Production And Marketing Efficiency Of Garlic Crop In Egypt Egypt

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Summary

Garlic is one of the vegetable crops grown in Egypt in the winter, It is grown either singly or combined with other winter crops It is also grown for local consumption or export, It is considered one of the vegetables rich in nutritional value, However, the problem with garlic lies in the high cost of intermediaries, which amounts to about 81.6% of the consumer's pound,Therefore, the study aims to identify the marketing margins and shares of garlic to estimate its marketing efficiency,The study shows a high rate of self-sufficiency in garlic, which allows us to export abroad,The total revenue and total costs of the garlic crop in Egypt amounted to about 24.57 and 8.7 thousand pounds, respectively, during the period (2010 – 2021),As a result, the value of the net per-acre return from the garlic crop amounted to about 15.87 thousand pounds,Therefore, the value of the return on invested capital amounted to about 1.93 pounds during the same period.

The study also showed that average producer, wholesale, and consumer prices amounted to about 2.61, 14.45, and 16.37 thousand pounds, respectively.Therefore, the margin for both wholesale and retail amounted to approximately 71.4% and 10.2%,That is, the intermediaries get 81.58% of the value of the consumer's pound,Which led to a decrease in the marketing efficiency of garlic crop to about 6.44%.Therefore, the study recommends the need to educate farmers on how to perform various marketing operations themselves through agricultural marketing extension to increase the share of the producer and reduce the role of intermediaries,Establishing a market in every governorate and center where farmers can display their products and avoid intermediaries.

Keywords: *production and consumption of garlic, marketing margins, marketing efficiency.*

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I.   Introduction:

Vegetable crops are characterized by a relatively short seasonal and seasonal production cycle for their cultivation, which enables farmers to benefit from the production in achieving a relatively quick revenue, as vegetable crops occupy a great economic importance in Egyptian agricultural production. Garlic is considered one of the vegetable crops that are grown in Egypt during the winter season during the months of September and October. It is grown either alone or loaded with other winter crops. It is also grown for local consumption or export[1]. As it is considered one of the vegetables rich in its nutritional value, but it is consumed in small quantities, and garlic cloves are used to give many foods a special desirable flavor, and it is used in cooking, in the pickling industry, and in preserving meat and fish[2], in addition to having some medicinal uses for it, and the importance of the natural and antiviral garlic crop has increased locally And globally after the outbreak of the Corona epidemic. Egypt is the second largest producer of garlic in the world, after Spain, in terms of acre productivity, with a general average of about 10 tons per acre[3].

II.   Research problem:

The problem lies in the apparent difference between the price the producer receives and the price the consumer pays for the garlic crop,Represented by higher consumer prices and lower producer pricesThat is, the increase in marketing margins during the marketing process despite the increase in production,Also, the marketing efficiency of garlic crop decreased due to the high marketing margins resulting from the increase in marketing costs and the profits of intermediariesThis requires studying the indicators of marketing efficiency of garlic crop.

III.   Search goal:

to achieve the main objective of the research, which is to study the production and marketing efficiency of the garlic crop during the period (2010-2021), the following was studied:

1-Productive indicators of garlic crop in Egypt.
2-Consumer indicators of garlic crop in Egypt.
3-Indicators of economic efficiency of garlic crop in Egypt.
4-The relationship between the net per-acre return, farm prices, and total costs for the garlic crop in Egypt.
5-Indicators and estimation of marketing efficiency of garlic crop in gypt.

IV.   Research method and data sources:

The research relied on descriptive and quantitative analysis methods and the use of some statistical methods such as arithmetic averages, percentages, and simple and multiple regression analysis. The research also relied on secondary data published by the Central Administration of Agricultural Economics, the Central Agency for Public Mobilization and Statistics, and the Ministry of Agriculture and Land Reclamation, in addition to some related research and studies. On the subject of the research.

V.   Results:

First: Productivity Indicators of the Garlic Crop in Egypt
1-Cultivated area:
Table (1) shows the development of the cultivated area of garlic crop in Egypt during the period (2010-2021) It was found that it ranged from a minimum of about 22.2 thousand acres in 2013, A maximum of about 61.28 thousand feddans in 2016, with an average of about 37.02 thousand feddans during the study period, and by estimating the general time trend equation for the area cultivated with garlic in Egypt, the significance of the function was not proven.

2-Feddan productivity:
The feddan productivity of the garlic crop ranged between a minimum of about 8.55 tons/feddan in 2018, and a maximum of about 10 tons/feddan in 2021, with an average of about 9.39 tons/feddan during the study period. And by estimating the equation of the general time trend of the acre productivity of the garlic crop in Egypt, the significance of the function was not proven.

3-Total production:
The total production of garlic ranged between a minimum of about 218 thousand tons in 2013, and a maximum of about 537 thousand tons in 2016, with an average estimated at about 346 thousand tons during the study period. And by estimating the equation of the general time trend for the total production of garlic crop in Egypt, the significance of the function was not proven.

Second: Consumer indicators for garlic crop:
1- The amount available for consumption:
It is clear from Table (1) that the amount of garlic crop available for consumption in Egypt ranged between a minimum of about 235 thousand tons in 2013, and a maximum of about 430 thousand tons in 2021, By estimating the growth equation for the amount consumed from the garlic crop, it was found that it increased by an annual change amounting to about 9.99 thousand tons, With a statistically significant annual growth rate at a significance level of 0.01, it amounted to about 3.3% of the period average of about 303 thousand tons during the study period.

2-Amount of loss:
Table (1)data indicates that the amount of garlic lost in Egypt during the study period ranged between a minimum of about 40 thousand tons in 2010, and a maximum of about 63 thousand tons in 2012, with an annual average of about 49.5 thousand tons. And by estimating the general time trend equation for the amount of loss of the garlic crop in Egypt, the significance of the function was not proven.

3- Pure food:
The net food of the garlic crop in Egypt ranged between a minimum of about 186 thousand tons in 2013, and a maximum of about 387 thousand tons in 2021. By estimating the growth equation for the net food of the garlic crop, it was found that it increased by an annual change of about 9.62, with a statistically significant annual growth rate at a significance level of 0.01, amounting to about 3.8% of the period average of about 253 thousand tons during the study period.

Table (1): The most important production and consumption indicators for the garlic crop in Egypt during the period(2010 - 2021)

the year	cultivated area (acre)	Acre productivity(ton/acre)	total production (thousand tons)	available for consumption (thousand tons)	Loss (thousand tons)	net food (thousand tons)	Self-sufficiency rate(%)	Average per capita (kg/year)
2010	23034	9.59	221	253	40	213	96.84	3.21
2011	28916	9.51	275	289	45	244	102.42	3.59
2012	33018	9.58	316	303	63	240	101.98	3.67
2013	22153	9.86	218	235	49	186	99.57	2.78
2014	52366	9.43	494	284	59	225	92.61	3.27
2015	29961	9.23	277	295	46	249	98.64	3.32
2016	61284	8.77	537	261	41	220	104.60	2.87
2017	30993	9.24	286	278	45	233	104.32	2.92
2018	40470	8.55	346	340	54	286	102.65	3.50
2019	38483	9.36	360	322	48	274	112.73	3.30
2020	38975	9.55	372	342	61	281	110.23	3.40
2021	44591	10.00	446	430	43	387	104.42	4.20
Average	37020	9.39	346	303	49.5	253.2	102.45#	3.34
growth rate%	4.6	(0.2)	4.4	3.3**	0.4	3.8**	1.0*	0.8

( ) The numbers between parentheses are negative
Geometric mean,
* significant at 0.05 , **: Significant at 0.01

Source: Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, CentralAdministration forAgricultural Economy **- Bulletin of Agricultural Statistics,** Cairo, various issues.
Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Central Administration forAgricultural Economy **- Food Balance Bulletin,** Cairo, various issues.

4- Self-sufficiency in garlic:
The percentage of self-sufficiency in the garlic crop in Egypt ranged between a minimum of about 92.61% in 2014, and a maximum of about 112.73% in 2019. Estimating the growth equation for the percentage of self-sufficiency in the garlic crop, it was found that it increased by an annual change amounting to about 1.02%, with a statistically significant annual growth rate at a significance level of 0.05, amounting to about 1% of the period average of about 102.45% during the study period.

5- Per capita share of garlic:
The average per capita share of the garlic crop in Egypt during the study period was about 3.34 kg/year, and it ranged between a minimum of about 2.78 kg/year in 2013, and a maximum of about 4.20 kg/year in 2021, By estimating the general time trend equation for the average per capita share of garlic in Egypt, the significance of the function was not proven - Table (1).

From the above, it is clear that despite the increase in the per capita share of garlic, an increase in the self-sufficiency rate was observed as a result of the increase in total production, which leads to an increase in the amount of exports directed to foreign markets.

Third: Economic indicators of the garlic crop in Egypt:
Economic indicators are considered one of the most important factors that the producer cares about for any crop. These indicators are represented in total revenue, production costs, and net return, in addition to the return on the invested pound. These indicators will be addressed during the period (2010- 2021).

1-Total revenue:
It is clear from Table (2) that the total revenue of the garlic crop in Egypt ranged between a minimum of about 14.6 thousand pounds/acre in 2012, and a maximum of about 50 thousand pounds/acre in 2021, It is also clear from the general time trend equation for the total revenue per acre of garlic that it took a general increasing trend with a change amounting to about 1.6 thousand pounds/acreWith a statistically significant annual growth rate at a significance level of 0.05, it amounted to about 6.5% of the average total yield per acre of garlic crop, which amounted to about 24.6 thousand pounds/acre during the study period.

2-Total production costs:
The total production costs per acre ranged between a minimum of about 5.2 thousand pounds/acre in 2010, and a maximum of about 13.8 thousand pounds/acre in 2021. It is clear from the general time trend equation for the total production costs per acre of the garlic crop that it took a general increasing trend with a change in It

amounted to about 870 pounds/acre during the study period, with a statistically significant growth rate at a significance level of 0.01, amounting to about 10% of the annual average of the total production costs of garlic, which amounted to about 8.7 thousand pounds/acre during the study period.

3-Net return per acre:
It is one of the comprehensive measures of economic efficiency and is calculated by subtracting the total production costs of a production unit from the total value of production (total revenue) for the same production unit. It means the share of the management and the employer in the income, and it is the final criterion for the efficiency of farm work, and it is useful in knowing the difference in returns and proceeds from Crops
Table (2) shows that the net return per acre of garlic crop ranged between a minimum of about 8.7 thousand pounds/acre in 2012, and a maximum of about 36.2 thousand pounds/acre in 2021, with an average of about 15.87 thousand pounds/acre during the study period, with an estimate The general time trend equation for the net yield per acre of garlic did not prove significant.

4-The cost of producing a ton:
The cost of producing a ton of garlic ranged between a minimum of about 539 pounds/ton in 2010, and a maximum of about 1.4 thousand pounds/ton in 2021. By estimating the general time trend equation for the cost of producing a ton of garlic, it was found that it increased by an annual change amounting to about 94.84 pounds/acre, with a statistically significant annual growth rate at a significance level of 0.01, amounting to about 10.2% of the average cost of producing a ton per acre of garlic crop, which amounted to about 930 pounds/acre during the study period.

5- Net return per ton:
The average net return of a ton of garlic during the study period was about 1.7 thousand pounds/ton, with a minimum of about 904 pounds/ton in 2012, and a maximum of about 3.6 thousand pounds/ton in 2021, and by estimating the general time trend equation for the net return of a ton of garlic. Garlic did not prove its significance.

6-Return on the invested pound:
This measure is useful in identifying the return on the pound spentin the production process, and is calculated by dividing the net return from the product by the total production costs necessary to complete the production process, as the higher the value of this measure, the more it indicates an increase in the profitability of the pound spent in the production process, and the availability of economic efficiency. In production, it was found that the average return on the invested pound of garlic during the study period amounted to about 1.93 pounds, with a minimum of about 1.21 pounds in 2020, and a maximum of about 4.22 pounds in 2010.

Table (2): The most important economic indicators of the garlic crop in Egypt in pounds during the period (2010-2021)

the years	total revenue	total production costs	Net return per acre	The cost of producing a ton	net yield per ton	Return on invested pounds
2010	27009	5170	21839	539	2277	4.22
2011	21247	5665	15582	599	1638	2.75
2012	14616	5960	8656	622	904	1.45
2013	15197	5793	9404	588	954	1.62
2014	16425	6054	10371	642	1100	1.71
2015	16438	6122	10316	663	1118	1.69
2016	24461	8603	15858	981	1808	1.84
2017	27662	10823	16839	1171	1822	1.56
2018	25229	11021	14208	1289	1662	1.29
2019	27669	12303	15366	1314	1642	1.25
2020	28848	13077	15771	1369	1651	1.21
2021	50036	13806	36230	1381	3624	2.62
Average	24570	8700	15870	930	1683	1.93
growth rate%	6.5*	10**	4.8	10.2**	4.9	

Source: Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Central Administration for Agricultural Economy - **Bulletin of Winter Costs and Net Return Statistics, Cairo**, various issues

Fourth: Studying the economic relations between each of the net yield per feddan, farm prices and total costs of the garliccrop during the period (2010-2021):

The net yield per feddan is one of the important determining factors for making production decisions at the farm level, and therefore it is an important indicator for motivating farmers towards expansion or contraction in the cultivation of different crops. From the point of view of the farmer, the net return per feddan depends on farm and secondary prices, and on the prices of agricultural inputs and production costs per feddan at the market price. Accordingly, the impact of the farm price and production costs on the net yield per acre of the garlic crop can be shown by analyzing the Multiple regression analysis according to market prices[4]. Table (3) shows the regression relationship between each of the farm prices per ton of garlic crop, the total costs in pounds, and the net per acre return in pounds for the garlic crop during the period (2010-2021). The results obtained from the equation showed that there is a direct relationship between farm prices and the net acre return, and indicated The values of the regression coefficients indicated that increasing farm prices by one pound leads to an increase in the net per-acre yield of the crop by approximately 10.67 pounds. The statistical significance of the estimated rates of increase was confirmed, while the results obtained from the same equation indicated the existence of an inverse relationship between the total costs and the net per-acre yield. The values indicated The regression coefficient indicated that a decrease in total costs by one pound leads to an increase in the net per-acre yield of the crop by approximately 1.33 pounds. The statistical significance was confirmed, and the value of the coefficient of determination indicated that 97% of the changes in the net per-acre yield are attributable to changes related to farm prices and the total costs of the garlic crop.

Table (3): Estimating the parameters of the multiple regressive relationship between net yield per feddan, farm prices and total costs of the garlic crop during the period (2010-2021).

The equation	R^{-2}	F
$\hat{Y}_h = 382.86 + 10.67 X_{1h} - 1.33 X_{2h}$ $(13.33)^{**} \quad (-5.61)^{**}$	0.959	128.45**

Where:
Y^h : Net per acre yield of garlic crop (pounds/acre)
X1h :   Farm prices for garlic crop (pounds/ton)
X2h : Total costs of garlic crop (pounds/acre)
H   : Time   , (**): Significant at the 0.01 level
Source : Calculated from Table (2)

Fifth: Indicators of marketing efficiency of garlic crop:
1-The evolution of the marketing prices of the garlic crop in Egypt:
A- Development of the agricultural price (product price) of the garlic crop:
Reviewing the data in Table (4) shows that the agricultural price of the garlic crop ranged between a minimum of about 1.5 thousand pounds / ton in 2012, and a maximum of about 5 thousand pounds / ton during the year 2021, and by estimating the general time trend equation it was found that it took a general increasing trend of Annual change amounted to about 182 pounds/ton, with a statistically significant annual growth rate at a significance level of 0.05, amounting to about 7% annually of the average farm price of garlic, which amounted to about 2.6 thousand pounds/ton during the study period.

B- The development of the wholesale price of the garlic crop:
By studying the development of the wholesale price per ton of garlic crop, it was found that it ranged between a minimum of about 8.2 thousand pounds per ton in 2010, and a maximum of about 24.7 thousand pounds per ton in 2017. By estimating the general time trend equation for wholesale prices per ton of garlic crop, it was found that it took a general trend. Increasing by an annual change estimated at about 1.3 thousand pounds, and with a statistically significant annual growth rate at a significance level of 0.01, amounting to about 9.2% of the annual average wholesale price of garlic, which amounted to about 14.5 thousand pounds during the study period.

C- Development of the retail price (consumer price) of the garlic crop:
By studying the evolution of the retail price per ton of garlic crop, it was found from Table (4) that it ranged between a minimum of about 9.3 thousand pounds per ton in 2013, and a maximum of about 31 thousand pounds per ton in 2021, and by estimating the general time trend equation for retail prices per ton of garlic crop It was found that it took a general increasing trend with an annual change amounting to about 1.5 thousand pounds, and a statistically significant annual growth rate at a significant level of 0.01 that amounted to about 9.2% of the general average of about 16.4 thousand pounds during the study period.

2-Distribution of consumer pounds to marketing bodies for the garlic crop in Egypt:

The distribution of the consumer pound means the distribution of the value of one pound of the final consumer price paid by that consumer, and how it is distributed to the marketing bodies, which include the producer (farmer), the wholesaler, and the retailer, in addition to the marketing functions (collection, sorting, transportation, etc.). ..) And the share of each of them from this pound, as expressed by the absolute price difference of the marketing level divided by the retail price of the commodity[5].

A- Product share: Table (4) shows that the average share of the product in the consumer's pound amounted to about 16.16% during the period (2010-2021), and the minimum amounted to about 10% in 2014, and it reached a maximum of about 28.31% in 2010.

Table (4): Marketing prices and distribution of consumer pounds for the garlic crop in Egypt during the period (2010 – 2021)

the year	Marketing prices (pounds/ton)			Distributing consumer pounds to marketing bodies (%)			
	Product price	Wholesale price	retail price	Product share	Wholesale share	Retail share	The share of intermediaries
2010	2789	8150	9850	28.31	54.43	17.26	71.69
2011	2210	10080	11270	19.61	69.83	10.56	80.39
2012	1452	9170	10770	13.48	71.66	14.86	86.52
2013	1515	8260	9270	16.34	72.76	10.90	83.66
2014	1709	15180	16930	10.09	79.57	10.34	89.91
2015	1779	10500	11550	15.40	75.51	9.09	84.60
2016	2785	12990	14310	19.46	71.31	9.22	80.54
2017	2962	24700	26000	11.39	83.61	5.00	88.61
2018	2979	13460	14760	20.18	71.01	8.81	79.82
2019	3059	15320	16620	18.41	73.77	7.82	81.59
2020	3062	22870	24170	12.67	81.95	5.38	87.33
2021	4958	22750	30950	16.02	57.49	26.49	83.98
Average	2605	14453	16371	16.16	71.39	10.19	81.58
growth rate%	7.0*	9.2**	9.2**	-	-	-	-

-Product share = (product price ÷ retail price) x 100
- Wholesaler share = ((wholesale price - product price) ÷ retail price) x 100
-Retailer share = ((retail price - wholesale price) ÷ retail price) x 100
-The share of intermediaries = (the share of the wholesaler + the share of the retailer)
Source: Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Central Administration for Agricultural Economy **- Agricultural Price Statistics Bulletins**, Cairo, various issues.
-The Central Agency for Public Mobilization and Statistics **- Annual Bulletin of Prices of Food Materials, Products, and Services (Producer/Wholesale/Consumer)**, Cairo, various issues.

B- The wholesaler's share: It is clear from the data in Table (4) that the average wholesaler's share of the consumer's pound was about 71.39% during the study period, its minimum was about 54.43% in 2010, and its maximum was about 83.61% in 2017.
C- Retailer's share: Table (4) shows that it ranged between a minimum of about 5% in 2017, and a maximum of about 26.5% in 2021, and the general average of the retailer's share of the consumer pound was about 10.19%.
D- Share of intermediaries (wholesaler and retailer together): Table (4) shows that it ranged between a minimum of about 71.69% in 2010, and a maximum of about 89.91% in 2014, while the general average of the share of intermediaries in the consumer's pound was about 83% during the study period**.**
From the foregoing, it is clear that the increase in the consumer price is a result of the increase in marketing margins and the multiplicity of intermediaries between the farmer and the consumer.

3-Marketing margins for the garlic crop in Egypt during the period (2010-2021):
The marketing margin or price spread is defined as the difference between the price paid by the consumer and the price received by the producer for equivalent physical quantities, or in other words the difference between the retail price and the agricultural price. The marketing margin is calculated in absolute or relative form, where the absolute form expresses marketing margins in monetary units, while The relative picture of the absolute marketing margin relative to the retail price. Therefore, evaluating marketing margins is considered one of the most widespread methods for evaluating market performance and efficiency, as it includes the costs of the necessary services depending on the type and nature of the commodity and the transfer of the commodity from the producer to the consumer, as well as the profits obtained by the intermediaries[6].

A- The marketing margin between the producer and wholesaler stages: Reviewing the data in Table (5) shows that the absolute marketing margin between the producer and the wholesaler ranged between a minimum of about 5.4 thousand pounds/ton in 2010, and a maximum of about 21.7 thousand pounds in 2017, and by estimating the general time trend equation for the absolute marketing margin between the producer and the wholesaler. The total showed that it took a general increasing trend with an annual change amounting to about 1.2 thousand pounds, and a statistically significant annual growth rate at a significance level of 0.01, amounting to about 10% of the general average of about 11.8 thousand pounds during the study period. It was also found that the relative marketing margin between the producer and the wholesaler reached a minimum of about 54.4% in 2010, while it reached a maximum of about 83.6% in 2017, with an annual average of about 71.4% during the study period.

Table (5): Absolute and relative marketing margins and marketing efficiency of the garlic crop in Egypt during the period (2010 – 2021)

the years	Absolute and relative marketing margins						(7)Product incentive %	(8)Marketing efficiency %
	wholesale-producer		Retail -wholesale		Retail-product			
	Absolute(1)(pounds/ton)	relative% (2)	absolute(3)(pounds/ton)	relative %(4)	absolute(5)(pounds/ton)	relative %(6)		
2010	5361	54.4	1700	17.3	7061	71.7	81.65	7.09
2011	7870	69.8	1190	10.6	9060	80.4	74.14	6.20
2012	7718	71.7	1600	14.9	9318	86.5	62.23	6.26
2013	6745	72.8	1010	10.9	7755	83.7	62.95	7.05
2014	13471	79.6	1750	10.3	15221	89.9	64.35	4.05
2015	8721	75.5	1050	9.1	9771	84.6	62.83	6.35
2016	10205	71.3	1320	9.2	11525	80.5	64.93	7.84
2017	21738	83.6	1300	5.0	23038	88.6	61.53	4.84
2018	10481	71.0	1300	8.8	11781	79.8	55.78	9.86
2019	12261	73.8	1300	7.8	13561	81.6	53.67	8.83
2020	19808	82.0	1300	5.4	21108	87.3	53.93	6.09
2021	17792	57.5	8200	26.5	25992	84.0	73.10	5.05
Average	11848	71.4*	1918	10.2*	13766	*83.1	63.77*	6.44*
growth rate%	10**		6		9.8**			

The marketing margins are as follows:
1-Wholesale-Product (Absolute) = (Wholesale Price – Product Price)
2-Wholesale-product (relative) = (wholesale price - product price) / retail price * 100
3- retail-wholesale(absolute)=(retail price-wholesale price)
4- Retail-Wholesale(relative)=(Retail Price-Wholesale Price)/Retail Price *100
5- retail-product(absolute)=(retail price-product price)
6- Retail-Product(Relative)=(RetailPrice-ProductPrice)/RetailPrice*100
7-Producer incentive = net return per ton / selling price per ton at the farm gate
8- Marketing efficiency = 100 – {[absolute marketing margin /(absolute marketing margin + production costs)] x 100 }
-Absolute marketing margin = retail price - product price .
-*Geometric mean.
Source: Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Central Administration for Agricultural Economy - **Agricultural Price Statistics Bulletins**, Cairo, various issues.
-The Central Agency for Public Mobilization and Statistics - **Annual Bulletin of Prices of Food Materials, Products, and Services (Producer/Wholesale/Consumer)**, Cairo, various issues**.**

B- The marketing margin between the wholesaler and retailer stages:
It was found that the absolute marketing margin between the wholesaler and the retailer ranged between a minimum of about one thousand pounds/ton in 2013, and a maximum of about 8.2 thousand pounds in 2021, with an annual average of about 1.92 thousand pounds/ton during the study period. By estimating the general time trend equation for the absolute marketing margin between the wholesaler and the retailer, the significance of the function was not proven. It also appears that the relative marketing margin between the wholesaler and

the retailer reached a minimum of about 5% in 2017, while it reached a maximum of about 26.5% in 2021, with an annual average of about 10.2% during the study period.

C-The marketing margin between the producer and retailer stages:
Reviewing the data in Table (5) shows that the absolute marketing margin between the producer and the retailer increased from about 7.1 thousand pounds/ton in 2010 to about 26 thousand pounds in 2021, and by estimating the general time trend equation for the absolute marketing margin between the producer and the retailer, it turns out that it took a general trend. Increasing by an annual change amounting to about 1.3 thousand pounds, and with a statistically significant annual growth rate at a significance level of 0.01, amounting to about 9.8% of the general average of about 13.8 thousand pounds during the study period. It is also clear that the relative marketing margin between the producer and the retailer reached a minimum of about 71.7% in 2010, while it reached a maximum of about 89.9% in 2014, with an annual average of about 81.% during the study period.

4-Marketing efficiency of garlic crop in Egypt:
Marketing efficiency refers to maximizing the ratio between inputs and outputs through the marketing system. That is, optimal marketing efficiency expresses maximizing the ratio between the output of marketing activity, represented by satisfying consumers' desires, and the total production elements used in the marketing process. High marketing efficiency leads to reducing marketing costs and raising the price of the product and lower the consumer price[7].

A- Development of marketing efficiency:
Table (5) shows that marketing efficiency fluctuated between a minimum of about 4.05% in 2014 and a maximum of about 9.86% in 2018, with an average of about 6.44% during the period (2010-2021). From these estimated results for marketing efficiency, it turned out to be low, less than 50%. This means that the marketing costs of the garlic crop in Egypt exceed its production costs during the study period, and this reflects the high profits obtained by intermediaries during the various marketing stages.

B-Product Incentive:
The producer incentive is equal to the profit per selling unit (per ton) divided by the selling price of the selling unit (per ton) at the farm gate, multiplied by 100. The producer incentive represents the percentage of his share in the selling price per unit of his production, given that the farm gate is the first marketing link, because measuring this relative margin It allows it to be compared with the shares of the next stages of production in the market, and then contributes to judging the extent to which a climate of fairness, competition, and flexibility in the transmission of market incentives is available, on the basis that consumer demand is the primary demand, and that the demand for output is a demand derived from it, and since the measure is relative for this, it is suitable. Also to compare different activities and different industries in terms of efficiency. It is clear from Table (5) that the average garlic producer incentive amounted to about 63.77% during the study period, and the minimum amounted to approximately 53.67% in 2019, while the maximum amounted to approximately 81.65% in 2010.

VI.   Recommendations :

1- Educating farmers on how to perform various marketing operations themselves through agricultural marketing guidance to increase the share of the product and reduce the role of intermediaries.
2-Establishing a market in every governorate and center where farmers can display their products and avoid intermediaries.
3-Importing new varieties of garlic with the aim of eliminating soil diseases widespread in garlic and increasing acreage productivity.
4-Using mechanization in agriculture and harvesting, which reduces costs and crop losses during harvest.

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