and for the evaluation of the economic prices of these items, the transfer transactions for Egypt, recommended by the World Bank in 1991, were used to convert the items of production costs of Egyptian potatoes from financial prices to economic prices estimated at about 0.5, 1,159, 1.15 ,1,633 and 1,976 for the items of human labor costs, machinery wages, seed price, chemical fertilizer costs and pesticide costs, respectively, while the other items remained the same unchanged, as

for the land, the concept of the cost of the alternative hypothesis is used, which is the net return per acre in the best alternative use, which is the economic rent of the land (rented to others for a full year) denominated by the duration of the crop's stay in the land, and for the economic evaluation of the acre revenue, it is equivalent to about 1.50 times of The value of the acre revenue at financial prices, and the following is a presentation of the results.

1. Nominal protection coefficient of outputs

It refers to the ratio between the return or price valued at the market price and the return or price valued at the economic price, and thus reflects the extent of convergence or distance of local prices from their global counterparts, as well as the extent to which the state bears the burden of supporting the crop or imposing taxes on producers and is estimated through the following equation:

$$NPC = \frac{P^d}{P_b}$$

Whereas: Pd: cultivated price in local currency.
Pb: Border price.

It is clear from the results of Table (11) that the value of the maximum protection factor for the output per acre of potatoes during the period (2018-2022), was less than the correct one in all years of the study, meaning that the local price per ton of potatoes is lower than its price at the borders, and this means that there are implicit taxes borne by potato producers in general, the value of these taxes ranges between a minimum of about 7460 pounds per acre in 2010, and a maximum of about 9350 pounds per acre in 2014, while the average tax rate in the study period was estimated at about 33% at a value of about 8157.3 pounds per acre, as shown in the data of Table (12).

2. Nominal protection coefficient of inputs

It refers to the ratio between the cost of inputs traded at the market price and the cost of inputs traded at the economic price, and can be estimated through the following equation:

$$NPI = \frac{CTI^d}{CTI^b}$$

Whereas:
CTId = The cost of the traded inputs at the local price.
CTIb = Cost of traded inputs at the border price.

Table 10: Estimation of costs and acre yield of potatoes at financial and economic prices during the period (2018-2022)

Year	Value at financial prices				Value in economic prices			
	Total revenue	Total costs	Costs traded	Costs not traded in it	Total revenue	Total costs	Costs traded	Costs not traded in it
2018	14920	8014	2526	5488	22380	8100.4	5816.3	2284.1
2019	15908.5	9342	3112.5	6229.5	23862.8	9031.1	6229.5	2801.6
2020	15967	7131	3669.5	3461.5	23950	6871.8	3699.9	3171.9
2021	16077	9397	6005.5	3391.5	24115.5	10444.1	7602	2842.1
2022	18699	9865	5981.5	3883.5	28049	11072.3	7879.7	3192.6
Average	16314.3	8749.8	4259	4490.8	24471.5	9103.94	6245.48	2858.46

Value in EGP
Source: Collected and calculated from data from the Ministry of Agriculture, Economic Affairs Sector, Agricultural Economy Bulletin, miscellaneous issues

The data of Table (11) indicate that the nominal protection factor for the traded inputs for the potato crop during the period (2018-2022), its value was less than the correct one during the study years, meaning that the cost of inputs at local prices is lower than its counterpart at international prices, which

confirms the existence of support on the requirements of production elements, and that the percentage of this support, as shown in Table (12) data.), was fluctuating, as its minimum limit was estimated at about 1% with a subsidy value of about 30.40 pounds per acre in 2020, and a maximum of about 57% and its value was about 3290.3 pounds per acre in 2018, and the average percentage of this support during the study period was estimated at about 30.6%, and its value was about 1986.48 pounds per feddan.

Table 11: Estimation of protection coefficients and cost of local potato resources during the period (2018-2022)

Year	Nominal protection factor for outputs	Nominal protection coefficient of outputs	Effective protection coefficient	Domestic resource cost
2018	0.67	0.43	0.75	0.14
2019	0.67	0.5	0.73	0.16
2020	0.67	0.99	0.61	0.16
2021	0.67	0.79	0.64	0.27
2022	0.67	0.76	0.52	0.19
Average	0.67	0.694	0.65	0.184

Source: Compiled and calculated from Table (10)

3. Effective protection coefficient

It refers to the ratio between the value added of a particular product at local prices prevailing in the market and its counterpart valued at international prices (Balassa 1965), and is estimated by the following equation:

$$\mathbf{EPC} = \left(P_i^d - \sum a_{ij} P_j^d\right) / \left(P_i^b - \sum a_{ij} P_j^b\right)$$

This coefficient shows distortions in both production markets and production inputs, and it is a more effective measure of the impact of policy as it measures the net impact of domestic economic policy on both production markets and production inputs, as the data of Table (11) indicate that the value of the effective protection factor for the potato crop during the period (2019-2022) was less than the correct one in all years of the study, meaning that the added value of Egyptian potatoes at local prices is less than their counterpart evaluated at shadow prices, which confirms However, there are implicit taxes on the producers of this crop during the study period, as shown by the data of Table (12) that the percentage of these taxes ranges between a minimum of about 25% with an estimated value of about 4169.7 pounds per acre in 2018, and a maximum of about 35% with an estimated value of about 7952.6 pounds in 2020, while the rate of this tax was about 35% and a value of about 6170.5 EGP per acre in the average study period, which confirms that the value added at market prices is less than the value added at shadow prices, which means that the total impact of the commodity confirms the existence of implicit taxes on production during the period (2018-2022), which confirms the importance of working to remove these taxes to encourage farmers to increase production of this important export crop.

4. Domestic resource cost

The cost factor of local resources shows the state's ability to replace its local resources to produce one unit of a commodity in order to provide a foreign exchange unit that could have been directed to import that commodity, as well as reflects the concept of domestic production efficiency for the global market, it refers to the economic cost or economic return from the production of the commodity instead of importing it, so it is used as a measure of the comparative advantage of productive activity and can be estimated from the following equation:

$$\mathbf{DRC} = \sum a_{ij}{}^{D} V_{ij} / \left(P_i^b - \sum a_{ij} P_j^b\right)$$

Whereas:

a_{ij}^{D} =Local resource transactions and non-traded inputs.

Vij =The shadow price of the local resource or the non-traded entrance.

aij =Transactions of traded inputs.

P_j^b = Border price for the entrance traded.

P_i^b =Border price for the traded product.

$\left(P_i^b - \sum a_{ij} P_j^b\right)$ =Value added at economic prices.

This coefficient reflects the concept of local production efficiency for the global market, so it is used as a measure of the comparative advantage of production activity, as the data of Table (12) indicate that the comparative advantage coefficient of the potato crop during the period (2018-2022) was less than the correct one during the study period, which confirms that Egypt enjoys a comparative advantage in the production of this crop due to the fact that the cost of producing potatoes locally is lower than the cost of importing it.

Table 12: Value of taxes or subsidies per acre of potatoes and measurement of comparative advantage in the period (2018-2022)

	Subsidies or taxes in the case of output protection factor		Subsidies or taxes in the case of input protection factor		Net Subsidies and taxes in the case of effective protection factor		Comparative advantage
	%	Value	%	Value	%	Value	
2018	33	7460-	57	3290.3	25	4169.7-	*
2019	33	7954.3-	50	3117	27	4837.3-	*
2020	33	7983-	1	30.4	39	7952.6-	*
2021	33	8039-	21	1596.5	36	6442-	*
2022	33	9350-	24	1898.2	48	7451-	*
Average	33	8157.3-	30.6	1986.48	35	6170.5-	*

Source: Compiled and calculated from Table (10, 11)
* Indicates a comparative advantage in production.

Problems facing the production, consumption and marketing of Egyptian potatoes

There are several problems facing the production, consumption and marketing of Egyptian potatoes, it has been found that the most important of these problems is the lack of specialized areas in production, the increase in local consumption of potatoes in recent years led to a decrease in the percentage of production allocated for export, the high prices in the local market led to the tendency of exporters to market a larger percentage of production locally and avoid exporting it and the associated risks of neglect and lack of mastery of sorting, grading and packaging processes.

The most important proposed solutions include:

The need to provide production dedicated to export that suits the tastes of consumers for all foreign markets, and the use of juvenile production means in potato cultivation to increase the productivity of acres of them, which in turn leads to increasing the profit of the product to the maximum possible, expanding the production of potato seeds locally to reduce the use of expensive imported seeds, which leads to reducing production costs, following an effective marketing policy that achieves reducing the multiplicity of intermediaries between producers and consumers, which works to reduce marketing expenses, and take appropriate means around directing Farmers to scale and sort their production and work to provide grading machines, whether in filling stations or in some large farms.

Summary

The potato crop is considered one of the most important vegetable crops which have the ingredients to increase its exports to the foreign markets. In the period 2006- 2022, the volume of potato exports in the world ranged from 7.89 million tons in 2006 to about 12.3 million Ton in 2022, reflecting the increase in the quantity of world exports by about 24.20% from the average international exports during the study period estimated at about 9.8 million tons during the study period, the world price of potato exports has ranged from $ 217 / ton in 2006 to about $ 373 / ton in 2022, reflecting an increase in the price of world exports by about 25.69% from the average international exports during the study period estimated at about 272.76 $/tons during the study, with an annual increase rate of about 0.02% of the world average potato price during the study period, World potato imports show that the average world

potato imports were estimated at 5.05 million tons during the study period (2006-2022) and ranged from a minimum of about 7.66 million tons in 2007 to a maximum of 18.75 million tons in 2022, an increase of about 35.9% from the annual average during the study period. The results indicate that the average quantity of Egyptian imports of potatoes was about 92 thousand tons during the study period and ranged between a minimum of about 48 thousand tons in 2006 and a maximum of about 218 thousand tons in 2021, an increase of about 91.66% on the average of Egyptian potato imports during the study period, the direct correlation between the average quantity of potato imports of Egypt during the studied period shows that it increases annually by a statistical certainty of about 0.47 thousand tons representing about 0.51% of the average quantity of Egyptian imports from The yield was 92.000 tons during the study period .The import price of potatoes during the period (2006-2022) ranged between a minimum of about 486 dollars / ton in 2006 and a maximum of about 1023 dollars / ton in 2022, reflecting the increase in the price of Egyptian imports of potatoes 50.7 the average price of potato imports in Egypt, estimated at 679 $ / ton, shows that the average price of potato imports increased annually by a statistical certainty of about 0.16 USD / ton, an increase of about 0.02% average import price of potatoes during the study period As shown by the study of the competitiveness indicators of the Egyptian potato, the markets of the EU countries are considered the main importer of Egyptian potatoes. This indicates that the advantages of the European Union should be constantly improved It is also clear from the study of competitiveness indicators of Egyptian potatoes that the markets of the European Union countries are the main importer of Egyptian potatoes, which indicates the need to improve the advantages granted by the European Union continuously negotiations, and for the Arab countries must make more marketing efforts to increase the market share of Egypt, to dwindle the market share of the Arab countries except Lebanon, which is the main Arab market, and also show the increasing amount of imports of Russian Egyptian potatoes and despite that still the share of Egypt's market is small, as it reached about 17.13% of the average imports of the Russian market during the average period (2018-2022), and this requires more marketing and research efforts to study these markets to develop and maintain Egyptian exports.

The results also indicated that the competitiveness of Egyptian potatoes depends on the conditions of production factors, domestic demand, related and supporting sectors, and the structure of the potato industry, and the apparent comparative advantage index of Egyptian potatoes indicates that Egypt has a large apparent comparative advantage in exporting potatoes to the world.

The results of the study of protection coefficients for Egyptian potatoes also showed that there are taxes borne by potato producers estimated at about 33% of the acre costs, as it was shown that there is support on the requirements of the elements of production amounted to 1986.5 pounds per acre representing about 30.6% of the costs per acre, and therefore the result is that the product incurs taxes represented in the difference between the two previous figures, i.e. about 8157.3 pounds per acre during the study period The results also confirmed that Egypt enjoys a comparative advantage in the production of this crop due to the fact that the cost of producing potatoes locally is lower than the cost of importing it.

Recommendations

1- Attention must be paid to the packaging processes in appropriate packages and the purpose for which the commodity is used, and ensure the preservation of the product and be easy to carry and transport from one place to another.
2- The need to provide production dedicated to export that suits the tastes of consumers in foreign markets.
3- Working to find export institutions with high efficiency to study foreign markets and their needs in terms of quantity, quality and export times, with the importance of opening new markets, especially in African countries that do not care about quality specifications as much as they care about price differences.

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