

The Factors Affecting on the World Prices of the Most Important Agricultural Commodities and their Effects on the Egyptian Domestic Prices

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Abstract: *The most important results of the study are represented in that the world prices of wheat are affected by some factors. The most important of these factors are America's export price of wheat, Russia's export price of wheat and Canada's production of ethanol. However, the most important factors affecting on corn crop are represented in the amount of the global exports of the crop, America's export price of the crop, France's export crop of the crop and France's production of ethanol. Finally, for soybeans, the most important factors are represented in America's export price, Brazil's export price and the amount of the global exports of soybeans. The study found, also, that the rise in the world prices of the three crops leads to an increase in their domestic prices and a rise in their import prices. Finally, it is shown that the rise in the import prices of these commodities leads to a rise in the prices of the local production and a rise in the Egyptian import bill. Thus, the most important recommendations of the study are confined in two trends. The first trends are represented in the vertical expansion through the produce high productive varieties and circulate them through activating the role of the agricultural guides. However, the second trend is represented in the horizontal expansion which is faced by a lot of obstacles foremost the problem of water scarcity in Egypt. Here, the state shall adopt two trends whether to activate the Egyptian-Sudanese relation and exploit the Egyptian expertise in cultivating the untapped areas in Sudan or reconsider, seriously, Congo River project which may results in providing about 95 billion cubic meters of water annually for Egypt. This amount of water can be exploited in reclaiming the lands suitable for reclamation and exploiting them in agriculture and thus the problem of the Renaissance Dam can be controlled.*

Keywords: World Prices- Agricultural Commodities- Domestic Prices-Egypt

1. Introduction

Three years after food crises and the financial crisis in 2008, food prices have risen again in global markets. The World Bank's report of food prices refers to that food prices at the present time are not less than its peak, to which it reached at the peak of food crisis in May 2008, but by 3%. The main reason of rising wheat prices is due to some climatic variables in countries. These climatic variables are dominating crop production globally. Also, the prices of both corn and oil have strongly risen in the world markets. Corn prices usually rise when wheat prices rise. Moreover, the prices of corn are affected, also, by the prices of oil as the incentives of using corn increase in order to produce ethanol fuel. USDA has explained that the rise in corn prices is due to the increase in the costs of animal feed which, in its turn, affects the prices of meat. Furthermore, world prices affect on increasing poverty in developing and poor countries, especially those countries that depend on importation to provide food to their people, as domestic prices are directly affected by world prices. When world prices increase locally, the problem of obtaining the poor such commodities with difficulty appear which is known as imported inflation. However, in the case of state's reliance on providing commodities locally, the rise in world prices would has a negligible effect, as domestic prices would be affected by production costs and the policies pursued by such countries. For example, when the world prices of corn have risen, the domestic prices of it have been declined as a result of crop's abundance. This decline has been increased to more than 10% in Malawi, Tanzania and Uganda.

2. The Problem of Study

The problem of study mainly appears in the rise of the world prices of the most important agricultural commodities including wheat, corn and soybeans. The prices has risen by about 204 dollars / ton, 211 dollar / ton and 350 dollars / ton, with an increase estimated at 142%, 169% and 162% respectively for each crop of them during 2011 compared to 2000. So, the prices of these commodities will be affected locally by such a matter, especially those countries that depend on importation to reduce the size of its food gap. Those countries include Egypt as producers has risen the prices during the same period by about 123 dollars / ton, 161 dollars / ton and 111 dollars / ton, with an increase estimated at 62%, 92% and 37% respectively for each crop during 2011 compared to 2000.

3. The Aim of Study

The study aims at identifying the factors affecting on the rise of the world prices of the most important agricultural commodities. This study, also, aims at identifying how the prices of producing these commodities locally are affected in Egypt as one of the countries that depend directly on importation to satisfy the needs of consumers at the local level, and identifying the impact of this matter on increasing the deficit in food balance during the coming period, as Egypt has unexpected crisis that the most important of which is climatic changes and the crisis of the Ethiopian Renaissance Dam.

4. Research Method and Data Sources

The study has depended on the technique of quantitative and descriptive analysis in achieving its desired objective. Moreover, the quantitative analysis has depended on using both of simple and multiple declines in order to study the impact of the factors affecting on the world prices of the selected commodities represented in the corns of wheat, corn and soybeans. Also, the quantitative analysis has depended on using the method of interim decline in order to reach the most important factors affecting on the world prices of the commodities which are under study, and finally study the expected impact from the world prices on the prices of the Egyptian product. Furthermore, in order to get the data, the study has depended on some websites including Food and Agriculture Organization and American agriculture, in addition to some websites that cover the subject.

The Most Important Factors Affecting on the World Prices of the Most Important Agricultural Commodities:

This requires identifying these factors, then conducting the technique of simple decline in order to study the impact of each factor separately and then using the technique of interim decline in order to identify the most important of these factors.

4.1 First: Wheat Crop

It is shown that the world price of wheat crop has risen from 144 dollars / ton in 2000 to about 348 dollars / ton with an increase estimated at 142% in 2011. The study has shown that there are factors affecting directly on the world prices of wheat crop. These factors can be identified in the total of the global production million tons, the amount of the global exports million tons, the export price of the most important exporting countries represented in America, France, Australia and Russia dollars / ton, the amount of wheat used in producing ethanol and the amount of producing ethanol in America billion gallons, Canada and France million gallons. It is shown that the total of the amounts produced and exported globally increases by about 20%, 26%. Also, it is shown that the prices of exportation of America, France, Australia and Russia increase by about 172%, 190%, 158% and 142%. During the same period, the amounts of wheat used in producing ethanol are shown to be increased by about 447%. Also, the produced amounts of ethanol in America, Canada and France are shown to be increased by about 338%, 763% and 75% during 2011 compared to 2000.

Table 1: Simple regression equations of the factors affecting the global wheat prices

Factor	A	B	T	F	R ²	Significant
X ₁	358.1	-0.245	-1.72	2.96	0.29	-
X ₂	288-	3.98	2.58	6.69	0.41	0.05
X ₃	10.5	0.99	14.9	222.61	0.96	0.01
X ₄	17.87	1.02	16.87	16.87	0.97	0.01
X ₅	18.522	0.89	14.6	214.03	0.95	0.01
X ₆	-21.1	1.196	7.86	61.89	0.86	0.01
X ₇	38.89	1.18	7.15	51.19	0.84	0.01
X ₈	157	40.2	3.5	12.8	0.56	0.01
X ₉	80.44	0.027	3.99	15.99	0.58	0.01
X ₁₀	140.29	0.389	3.78	14.3	0.6	0.01
X ₁₁	-66.55	1.03	4.15	17.23	0.63	0.01

Source: calculated and the collected from the website of the FAO, and the website of the U.S. Department of Agriculture That's where:

- X1 = The total world production of wheat million tons
- X2 = The amount of global exports of wheat million tons
- X3 = U.S export price of dollars / ton
- X4 = France export price of. \$ / ton
- X5 = Australia export price of. \$ / ton
- X6 = Canada export price of. \$ / ton
- X7 = Russia export price of. \$ / ton
- X8 = The amount of wheat used in the production of ethanol million tons
- X9 = The amount of ethanol production in the U.S. billion gallons
- X10 = The amount of ethanol production in the Canada billion gallons
- X11= The amount of ethanol production in the France billion gallons

Moreover, by conducting the simple decline relations between wheat's world crop (dependant variable) and the factors affecting on it (independent variable) as explained in table No (1), it is shown that the significance of relations estimated statically has been fixed at the level of significance (0.05, 0.01) except for the relation estimated between the world price and the total of global amounts produced from wheat crop. In addition, equation (2) indicates that the increase in the total of the exported amounts of the crop by million tons results in a rise in the world price of wheat by about 3.9 dollars / ton. This rise is due to countries' trend to produce ethanol from wheat crop, as the amounts of wheat specified to produce ethanol in the world during study period has been increased from about 0.15 million tons in 2000 to about 0.82 million tons with an increase estimated at 447% in 2011 compared to 2000. Furthermore, equations (3, 4, 5, 6, 7) show that the rise in the prices of exporting wheat in America, France, Canada, Australia and Russia by about one dollar results in a rise in the world price of the crop by about 0.99, 1.02, 0.89, 1.196, 1.18 dollars / ton, respectively, for each country of them. Equation No (8) indicates that the increase in the amount of wheat specified to produce ethanol by about million tons leads to an increase in wheat's world price by about 40.2 dollars / ton. In addition, equations (11, 9, 10) show that the increase in ethanol production in America, Canada and France by about one billion gallons contributes in rising the world prices of exporting wheat by about 0.027, 0.389, 1.03 dollars / ton as shown in table No (1). The most important factors affecting on the world price of wheat crop by using the technique of interim decline is studied, as illustrated by the following equation:

$$\text{Log } y = - 0.30 + 0.87 \log x_3 + 0.35 \log x_7 + 0.14 \log x_9$$

(5.7) (2.8) (2.61)

F= 104.03
R²= 0.96

The value of coefficient of determination indicates that about 96% of the changes in wheat's world price are due to America's export price of wheat (x3), Russia's export price of wheat (x7) and Canada's production of ethanol. The

significance of the estimated relation has been fixed at the level of significance 0.01.

4.2 Second: Corn Crop

It is shown that the world price of corn crop has risen from 125 dollars / ton in 2000 to about 336 dollars / ton with an increase estimated at 169% in 2011. It has been shown that there are factors affecting directly on the world prices of corn crop. These factors are represented in the total of the global production million tons, the amount of the global exports million tons, the export price of the most important exporting countries represented in America, Argentina and France dollars / ton, the amount of ethanol production in America billion gallons, France billion gallon. It is shown that the total of the amounts produced and exported globally increases by about 49%, 34%. Also, it is shown that the prices of exportation of America increase by about 203%, the prices of Argentina increase by about 204%, and the prices of France increase by about 171%. Moreover, during the same period the produced amounts of ethanol in America and France are shown to be increased by about 338%, 75% during 2011 compared to 2000.

Table 2: Simple regression equations of the factors affecting the global price of maize

Factor	A	B	T	F	R ²	Significant
X ₁	286-	0.66	8.11	65.7	0.87	0.01
X ₂	-349.9	5.74	4.9	24.2	0.71	0.01
X ₃	1.08	26.1	19	364.4	0.97	0.01
X ₄	34.4	1.11	12.3	13.23	0.94	0.01
X ₅	-4.08	0.81	17.3	298.6	0.96	0.01
X ₆	64.4	2.77	6.31	39.89	0.81	0.01
X ₇	58.41	0.027	2.64	6.97	0.82	0.01
X ₈	-87.4	1.03	7.01	49.21	0.82	0.01

Source: calculated and the collected from the website of the FAO, and the website of the U.S. Department of Agriculture That's where:

- X1 = The total world production of Maize million tons
- X2 = The amount of global exports of Maize million tons
- X3 = U.S export price of dollars / ton
- X4 = Argentina export price of. \$ / ton
- X5 = France export price of. \$ / ton
- X6 = The amount of Maize used in the production of ethanol million tons
- X7 = The amount of ethanol production in the U.S. billion gallons
- X8 = The amount of ethanol production in the France billion gallons

In addition, table No (2) shows the simple decline relations between the world price of corn crop and the factors affecting on it. The significance of the relations estimated statistically has been shown to be fixed at the level of significance 0.01. Furthermore, equations (1, 2) show that the increase in the amounts of corn, produced and exported globally, by about one million tons leads to an increase in the crop's world price by about 0.66 dollars / ton and 5.74 dollars / ton. This increase is due to the increase in the amounts of the crop specified to produce ethanol. These amounts increase and reach about 83 millions ton in 2011, with at increase estimated at 419% compared to 2000. The

results of equations (3, 4, 5) refers to that the increase in the export prices of wheat in America, Argentina and France by dollar / ton leads to increasing corn's world prices by about 26.1 dollar / ton, 1.11 dollar / ton and 0.81 dollar / ton, respectively, for each one of them. However, equation (6) indicates that the increase in the amount of corn, used in producing ethanol, by about one million tons leads to increasing corn's world price by about 2.77 dollars / ton. Moreover, the results of equations (7, 8) refer to that the increase in the produced amounts of ethanol in America and France by about billion gallons leads to an increase in the world price of corn by about 0.027 dollars / ton and 0.03 dollars / ton for America an France respectively.

The main factors affecting on the world price of corn crop is studied by using the technique of interim decline, as illustrated by the following equation:

$$\text{Log } y = 0.78 - 0.52 \log x_2 + 0.33 \log x_3 + 0.58 \log x_5 + 0.35 \log x_7$$

(-3.07) (4.39) (9.98) (2.98)

F = 856.3
R² = 0.97

The value of coefficient of determination indicates that about 97% of the changes in corn's world price are due to the amount of world exports (x₂) America's export price of corn(x₃), France's export price of corn (x₅) and France's production of ethanol (x₇). The significance of the estimated relation has been fixed at the level of significance 0.01.

4.3 Third: Soybeans

It is shown that the world price of corn crop has risen from 216 dollars / ton in 2000 to about 566 dollars / ton with an increase estimated at 162% in 2011. It has been shown that there are factors affecting directly on the world prices of soybeans crop. These factors are represented in the total of the global production million tons, the amount of the global exports million tons, the export price of the most important exporting countries represented in America, Brazil and Argentina dollar / ton. It is shown that the total of the amounts produced and exported globally increases by about 63%, 94%. Also, it is shown that the prices of exportation of America increase by about 155%, Brazil's prices of exportation increase by about 161%, and the prices of exportation of Argentina increase by about 168% during 2011 compared to 2000.

Table 3: Simple regression equations of the factors affecting the global soybean prices

Factor	A	B	T	F	R ²	Significant
X ₁	-387	3.47	4.9	28.3	0.71	0.01
X ₂	-178.1	7.48	4.8	23.3	0.7	0.01
X ₃	-9.39	1.19	22.61	511	0.98	0.01
X ₄	2.11	1.17	5.33	28.3	0.98	0.01
X ₅	6.132	1.2	13.55	182.	0.94	0.01

Source: calculated and collected from the website of the FAO, and the website of the U.S Department of Agriculture Where:

- X1 = The total world production of Soybean million tons
- X2 = The amount of global exports of Soybean million tons
- X3 = U.S export price of dollars / ton
- X4 = Brazil export price of. \$ / ton

X5 = Argentina export price of. \$ / ton

Moreover, by estimating the simple decline relations between soybeans' world prices and the factors affecting on them, as illustrated in table No (3), it is shown that the significance of the statistically estimated relations has fixed at the level of significance 0.01. In addition, equations (1, 2) show that the increase in the amounts produced and exported globally by about one million tons leads to an increase in the world price of soybeans by about 3.47 dollars / ton and 7.48 dollars / ton, respectively, for each one of them. This increase is due to the increase in soybeans amounts used in animal provender in order to meet the ratio of proteins which animals need in their provender, in addition to extracting soybeans oil which results in increasing the demand on the crop. Furthermore, equations (3, 4, 5) indicate that the increase in the export prices of America, Brazil and Argentina by about dollar / ton leads to an increase in the world price of soybeans by about 1.19 dollars / ton, 1.17 dollars / ton and 1.2 dollars / ton, respectively, for each country of them.

The most important factors affecting on the world price of soybeans is studied by using the technique of interim decline, as illustrated in the following equation:

$$Y = 4.98 + 0.49X_3 + 1.29X_4 - 0.63X_2$$

(2.5) (3.9) (-2.6)

$$F = 421 \quad R^2 = 0.94$$

The value of coefficient of determination indicates that about 94% of the changes in soybeans' world price are due to the export price of America dollar / ton (x1), Brazil's export price and the amounts of global exports of soybeans. The significance of the estimated relation has been fixed at the level of significance 0.01.

Fourth: the Impact of Producing Biofuels on the World Prices of the Crops under Study:

It is shown that the global production of ethanol and biodiesel increases from about 7.8 billion gallons and 0.236 billion gallons in 2000 to about 21.4 billion gallons and 5.9 billion gallons, with an increase estimated at 176%, 2386% in 2011 compared to 2000. Moreover, by studying the most important factors affecting on the world prices of wheat, corn and soybeans as shown in table No (4), they are for wheat crop, represented in the amount of the global production of ethanol, the amount of the global production of diesel and the amount of wheat used in producing ethanol. The value of the coefficient of determination refers in equation (1) to that about 0.64% of the changes in the world prices of wheat crop are due to the change in these factors combined. However, these factors for corn and soybeans are represented in the amount of the global production of ethanol and the amount of the global production of diesel, as the value of coefficient of determination refers in equations (2, 3) to that about 84% and 83% from the changes in the world prices of corn and soybean crops are due to the change in these factors. The significance of the estimated relation has been fixed at the level of significance 0.01.

Table 4: the impact of biofuel production on world prices for crop under Study

Crops	A	X ₁	X ₂	X ₃	F	R ²
Wheat	-70.4	0.26	-0.05	28.9	6.69	0.64
		2.3	-1.3	3.9		
Maize	-10.97	0.013	0.001		23.9	0.84
		3.2	0.02			
Soybear	23.8	0.23	0.004		23.1	0.83
		-2.29	-1.19			

Source: calculated and collected from the website of the FAO, and the website of the U.S Department of Agriculture Where:

X1 = the amount of global production of ethanol million gallons

X2 = the amount of global production of diesel million gallons

X3 = the amount of wheat or maize used to produce ethanol million tons

Furthermore, the non-significance of producing diesel, on the world prices, for wheat, corn and soybeans is due to that diesel depends mainly on jatropha.

Fifth: the Impact of the World Prices of the Commodities under Study on the Egyptian Local Prices:

This impact is being studied through three stages. The first stage studies the impact of world prices on the domestic prices of production. However, the second stage studies the impact of world prices on importation. Finally, the third stage studies the impact of import prices on the local prices of production for the commodities under study, as shown in table No (5).

Table 5: the impact of international prices on the Egyptian local prices of goods under study

Stage	Statement	A	B	T	F	R ²	Significant
First	Wheat	14.81	1.02	5.3	28.26	0.74	0.01
	Maize	33.03	0.93	5.83	33.94	0.75	0.01
	Soybean	179.16	0.42	4.69	22.01	0.69	0.01
Second	Wheat	45.05	0.76	7.4	55.09	0.85	0.01
	Maize	8.29	0.83	17.6	309.7	0.97	0.01
	Soybean	-92.3	1.48	2.7	7.33	0.42	0.01
Third	Wheat	-12.88	1.19	4.6	21.15	0.68	0.01
	Maize	29.34	1.08	5.5	30.32	0.75	0.01
	Soybean	277.4	0.51	2.8	7.84	0.42	0.01

Source: calculated and collected from the website of the FAO, and the website of the U.S Department of Agriculture

The results of the three stages, as the table referred to illustrates, show that the increase in the world prices by about dollar / ton leads to an increase in the domestic price of wheat by about 1.02 dollars / ton, an increase in the domestic price of corn by about 0.93 dollars / ton and an increase in the domestic price of soybeans by about 0.42 dollars / ton. Also, this increase in the world prices by about dollar / ton leads to an increase in the import price by about 0.76 dollars / ton, 0.83 dollars / ton and 1.48 dollars / ton, respectively, for wheat, corn and soybeans. Finally, it is shown that the increase in import price will result in an increase in the price of production by about 1.19 dollars / ton for wheat, 1.08 dollars / ton for corn and 0.51 dollars / ton for soybeans. The significance of the estimated relation has

been fixed at the level of significance 0.01, as illustrated in table No (5). The matter of increasing the prices can result in an increase in the prices for the Egyptian consumer in the local market. Also, the rise in the import prices results in an increase in the value of import bill by about 18.6 million dollars for grains and 1.7 million dollars for oils.

The Most Important Findings and Recommendations:

- The world prices of the agricultural commodities under study, represented in wheat, corn and soybeans, affect by some factors including America's export price of wheat, Russia's export price of wheat and Canada's production of ethanol, and this is for the world prices of wheat crop. However, the most important factors affecting on corn crop are represented in the amount of the global exports of the crop, America's export price of the crop, France's export crop of the crop and France's production of ethanol. For soybeans, the most important factors are represented in America's export price, Brazil's export price and the amount of the global exports of soybeans.
- By studying the impact of producing biofuels on the world prices for wheat, corn and soybeans, they are, for wheat crop, represented in the amount of the global production of ethanol, the amount of the global production of diesel and the amount of wheat used in producing ethanol. However, these factors for corn and soybeans are represented in the amount of the global production of ethanol and the amount of the global production of diesel.
- Studying the impact of the world prices of wheat, corn and soybeans on the domestic prices of these three crops shows that the rise in the world prices of the three crops leads to an increase in the domestic prices and leads, also, to an increase in the import prices of these crops. Finally, it is shown that the rise in the import prices of these commodities leads to a rise in the prices of the domestic production of the three commodities. This matter can result in an increase in the prices for the Egyptian consumer in the local market. Moreover, the rise in the import prices results in an increase in the value of import bill by about 18.6 million dollars for grains and 1.7 million dollars for oils.

Therefore, the Most Important Recommendations of Study are:

The need for conducting comprehensive reforms in the adopted agricultural policies in order to raise the productive efficiency for the crops under study through these policies' cooperation with research centers and applying the results reached by laboratory experiments, such as producing high productive varieties of the crops under study, and working to circulate them at field level through activating the role of the agricultural guides and thus the volume of production can be increased through the vertical expansion. However, in the case of tending to the horizontal expansion in the light of the current conditions of the stability of the Egyptian agricultural lands and the inability of the state to provide the necessary irrigation water, the matter needs to increase the efforts of the state's officials in order to activate the Egyptian-Sudanese agricultural relations and use the Egyptian expertise in exploiting the agricultural areas in the Sudanese lands which are untapped in order to achieve self-

sufficiency for these crops. In addition to the need to reconsider, seriously, the Congo River project that will result in providing about 95 billion cubic meters of water annually for Egypt. This amount of water can be exploited in reclaiming the lands suitable for reclamation and exploiting them in agriculture and thus the problem of the Renaissance Dam can be controlled. In addition to the benefit that can be resulted from providing about 350 million agricultural acres for Egypt, Sudan and Congo, as planting these acres contributes in achieving the food security targeted in Egypt and the Arab and African countries. So, when Egypt reaches to the extent of self-sufficiency, especially for the strategic commodities referred to earlier, the domestic prices will not be affected by the world prices, and Egypt reaches to the extent of the targeted economic security by reducing the volume of its subordination to the foreign countries.

5. Summary

The study aims at identifying the factors affecting on the rise of the world prices of the most important agricultural commodities, and the extent of affecting the prices of producing these commodities locally in Egypt. The study has depended on the technique of quantitative and descriptive analysis in achieving its desired objective. Moreover, the study has depended on some websites including Food and Agriculture Organization and American agriculture, in addition to some websites that cover the subject. This study has tackled the most important factors affecting on the world prices of the most important agricultural commodities represented in wheat, corn and soybeans. It has tackled, also, the impact of producing biofuels on the world prices of the crops referred to previously, and finally, the study tackled the impact of the world prices of the commodities under study on the Egyptian domestic prices of the commodities under study. Furthermore, the most important results of the study are represented in that the world prices of wheat are affected by some factors. The most important of these factors are America's export price of wheat, Russia's export price of wheat and Canada's production of ethanol. However, the most important factors affecting on corn crop are represented in the amount of the global exports of the crop, America's export price of the crop, France's export crop of the crop and France's production of ethanol. Finally, for soybeans, the most important factors are represented in America's export price, Brazil's export price and the amount of the global exports of soybeans. The study found, also, that the rise in the world prices of the three crops leads to an increase in their domestic prices and a rise in their import prices. Finally, it is shown that the rise in the import prices of these commodities leads to a rise in the prices of the local production and a rise in the Egyptian import bill. Thus, the most important recommendations of the study are confined in two trends. The first trend is represented in the vertical expansion through the fruitful and constructive cooperation with research centers in order to produce high productive varieties and circulate them through activating the role of the agricultural guides. However, the second trend is represented in the horizontal expansion which is faced by a lot of obstacles foremost the problem of water scarcity in Egypt. Here, the state shall adopt two trends whether to activate the Egyptian-Sudanese relation and exploit the

Egyptian expertise in cultivating the untapped areas in Sudan or reconsider, seriously, Congo River project which may results in providing about 95 billion cubic meters of water annually for Egypt. This amount of water can be exploited in reclaiming the lands suitable for reclamation and exploiting them in agriculture and thus the problem of the Renaissance Dam can be controlled.

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