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تحليل الطلب على بعض منتجات الحبوب المصنعة في مصر

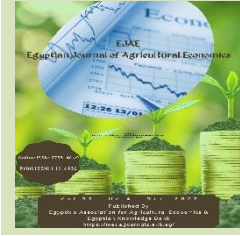
هناء محمد عبد العظيم أبوشوك¹ أ.د/ محمد حمدي سالم¹ أ.د/ محمد سيد شحاتة¹ د/ إيمان السيد يوسف²¹ قسم الاقتصاد الزراعي - كلية الزراعة - جامعة عين شمس² قسم الصناعات الغذائية - كلية الزراعة - جامعة عين شمس

بيانات البحث	المستخلص
استلام 2023 /7/3 قبول 2023 /8 / 16	تعتبر الحبوب ومنتجاتها جزء مهم في نظامنا الغذائي وذلك لقيمتها الغذائية العالية، حيث تكون مصدراً أساسياً للطاقة، وللألياف والعناصر الغذائية المهمة، والفيتامينات مثل مجموعة فيتامين ب. وبلغ حجم إنتاج الحبوب العالمي 2,8 مليار طن عام (2021/2020)، مقابل 2,7 مليار طن عام (2020/2019) بنسبة زيادة بلغت 2.7%، وبلغ متوسط نصيب الفرد من الحبوب 149.6 كجم عام (2021/2020) مقابل 145.6 كجم عام (2020/2019) بنسبة زيادة بلغت 2.7%. وأكثر أنواع الحبوب استهلاكاً هي القمح والذرة والأرز، ويعاني المقتصد المصري في توفير العملات الأجنبية اللازمة لتوفير الاحتياجات المتزايدة المطلوبة منها، نتيجة تزايد الأعداد السكانية، هذا بالإضافة إلى التغيرات التي تشهدها أسواق تلك المنتجات من مشاكل نتيجة للظروف العالمية التي يمر بها العالم في السنوات الأخيرة. ويستهدف البحث دراسة الطلب على منتجات الحبوب والخبز والزيتون في مصر، وأوضحت النتائج تأثير إجمالي الإنفاق السنوي للفرد على السلع الغذائية على الإنفاق الفردي للحبوب والخبز في الحضر والريف، حيث ثبتت المعنوية الإحصائية للتقديرات المتحصل عليها، كما يشير معامل التحديد إلى أن حوالي 96%، 40% من التغير في الإنفاق الفردي على الحبوب والخبز ترجع إلى التغيرات في متوسط إجمالي الإنفاق السنوي للفرد في الريف والحضر على الترتيب. كما ثبتت معنوية قيمة (F) المحسوبة وهو ما يعنى ملائمة النموذج الرياضي للصورة الخطية لدراسة الدالة الإنفاقية على الحبوب والخبز، وبتقدير المرونة الإنفاقية للخبز والحبوب في الحضر والريف، تبين أن المرونة المقدره لكل من الحضر والريف بلغت نحو 0.38، 0.15 على الترتيب، وهو ما يعنى ضرورة هذه السلعة وأهميتها بالنسبة للنمط الغذائي المصري سواء بالحضر أو الريف وكذلك بالنسبة لكافة الفئات الإنفاقية سواء المنخفضة منها أو المرتفعة.
الكلمات المفتاحية: الحبوب، تصنيع الحبوب، الطلب، المرونة الإنفاقية، الدالة الإنفاقية	

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An Analysis of the Demand for Select Grain Products in Egypt

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ABSTRACT

Cereals and their products are an important part of our diet, due to their high nutritional value. The volume of global cereal production amounted to 2.8 billion tons in the year 2020/2021, and the average per capita share of cereals reached 149.6 kg in the year 2020/2021, compared to 145.6 kg in 2019/2020, an increase of 2.7%. The Egyptian economy suffers from the provision of foreign currencies necessary to meet the increasing needs required of it, because of the problems of the current global situation. The research aims to study the demand for grain, bread, and oil products in Egypt. And bread in urban and rural areas, where the statistical significance of the estimates obtained was proven, and the coefficient of determination indicates that about 40% and 96% of the change in individual spending on grains and bread is due to changes in the average annual total expenditure per capita in rural and urban areas, respectively. The value of (F) calculated was significant, which means the suitability of the mathematical model for the linear image to study the spending function on grains and bread, and by estimating the spending flexibility of bread and grains in urban and rural areas, it was found that the estimated elasticity for both urban and rural areas amounted to about 0.38 and 0.15, respectively, which means the necessity of this commodity in relation to the Egyptian diet, whether in urban or rural areas, as well as in relation to all spending groups.

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Introduction

Cereals and their products are an integral part of our food system due to their high nutritional value, as they are an essential source of energy and are rich in carbohydrates. They are also considered a source of fiber and important nutrients, such as potassium, phosphorus, magnesium, and zinc, as well as vitamins like the B group, antioxidants, and plant compounds. The volume of cereal production globally reached 2.8 billion tons in fiscal year (FY) 2020–2021, marking an increase of 2.7% from 2.7 billion tons in FY19–20. Meanwhile, the average per capita share of cereals amounted to 149.6 kilograms (kg) in FY20/21, higher by 2.7% than 145.6 kg in the previous FY. The most consumed kinds of cereals are wheat, maize (corn), and rice, which represent the largest proportion of the global supply of food energy. Cereals of all types constitute a pivotal role in food manufacturing due to the multiplicity of uses of cereals as raw materials across several industries, which most importantly include flour production. This is in addition to the production of vegetable oil from some types of these grains, as nutritional oils are the third crucial component of human nutrition besides sugars and proteins.

The consumption pattern of grain products in Egypt is represented by the intake of what is manufactured from those grains, especially bread from wheat and the vegetable oils extracted from them. There are many types of vegetable oils extracted from grains, the most significant of which are corn, soybeans, and sunflower. Egyptian consumption of cereals, bread, and vegetable oils is surging. There is a nutritional gap for these products, ranging between 40% and 45% for wheat and around 75% to 80% for vegetable oils. This leads to reliance on imports to meet the growing needs due to population growth and other factors.

Research Problem

Cereals, bread, and vegetable oils constitute a vital element in the food systems of the Egyptian family. The Egyptian economizer suffers in securing the required foreign currencies to meet the increasing needs because of the hiking population numbers. This is in addition to the changes that the markets for these products are experiencing because of the Russian-Ukrainian war in recent years, which make it difficult to cope with these demands. The problem of the research is to pinpoint the extent to which there is a difference between the consumption pattern of these products in rural and urban areas across Egypt, as well as the scope to which it is affected by some factors, such as income or educational status.

Research Aim

The research aims to tackle the demand for grain products, bread, and oils in Egypt, in addition to determining whether there is a difference in the quantities consumed in urban and rural areas and other factors. This helps decision-makers outline future and expectations for consumer demand for these food products, given their importance in the Egyptian food system and their impact on the agricultural and trade balance.

This aim is achieved by answering the following questions:

- What is the Evolution of National Consumption of Wheat and Maize in Egypt.
- Is there a difference between the expenditure and elasticity functions on grain, wheat, and oils in rural and urban areas.

- Is there a fair distribution of the actual consumption of grain, bread, and oils in urban and rural areas in Egypt.

Research Methodology and Sources of Data

The research is based on the use of many descriptive, quantitative, and econometric statistical methods, where the Ordinary Least Squares (OLS) technique was published to estimate regression models. Dummy variables are also used to study the difference between rural and urban areas and the effect of some descriptive variables.

The research data is mainly based on household budget research (2019-2020). It also uses published and unpublished secondary data drawn from various agencies, such as the Ministry of Agriculture and Land Reclamation and the Central Agency for Public Mobilization and Statistics (CAPMAS) Household Budget Surveys, Statistical Yearbook, as well as some related studies and research.

Research Limitation:

The research relies on data from the Central Agency for Public Mobilization and Statistics (CAPMAS) (family budget research), due to the difficulty of field data collection of total income.

Only two types of grain products are analyzed, which are (cereals, bread) and (oils, fats), due to the difficulty of analyzing all types of grain products.

Results

1: Evolution of National Consumption of Wheat and Maize in Egypt, 2007-2020:

A. Growth of wheat crops available for consumption in Egypt:

After reviewing the development of the quantities available for consumption of the wheat crop during the study period, it is found that it ranges from a minimum of about 11,450 tons in 2009 to a maximum of 24,734 tons in 2017, with an average of 17,917.1 tons.

Based on estimating the general temporal trend of wheat crop consumption, it is clear that it is increasing by an amount of about 698,273 tons, with a statistically significant annual growth rate of around 3.89%. The coefficient of determination shows that about 72% of the changes in the availability for consumption are due to factors whose effects reflect the element of time.

B. Trends in remaining from Wheat Production in Egypt: remaining wheat production

By reviewing the development of the remaining from the wheat crop during the study period, it is noticed that it ranged from a minimum of nearly 10,828 tons in 2009 to a maximum of 19,129 tons in 2017, with an average of 15,105.9 tons.

By estimating the general temporal trend of the remaining from the wheat crop, it turns out that it increased by about 496,899 tons, with a statistically significant annual growth rate of nearly 3.28%. The coefficient of determination shows that around 63% of the changes in the residual are due to factors whose effects reflect the element of time.

C. Development of net food from the wheat crop in Egypt:

By reviewing the evolution of net food from the wheat crop during the study period, it is ascertained that it ranged from a minimum of around 8,795 tons in 2009 to a maximum of 24,734 tons in 2017, with an average of 12,357.29 tons.

According to an estimation of the general temporal trend of the net food of the wheat crop, it was found that it increased by about 403,982 tons, with a statistically significant annual growth rate of around 3.26%. The coefficient of determination shows that nearly 0.665% of changes in pure food are due to factors whose effects reflect the element of time.

D. Growth of the annual per capita wheat crop in Egypt:

By reviewing the development of the annual per capita share of the wheat crop during the study period, it is clear that it ranged from a minimum of about 121.7 kilograms in 2012 to a maximum of 182.7 kilograms in 2008, with an average of 146 kilograms.

By estimating the general temporal trend of the annual per capita share of the wheat crop, it is found that the statistical significance of any of the mathematical models -used to evaluate the temporal trend- is not proven, which means that there was no change in the average per capita share of the wheat crop during the study period.

Table 1: Development of wheat crop production indicators during 2007-2020.

Years	Available for consumption	remaining	Net food	Annual average per capita
2007	13790	13029	10582	132.9
2008	14546	13743	11162	182.7
2009	11450	10828	8795	140.9
2010	17685	15522	12607	160.1
2011	17153	15056	12228	152.1
2012	15781	11447	10109	121.7
2013	16678	13126	10706	126.5
2014	17825	14219	11597	133.6
2015	19563	15390	12552	141.1
2016	19592	15380	12544	137.8
2017	24734	19129	15602	163.9
2018	19714	17346	14154	145.7
2019	20847	18149	14784	149.5
2020	21482	19119	15580	154.9
Average	17917.1	15105.9	12357.3	145.957
Maximum	24734	19129	15602	182.7
Minimum	11450	10828	8795	121.7

Source: Gathered and calculated data from the Ministry of Agriculture and Land Reclamation, Economic Agricultural Affairs Sector, Bulletin of Summer, and Nile Crops Statistics (Part II), Various Issues.

Table 2: Linear Trend Equations for Selected Variables of Wheat Production, 2007-2020

Data	Equation	Growth/dec line	Change	Coefficient of determination	Calculated F value
Available for consumption	$Y = 12680.099 + 698.273t$ (11.929)* (5.593)*	3.897	698.273	.723	31.286*
Residual	$Y = 11379.187 + 496.899t$ (12.102)* (4.500)*	3.289	496.899	.628	20.246*
Net food	$Y = 9327.418 + 403.982t$ (13.241)* (4.883)*	3.269	403.982	.665	23.846*
Annual average per capita	$Y = 146.214 - 0.34t$ (15.369)* (-.031)	-	-		-

\hat{Y} reflects the estimated value of the indicated dependent variable on annual basis

t represents the time component in years.

* Significant at the significance level 0.01.

** Significant at the level of significance 0.05.

Source: Results of the statistical analysis of Table 1

A. Development of maize crop available for consumption in Egypt:

By reviewing the evolution of the maize crop available for consumption during the study period, it appears that it ranged from a minimum of around 11,392 tons in 2007 to a maximum of 16,988 tons in 2018, with an average of 14,094.7143.

By estimating the general temporal trend of the maize crop available for consumption, it is found that it is increasing by about 426,659 tons, with a statistically significant annual growth rate of 3.027%. The coefficient of determination shows that nearly 0.824% of the changes in the availability for consumption are due to factors whose effects reflect the element of time.

B. Evolution of remaining from the maize crop in Egypt:

By reviewing the development of the remaining from the maize crop during the study period, it is clear that it ranged from a minimum of about 2,715 tons in 2020 to a maximum of 8,782 tons in 2016, marking an average of 5,877.21429 tons.

By estimating the general temporal trend of the remaining volume of the maize crop, it is found that the statistical significance of any of the mathematical models is not proven, which indicates that there was no change in the residual from the maize crop during the study period.

C. Growth of net food from the maize crop in Egypt:

By studying the development of net food from the maize crop during the study period, it was found that it ranged from a minimum of about 2,601 tons in 2020 to a maximum of 8,413 tons in 2016, with an average of 5,630.42857 tons.

By estimating the general temporal trend of the net food from the maize crop, it is clear that the statistical significance of any of the mathematical models is not proven, which means that there was no change in the net food from the maize crop during the study period.

D. Evolution of the annual per capita share of the maize crop in Egypt:
 Reviewing the development of the annual per capita share of the maize crop during the study period indicated that it ranged from a minimum of nearly 25.9 kilograms in 2020 to a maximum of 71.7 kilograms in 2010, with an average of 53.7 kilograms.

Estimating the general time trend of the annual per capita share of the maize crop shows that it decreased by a change amounting to around 3,624 tons, with a statistically significant annual decline rate of about 6.75%.. The coefficient of determination shows that about 90% of the changes in the annual per capita share are due to factors whose effects reflect the element of time.

Table 3: Development of maize crop production indicators during (2007-2020).

Years	Available for consumption	remaining	Net food	Annual average per capita
2007	11392	5104	4890	71.7
2008	12000	5694	5455	67.5
2009	11967	5606	5371	66.3
2010	12663	5731	5490	71.7
2011	14074	7295	6989	67.3
2012	13381	7145	6845	60.9
2013	13925	7086	6788	65.4
2014	12313	6029	5776	58.1
2015	14877	8650	8287	48.5
2016	13909	8782	8413	39.9
2017	16621	5185	4967	37.1
2018	16988	3639	3486	35.9
2019	16264	3620	3468	35.1
2020	16952	2715	2601	25.9
Average	14094.7	5877.21	5630.43	53.66
Maximum	16988	8782	8413	71.7
Minimum	11392	2715	2601	25.9

Source: Gathered and calculated data from the Ministry of Agriculture and Land Reclamation, Economic Agricultural Affairs Sector, Bulletin of Summer and Nile Crops Statistics (Part II), Various Issues.

Table 4: General Time Trend Equations for Selected Variables of Maize Production, 2007-2020

Data	Equation	Growth/ decline	Change	Coefficient of determinati on	Calculat ed F value
Available for consumpti on	$Y = 10894.769 + 426.659t$ (22.488)* (7.498)*	3.027	426.659	.824	56.227
Residual	Statistical significance was not confirmed for any of the mathematical images used	-	-	-	-
Net food	Statistical significance was not confirmed for any of the mathematical images used	-	-	-	-
Annual average per capita	$Y = 80.847 - 3.624t$ (27.293)* (-10.418)*	-6.753	-3.624	.900	108.54

Y reflects the estimated value of the indicated dependent variable on annual basis.

t represents the time component in years.

* Significant at the significance level 0.01.

** Significant at the level of significance 0.05.

Source: Results of the statistical analysis of Table 3

2. Statistical Estimation of Expenditure Elasticities and Functions for Cereals, Bread, and Oils, Fats in Urban and Rural Egypt (2019-2020)

To estimate the expenditure function on cereals, bread, oils, and fats in urban and rural Egypt during the 2019-2020 period, we use the average annual per capita expenditure on food commodities as an independent variable. Meanwhile, the average annual per capita expenditure on grains, bread, oils, and fats in urban or rural areas is deployed as a dependent variable. The most suitable mathematical image for estimation is displayed from the different mathematical photos that are used for estimation.

- Expenditure elasticity and function of cereals and bread in urban and rural areas (2019-2020):

The results shown in Table 5 highlight the effect of the total annual per capita expenditure on food commodities on cereals and bread in urban and rural areas, where the statistical significance of the obtained estimates was proven. This came after studying the relationship between the average annual per capita total expenditure on food commodities and the average annual per capita expenditure on

cereals and bread in urban and rural areas using the linear image in the study of the family budget for 2019-2020. The coefficient of determination also indicates that about 40% and 96% of the change in per capita expenditure on grains and bread is due to changes in the average annual per capita expenditure in rural and urban areas, respectively. The calculated (F) value was also found to be significant, which means that the mathematical model is suitable for the linear image to study the expenditure function on grains and bread.

By evaluating the expenditure elasticity of cereals and bread in urban and rural areas, it appeared that the estimated elasticity for both urban and rural areas reached about 0.38 and 0.15, respectively. This proves the necessity and importance of this commodity for the dietary pattern, whether urban or rural, as well as for all expenditure groups, whether low or high.

➤ Expenditure elasticity and function of oils and fats in urban and rural areas (2019-2020):

The results shown in Table 5 reflect how the total annual per capita expenditure on food commodities impacts the individual expenditure of oils and fats in urban and rural areas, where the statistical significance of the obtained estimates was proven. This conclusion is based on the relationship between the average annual per capita total expenditure on food commodities and the average annual per capita expenditure on oils and fats in urban and rural areas using the linear image in the study of the family budget for 2019-2020. The coefficient of determination indicates that about 67% and 27% of the change in individual expenditure on oils and fats is due to changes in annual total per capita in rural and urban areas, respectively. The calculated value of (F) was found to be significant, which means that the mathematical model is suitable for the linear image to study the expenditure function on oils and fats.

By estimating the expenditure flexibility of oils and fats, it was found that the estimated elasticity for both urban and rural areas was about 0.16 and 0.19, respectively. This underlines the necessity of the commodity and its importance in relation to the food system, whether in urban or rural areas, as well as for all expenditure groups, whether low or high.

➤ Study for the zonal effect of the expenditure functions on cereals, bread, oils, and fats in urban and rural Egypt (2019-2020):

To study the zonal effect on the expenditure functions of cereals, bread, oils, and fats in urban and rural Egypt, the transitional variables method is deployed to estimate non-quantitative variables.

This method relies on the usage of the two values (0 and 1), where the value (1) is used in the case of the presence of the characteristic, and the value (0) is used in the absence of the characteristic.

The number of transitional variables is equal to the number of variables minus one. Thus, the mathematical form of the estimate will be as follows:

$$Y_i = \alpha + b_1 X_i + b_2 D_i + e_i$$

- Y_i : average annual per capita expenditure on cereals, bread, oils, and fats in urban and rural areas.

- Xi: average annual per capita expenditure on food commodities in urban and rural areas.
 - Di: transitional variable that reflects the zonal effect. It takes the value (1) for urban areas and (0) for rural areas.
 - ei: random error variable.
- Study for the zonal effect of the expenditure functions on cereals and bread in urban and rural Egypt (2019-2020):

An equation of the expenditure function for bread and cereals in urban and rural Egypt (2019-2020) in Table (5) shows that the average annual per capita expenditure on bread and cereals increased at a statistically significant rate of around EGP 0.011 when the total per capita expenditure increased by about EGP 1,000. The equation also indicated that there is no statistically significant effect of urbanization on individual expenditure on grains and bread, which means that there is no difference in individual expenditure on grains and bread in rural areas compared to urban areas. The coefficient of determination indicates that nearly 82% of the change in the average per capita expenditure on bread and cereals is due to changes in the total annual per capita expenditure and the degree of urbanization. The calculated value of (F) was also found to be significant, which means the suitability of the mathematical model used to explain changes or differences in the individual's expenditure on grains and bread.

Using the equation, the expenditure function for rural and urban areas can be estimated as follows:

$Y = 465.0 + 0.011X$ due to the lack of statistical significance of the transitional variable expressing the difference between rural and urban areas.

- The effect of urbanization degree on the expenditure functions of oils and fats:

It is clear from Table 5 that the average annual per capita expenditure on oils and fats increased at a statistically significant rate of about EGP 0.004 when the total per capita expenditure increased by around EGP 1,000. By using the transitional variable, it is also clear that there is a statistically significant effect of urbanization on individual expenditure on oils and fats, in the opposite direction. The coefficient of determination indicates that about 49% of the change in the average per capita expenditure on oils and fats is due to changes in the total annual per capita expenditure and the degree of urbanization. The calculated value of (F) was also found to be significant, which means the suitability of the mathematical model used to explain changes or differences in the individual's expenditure on oils and fats.

Using the equation, it is possible to estimate the expenditure function of oils and fats for both rural and urban areas. The equation in rural areas is as follows: $Y = 369.17 + 0.004 X$

While the estimate of the expenditure function for oils and fats in urban areas is $Y = 304.25 + 0.004 X$. In this regard, the constant part of the transition variable includes the effect of urbanization, which appears in the transition of the entire spending function downward.

Table 5: Statistical estimate of the expenditure functions on grains, bread, oils, and fats in Egypt through a study of expenditure and consumption

N	Dependent variable	Equation	F	R ²
1	Expenditure on cereals and bread in urban areas	Y = 419.64 + 0.013X (24.68) (19.58)**	383.38	0.96
2	Expenditure on oils and fats in urban areas	Y = 310.65 + 0.003X (21.99) (5.85)**	34.25	0.67
3	Expenditure on cereals and bread in rural areas	Y = 559.24 + 0.006X (17.84) (3.36)	11.32	0.40
4	Expenditure on oils and fats in rural areas	Y = 353.89 + 0.005X (10.41) (2.52)**	6.36	0.27
5	Effects of urbanization on cereals and bread	Y = 460.0 - 0.011X -5.87D (20.88) (12.33)** (-0.25)	76.95	0.82
6	Effects of urbanization on oils and fats	Y = 369.17 + 0.004X -64.92D (20.80) (4.97) (-3.50)**	16.49	0.49

Y: Dependent variable is the annual total individual expenditure on grains and oils

X: Independent variable is the total annual expenditure in thousands of pounds on grains and oils

D: Transitional variable that takes the value of (1) in urban areas and (0) in rural areas.

** Significance level at 0.01.

Source: Results of the Income, Expenditure & Consumption surveys, Public Indicators (2019-2020), Household Budget Surveys, Statistical Yearbook,2022.

Table 6: Analysis of Actual Cereal and Bread Expenditure Distribution in Urban Egypt: (2020-2019) Income, Expenditure & Consumption surveys, Household Budget Surveys

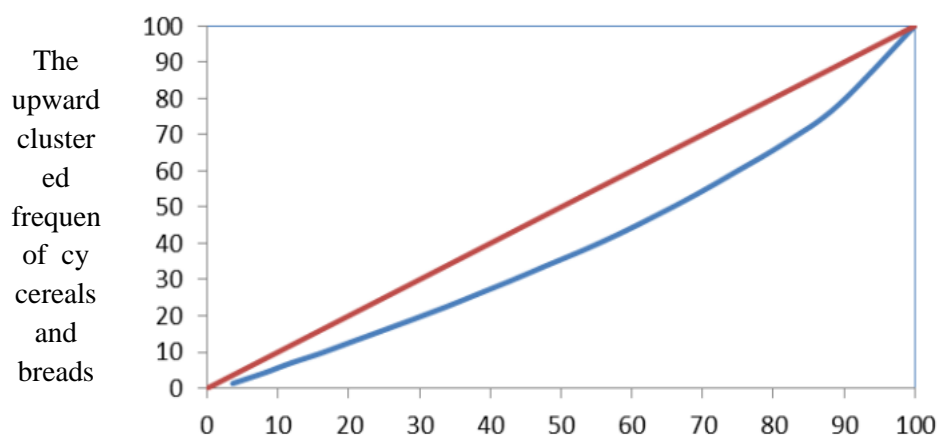
Source: Gathered and calculated data from the Income, Expenditure & Consumption surveys, Public Indicators (2019-2020), Household Budget Surveys, Statistical Yearbook,2022

The results of Table 6, which outlined the statistical estimate of Lorenz curves, showed that the category containing cereals and bread in urban Egypt ranges from 150,000 to 200,000 and includes the maximum total actual expenditure consumption, which amounted to EGP 77,953.5. Meanwhile, the category that includes (10,000–10,000) occupies the lowest limit of the total actual expenditure consumption, reaching EGP 10,329.6. The results of estimating the Gini coefficient, which stood at -5151.439251, showed that this coefficient is

Categories	Cereals and bread	Actual total consumption	Percentage %	Clustered frequency of cereal and bread	pi- pi-1	Total consumption expenditure	Cumulative upward frequency of total consumption expenditure	Li+Li-1
<10.000	465.6	10329.6	3.59	3.59	3.59	1.339	1.339	1.339
10.000-	581.6	12746.3	4.484	8.074	4.484	2.92	4.259	5.598
20.000-	483.3	10801.5	3.726	11.8	7.316	2.705	6.964	12.562
25.000-	569.8	11024.9	4.393	16.193	8.877	2.819	9.783	22.345
30.000-	528.7	11248.2	4.076	20.27	11.392	2.933	12.716	35.061
35.000-	558.9	11662.4	4.309	24.579	13.186	3.065	15.781	50.842
40.000-	578.7	12064.3	4.462	29.04	15.854	3.206	18.986	69.828
45.000-	596	12813.7	4.595	33.636	17.782	3.4	22.386	92.214
50.000-	590.8	13319.5	4.555	38.191	20.409	3.567	25.953	118.166
55.000-	618	13999.1	4.765	42.955	22.546	3.772	29.725	147.891
60.000-	635.5	15040.8	4.9	47.855	25.309	4.074	33.799	181.69
65.000-	668.1	15582.6	5.151	53.006	27.697	4.209	38.007	219.698
70.000-	665.4	16769.6	5.13	58.136	30.439	4.534	42.541	262.239
80.000-	704	19312	5.428	63.564	33.125	5.264	47.805	310.044
90.000-	704.8	20289.3	5.434	68.998	35.873	5.559	53.363	363.407
100.000-	760.4	23776	5.863	74.861	38.988	6.548	59.911	423.319
120.000-	898.8	29194.3	6.93	81.791	42.803	7.992	67.904	491.222
150.000-	964.2	37275.5	7.434	89.225	46.422	10.362	78.266	569.488
200.000+	1397.6	77953.5	10.775	100	53.578	21.734	100	669.488
Total	12970.2	375203.1						
Gini coefficient- = 5151.439251								

fundamentally different from zero, which represents complete distributive justice. Hence, there is a misdistribution of the consumption of cereals and bread based on the family budget research (2019–2020) (Figure 1). Nonetheless, the results show an improvement in the equitable distribution according to the family budget research (2019–2020) at the level of cereals and bread in urban Egypt.

Figure 1: Equitable distribution of the actual expenditure consumption of cereals and bread in urban Egypt based on Household Budget Surveys (2019/2020)



The cumulative upward frequency of total consumption expenditure

Source: Table 6

As for Table 7 results, it showed that the category including cereals and bread in rural Egypt ranges from (150,000-200,000) and have the maximum total actual expenditure consumption, which reached EGP 49,214.6. Meanwhile, the category that includes (10,000 -10,000) marks the lowest limit of the total actual expenditure consumption, amounting to EGP 11,609.1. The results of estimating the Gini coefficient, which hit -5746.661348, indicated that the coefficient is fundamentally different from zero, which represents complete distributive justice. Accordingly, there is a misdistribution of the expenditure consumption of cereals and bread, based on the family budget research (2019/2020) (Figure2.)

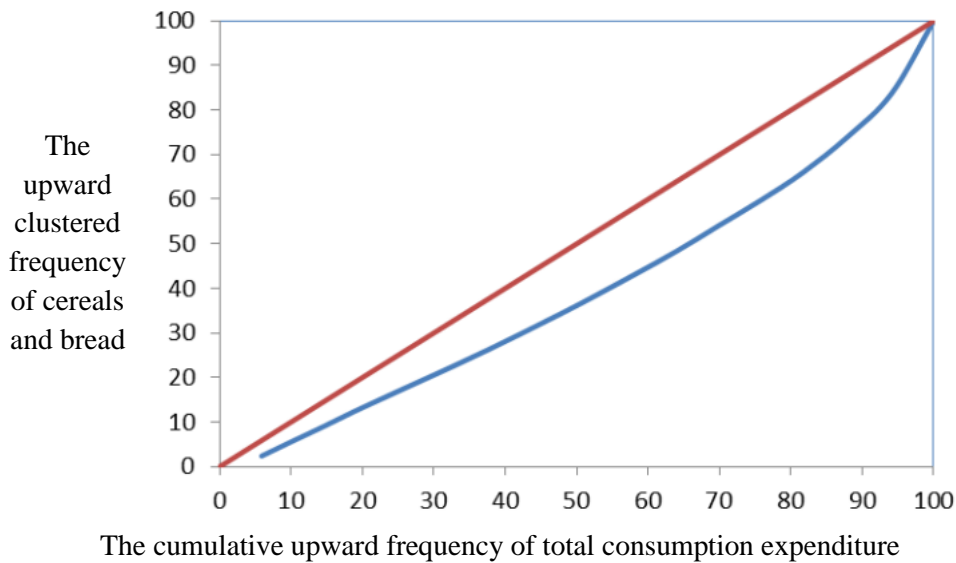
However, the results show an improvement in the equitable of distribution according to the 2019/2020 family budget research on the level of cereals and bread in rural Egypt.

Table 7: Analysis of Actual Expenditure on Cereals and Bread in Rural Egypt, Income, Expenditure & Consumption surveys, Household Budget Surveys (2019-2020)

Categories	Cereals and bread	Actual total consumption	Percentage %	Clustered frequency of cereal and bread	pi- pi-1	Total consumption expenditure	Cumulative upward frequency of total consumption expenditure	Li+Li-1
<10.000	726.2	14767.1	5.865	5.865	5.865	2.368	2.368	2.368
10.000-	534.8	11609.1	4.319	10.185	4.319	3.334	5.701	8.069
20.000-	554.1	10964.2	4.475	14.66	10.341	3.382	9.083	17.152
25.000-	517.5	10750.2	4.18	18.84	8.499	3.292	12.376	29.528
30.000-	562.7	10536.2	4.545	23.385	14.886	3.357	15.732	45.26
35.000-	566	10687.4	4.571	27.956	13.071	3.336	19.069	64.329
40.000-	601.8	10838.6	4.861	32.817	19.746	3.547	22.616	86.945
45.000-	612.5	11313.4	4.947	37.764	18.018	3.719	26.335	113.28
50.000-	622.4	11979.1	5.027	42.791	24.773	3.957	30.292	143.572
55.000-	637.4	12598.5	5.148	47.939	23.166	4.142	34.434	178.006
60.000-	634.4	12971.8	5.124	53.063	29.897	4.302	38.736	216.742
65.000-	657.6	13968.6	5.311	58.374	28.477	4.609	43.345	260.087
70.000-	694.3	15152	5.608	63.982	35.505	4.988	48.333	308.421
80.000-	700.5	16379.6	5.658	69.64	34.135	5.486	53.82	362.241
90.000-	743.4	17531.4	6.004	75.644	41.509	5.803	59.622	421.863
100.000-	747.1	19411.3	6.034	81.679	40.169	6.367	65.989	487.852
120.000-	767.1	23680.6	6.196	87.874	47.705	7.924	73.913	561.765
150.000-	768.4	28941.1	6.206	94.08	46.376	9.757	83.67	645.436
200.000+	732.9	49214.6	5.92	100	53.624	16.33	100	745.436
Total		12381.1	313294.8					
Gini coefficient = -6507.451712								

Source: Gathered and calculated data from the Income, Expenditure & Consumption surveys, Public Indicators (2019-2020), Household Budget Surveys, Statistical Yearbook,2022.

Figure 2: Equitable distribution of the actual expenditure consumption of cereals and bread in rural Egypt based on the Household Budget Surveys (2019/2020)



Source: Table 7

The results of Table 8 for urban Egypt showed that the category that includes oils and fats in urban Egypt ranges from (150,000-200,000) and includes the maximum total actual expenditure consumption of EGP 77,953.5.

The category that includes (10,000 -10,000) is the minimum of the total actual expenditure consumption, which amounted to EGP 10,329.6

The Gini coefficient is fundamentally different from zero, which represents distributive justice, and therefore there is a misdistribution of the expenditure consumption of oils and fats based on the family budget research (2019/2020) (Figure 3)

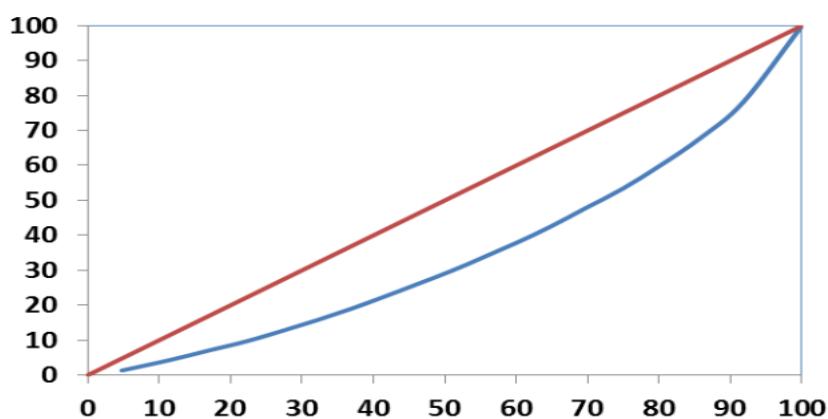
However, the results show an improvement in equitable distribution according to the research on the level of oils and fats in urban Egypt.

Table 8: Analysis of Actual Expenditure on Oils and Fats in Urban Egypt, Income, Expenditure & Consumption surveys, Household Budget Surveys (2019-2020)

Categories	Oil and fats	Actual total consumption	Percentage %	Clustered frequency of oils and fats	pi- pi-1	Total consumption expenditure	Cumulative upward frequency of total consumption expenditure	Li+Li-1
<10.000	341.2	10329.6	4.776	4.776	4.776	1.339	1.339	1.339
10.000-	470.1	12746.3	6.581	11.357	6.581	2.92	4.259	5.598
20.000-	385.3	10801.5	5.394	16.751	10.17	2.705	6.964	12.562
25.000-	403.2	11024.9	5.644	22.395	12.225	2.819	9.783	22.345
30.000-	351.1	11248.2	4.915	27.31	15.085	2.933	12.716	35.061
35.000-	346.7	11662.4	4.853	32.164	17.078	3.065	15.781	50.842
40.000-	336.7	12064.3	4.713	36.877	19.798	3.206	18.986	69.828
45.000-	323.9	12813.7	4.534	41.411	21.613	3.4	22.386	92.214
50.000-	328.7	13319.5	4.601	46.012	24.4	3.567	25.953	118.166
55.000-	342.1	13999.1	4.789	50.801	26.402	3.772	29.725	147.891
60.000-	333.9	15040.8	4.674	55.476	29.074	4.074	33.799	181.69
65.000-	335.9	15582.6	4.702	60.178	31.104	4.209	38.007	219.698
70.000-	332.8	16769.6	4.659	64.837	33.733	4.534	42.541	262.239
80.000-	348.7	19312	4.881	69.718	35.985	5.264	47.805	310.044
90.000-	370.8	20289.3	5.191	74.909	38.923	5.559	53.363	363.407
100.000-	369.7	23776	5.175	80.084	41.16	6.548	59.911	423.319
120.000-	409.9	29194.3	5.738	85.822	44.662	7.992	67.904	491.222
150.000-	429.5	37275.5	6.012	91.835	47.173	10.362	78.266	569.488
200.000+	583.3	77953.5	8.165	100	52.827	21.734	100	669.488
Total	7143.5	375203.1						
Gini coefficient = -5746.661348								

Source: Results of the Income, Expenditure & Consumption surveys, Public Indicators (2019-2020), Household Budget Surveys, Statistical Yearbook, 2022.

Figure 3: Equitable distribution of the actual expenditure consumption of oils and fats in urban Egypt based on the Household Budget Surveys (2019/2020)



The cumulative upward frequency of total consumption expenditure

Source: Table 8

The results of Table 9 for rural Egypt showed that the category that includes oils and fats in urban Egypt ranges from 150,000 to 200,000 and holds the maximum total actual expenditure consumption of EGP 49,214.6. The category that includes (10,000–10,000) is the minimum of the total actual expenditure consumption, which amounted to EGP 11,609.1. The results of estimating the Gini coefficient, which amounted to 6840.303812, showed that it is fundamentally different from zero, which represents complete distributive justice.

Consequently, there is a misdistribution of the expenditure on consumption of oils and fats based on the family budget research (2019–2020) (Figure. 4).

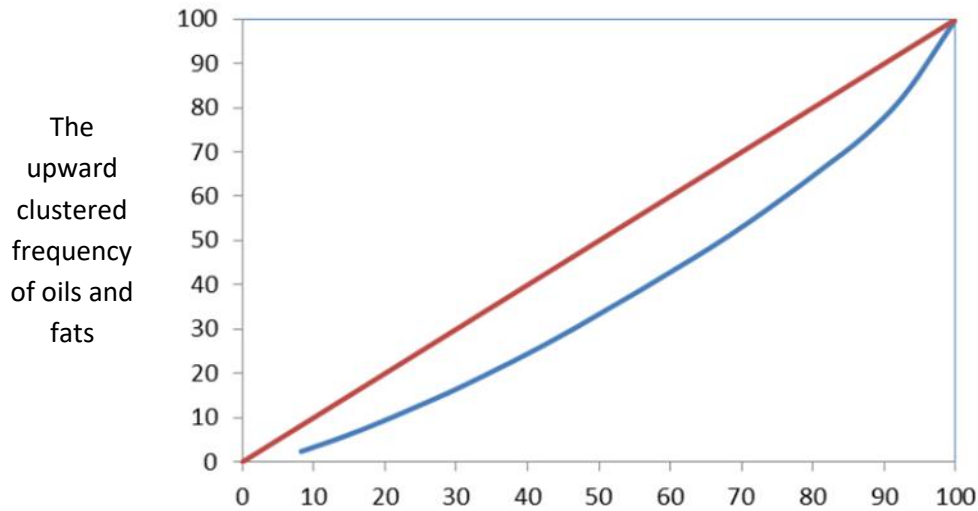
Nevertheless, the results show an improvement in equitable distribution according to the family budget 2019–2020 research on the level of oils and fats in rural Egypt.

Table 9: Analysis of Actual Expenditure on Oils and Fats in Rural Egypt, Derived from the 2019/2020 Family Budget Study: Income, Expenditure & Consumption surveys, Household Budget Surveys (2019-2020)

Categories	Oil and fats	Actual total consumption	Percentage %	Clustered frequency of oils and fats	pi- pi-1	Total consumption expenditure	Cumulative upward frequency of total consumption expenditure	Li+Li-1
<10.000	341.2	10329.6	4.776	4.776	4.776	1.339	1.339	1.339
10.000-	470.1	12746.3	6.581	11.357	6.581	2.92	4.259	5.598
20.000-	385.3	10801.5	5.394	16.751	10.17	2.705	6.964	12.562
25.000-	403.2	11024.9	5.644	22.395	12.225	2.819	9.783	22.345
30.000-	351.1	11248.2	4.915	27.31	15.085	2.933	12.716	35.061
35.000-	346.7	11662.4	4.853	32.164	17.078	3.065	15.781	50.842
40.000-	336.7	12064.3	4.713	36.877	19.798	3.206	18.986	69.828
45.000-	323.9	12813.7	4.534	41.411	21.613	3.4	22.386	92.214
50.000-	328.7	13319.5	4.601	46.012	24.4	3.567	25.953	118.166
55.000-	342.1	13999.1	4.789	50.801	26.402	3.772	29.725	147.891
60.000-	333.9	15040.8	4.674	55.476	29.074	4.074	33.799	181.69
65.000-	335.9	15582.6	4.702	60.178	31.104	4.209	38.007	219.698
70.000-	332.8	16769.6	4.659	64.837	33.733	4.534	42.541	262.239
80.000-	348.7	19312	4.881	69.718	35.985	5.264	47.805	310.044
90.000-	370.8	20289.3	5.191	74.909	38.923	5.559	53.363	363.407
100.000-	369.7	23776	5.175	80.084	41.16	6.548	59.911	423.319
120.000-	409.9	29194.3	5.738	85.822	44.662	7.992	67.904	491.222
150.000-	429.5	37275.5	6.012	91.835	47.173	10.362	78.266	569.488
200.000+	583.3	77953.5	8.165	100	52.827	21.734	100	669.488
Total	7143.5	375203.1						
Gni coefficient = -5746.661348								

Source: Results of the Income, Expenditure & Consumption surveys, Public Indicators (2019-2020), Household Budget Surveys, Statistical Yearbook, 2022.

figure 4: Equitable distribution of the actual expenditure consumption of oils and fats in rural Egypt based on the Household Budget Surveys (2019/2020)



The cumulative upward frequency of total consumption expenditure

Source: Table 9

Recommendations

As the research topic is related to the macroeconomy, the recommendations depend on the governmental interest in the following:

1. Development of comprehensive strategies to rationalize the consumption of grains and oils.
2. Development of economic policies that promote the increase of grain and oil production.
3. Conduction of more research and studies related to the consumption of grains and oils to assist in planning of future policies.

References

1. Nashwi El-Tatawy (2010). The effect of variation in the pattern of food consumption and its relationship to food security over half a century. Agricultural development strategy and food security challenges conference. faculty of Agriculture . Alexandria University .
2. Naira Yahya Suleiman. Ezzat Malouk Kenawy (2002). An analytical economic study of the most important agricultural consumer commodities in the Egyptian countryside. The Egyptian Journal of Agricultural Economics. Volume (11). Issue (1). March .
3. Waheed Muhammad al-Boluni, (1995). An economic study of the production and consumption of nutritional vegetable oils in Egypt, Ph.D. thesis, Department of Agricultural Economics, Faculty of Agriculture, Ain Shams University.
4. Central Agency for Public Mobilization and Statistics, Statistical Yearbook,2022.
5. Eman Fakhry Youssif Ahmed (2022).Statistical Estimation of Spending Function on Fish From the reality of Family Budget Research in EGYPT. Scientific Journal of Agricultural Sciences 4 (3): 0-0, 2022
6. Hossam El deen M. Sedeak. Ibrahim M.Alhafiny. (2016) An economic Study of the Patten of consumption of Wheat and Traditional Products in rural and urban EGYPT. Journal of Agricultural Economics and Social Sciences Volume (26), No.(2),June.