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The Economic Impact of Price Policy (Focus Price Policy) on Production and Consumption of Wheat in Sudan

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Abstract

The study was conducted to partially analyze Wheat market equilibrium during the period 2015-2019, it aimed to determine the impact of focus price policy on Wheat producers and consumers through assessing profits, losses and efficiency in Wheat market. The study depends on secondary data; partial analysis model was used as an analytical tool. The study concluded that the elasticity of supply of Wheat was 0.11 and the elasticity of demand of Wheat was 0.33, i.e. supply and demand for Wheat were inelastic. The study showed that the value of the nominal protection coefficient for producer and consumer during the seasons 2015-2018 was less than one, this indicate that there were taxes imposed on producers and support for consumer but in season 2018-2019 the value of nominal protection coefficient of producers was 1.36, i.e. there was support for producers and taxes imposed on the consumers because the value of nominal coefficient protection of consumer was greater than one (1.29). Quantities produced and consumed under the policy was less than quantities produced and consumed in the case of non-intervention except in season 2018-2019 in which production was increased from 556,650 MT without policy intervention to 6199,00 MT under focus price policy leading waste of resources where as consumption increased from 236,015,0 MT without policy intervention to 242,270,0 MT under focus price policy causing waste of foreign exchange in order to cover Wheat imports. The change in the quantity supplied (632,50 MT) was greater than the change in the quantity demanded (625,50 MT). Results also showed that loss in production efficiency was 156.1SDG/MT, loss in consumption efficiency was 123.1SDG/MT and loss in society efficiency was 279.24SDG/MT. Study recommended that government should adopt an alternative policy to the focus price policy in order to encourage small farmers to produce Wheat such as reducing taxes and subsidizing production inputs.

Keywords

Wheat, Price Policy, Equilibrium, Quantity, Demand, Supply, Production, Consumption

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1. Introduction

Wheat is one of the most important strategic food commodities in the world. Governments without exception production and some work to support the consumption in order to be accessible evenly to all citizens of all classes, especially the destroyed classes, [1]. In Sudan, Wheat is the second food after Maize; it represents the main food in the Northern State, the Nile State, the national capital and most of the great cities. In the rest of Sudan people depends on

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Wheat and millet in their diet. During the last four decades, [2] Sudan's consumption of Wheat increased as a result of the increase of population growth rate, increase of migration from rural to urban areas, increase of food awareness among population, [3]. The increase in the amount of imported Wheat and the change in the consumption pattern of citizens, results in increase of the gap between domestic production and consumption, [4, 5]. This gap and the inability to import from abroad due to insufficient financial resources place a heavy burden on the Sudan foreign exchange.

The market equilibrium is achieved by equalling the required quantity with the quantity offered in the market, [6]. However, the State often intervenes in the market to regulate it. This intervention may be either to enable a segment of consumers to acquire certain goods and services or to reduce the consumption of other, [7]. The intervention of the State to regulate the market may be either through the price mechanism or through financial instruments (taxes and subsidies), [8]. Locally, since the 1970s, the government has been supporting Wheat prices for the consumer. This support has contributed to the spread of Wheat consumption in rural areas as well as urban, [9, 10]. Country's Wheat policy represented in reducing custom restrictions through imposing low tariffs (not exceed 5%) on imported Wheat and Wheat flour in addition the internal pricing policy (concentration price),[1], which encouraged producers and farmers to grow Wheat.

Producers of Wheat and agricultural sector in general suffer from the low price levels that do not cover cost of their production, [11, 12]. This will lead to a decrease in the production and farmers left agriculture, [11, 13]. Alternately, this led governments and decision makers to intervene and adopt price policies to support Wheat production, [14, 15]. The main objective of the study is to analyze economic impact of price policy (focus price policy) on production and consumption of wheat in Sudan during the period (2015-2019). The Importance of study stem from the fact that Wheat is considered as a basic food and national strategic commodity. The paper is also important because it explains policies and government interventions on Wheat prices; in addition, the research uses a different and unique method of data analysis process. More over the paper provides information that may serve as a reference for subsequent studies.

2. Material and Method

The study based on secondary data from different sources: books, economic periodicals and reports from Ministry of Agriculture, Agricultural Bank and the Central Organization for Statistics in addition to previous studies. The model of partial equilibrium analysis was used to study effect of focus price of Wheat on consumer and producer and government.

2.1. Partial Equilibrium Model

The model is based on two basic assumptions:

1. The first, prices are equal to average costs because of the technological efficiency of the long-term input/output relationship or because of rounding
2. Second, the consumer price is equal to the price of the producer, and then the consumer will bear the cost of consumption real, and the producer gets the real yield for its production, and accordingly the price cap price limits local for both producer and consumer can lead to increased production and reduced consumption, which is what leading to increased exports or a decrease in imports. Later will be addressed to explain some economic concepts of this model and how to calculate them.

2.2. Key Elements of Model

2.2.1. Border Price

In this case, it reflects the price agreed by foreign suppliers he has to display their goods in the local market, or the price that the foreign consumer pays the supplier to display its goods in the foreign market under the rule of free trade.

2.2.2. Nominal Protection of Producers and Consumers

The nominal protection coefficient of the producers is expressed from the farm price to the price of the commodity, it measures the extent of price deviation or distortion between the two prices, and if the coefficient of protection for producers larger than one it demonstrates the existence of support for the producer and if it is less than one it is illustrated the existence of taxes on the producer, while if equal to one it shows a neutral policy together, the nominal protection of the consumer expresses the ratio of retail price to consumer price and refers to the impact of economic liberalization policies on consumer spending their standard of living affected by the retail prices of the goods they consume compared to border prices, and the less this coefficient is the right one whenever these policies are in the interest of the consumer and vice versa.

2.2.3. Price Elasticity's of Supply and Demand

It measures the responsiveness of the quantities offered or required of the commodity to changes in Price, and for the application of the partial equilibrium model referred to, special values need to be estimated with elasticity of supply and demand for Wheat during the periods studied.

2.3. Analysis Steps

1. Organization of the data

The data required for the analysis include information on the elasticity of demand and supply of Wheat, local and aggregate production, international and local Wheat prices, consumer price and the official exchange rate of the US dollar locally during the period (2015-2019).

2. Calculate the border price

Border price: the price accepted by foreign suppliers to the local market in the case of imported goods or the price accepted by foreign consumers in the case of exported goods.

3. Calculate the nominal protection factor

Nominal protection coefficient compares the domestic commodity price with the world price.

$$NPC=Pf_1 / PW_1$$

Where:

NPC: Nominal Protection Coefficient.

Pf_1: The price at the farm level.

PW_1: Price of the border.

4. Assessing the impact on supply and demand:

Price elasticity's of supply and demand are used, and to calculate the degree of this effect, the ratio of change between international prices and the prices of local producers is calculated by the equation:

$$(1-(NPC*PP)/(NPC*PP))*100)$$

Where:

NPC: Nominal protection coefficient of producers.

PP: Production price.

5. Calculate the change in the quantity demanded, we use the equation:

$$((1-CP/BP)/CP/PP)*AC*ED$$

Where:

CP: Consumer price.

BP: Border Price (SDG per ton).

AC: Consumption.

ED: Elasticity of demand.

6. Calculation of quantities produced and consumed

The quantity produced and consumed under government intervention is combined to change in quantities.

7. Evaluation of loss in production efficiency

When the government intervenes, two types of losses appear: loss in production efficiency and loss in consumption efficiency

It is calculated by:

$$0.5*[(TP+(((1-(PP/BP)/PP/BP)*TP*ES))-TP]*(BP-PP)/1000.$$

Where:

TP: Total production.

PP: Price production.

BP: Border price (SDG/TON).

Es: Elasticity of supply.

8. Assess the loss in consumption efficiency

Calculated by the equation:

$$0.5*[(Ac+((1-(CP/BP))/CP/BP)*AC+ED)-AC]*(BP-CP)/1000$$

Where:

AC: The consumption.

CP: price consumption.

BP: Border price (SDG/TON).

ED: Elasticity of demand.

9. Assessment of total efficiency loss

The total efficiency loss represents the total loss lost which is the sum of the productive loss and the loss of efficiency in consumption.

$$[0.5*[(TP+(((1-(PP/BP)/PP/BP)*TP*ES))-TP]*(BP-PP)]+[0.5*[(Ac+((1-(CP/BP))/CP/BP)*AC+ED)-AC]*(BP-CP)]/1000$$

3. Result and Discussion

The study aimed at calculating the elasticity of demand and supply of Wheat and calculates the nominal protection factor to determine subsidies or taxes on producers or consumers. The study also aimed at calculating the change of the quantities supplied and demanded to identify the impact of the policy on the quantities. In addition, the study aimed at determining the impact of policy on the loss of efficiency of the total and the loss efficiency of producers and consumers, and whether the policy led to the expansion or contraction of production and consumption. The study was based on secondary data represented in (produced, consumed and imported quantities of Wheat, local prices, the international price and exchange rates during the study period), the data were analyzed using partial equilibrium method. The study

reached the following results:

3.1. Elasticity of Supply and Demand

The study concluded that elasticity of supply Wheat is inelastic supply during the period 2015-2019, also after calculate the average supply elasticity is less than one (0.11) still inelastic supply, this means that the change in the quantity produced is less than the change in price is much as shown on table 1.

Table 1. Elasticity of Demand and Supply During The period (2015-19).

Indicator	2015-16	2016-17	2017-18	2018-19	Average
Elasticity of supply	0.19	0.12	0.10	0.03	0.11
Elasticity of demand	0.47	0.46	0.33	0.14	0.35

Source: Results of Study, (2019)

Also we note from table 1, the average elasticity of demand (0.35) is less than one, this indicates that the change in the quantity demanded less than the change in prices, that is the demand is inelastic, in other words the relative change in quantity demand is low response to change in prices.

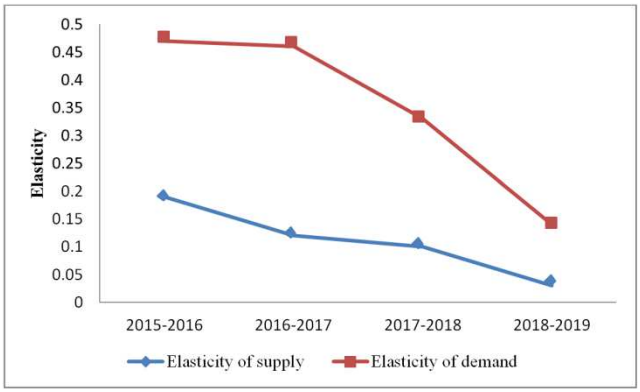

Figure 1. Trend Line of Elasticity.

Source: Results of Study, (2019).

Figure 1 shows the general trend of elasticity supply inelastic curve is very steep and close to the straight line indicating that the relative change in quantity supplied is less response to relative change in prices.

The general trend of elasticity of demand show that response rate of the quantity demanded for the change in quantity is relatively low.

3.2. Nominal Protection Coefficient

From table 2 results reached to the fact that there are taxes imposed on the producers in the season 2015-16 with value 10%because the Nominal Protection Coefficient was less than one 0.90. In season (2016-17) increased the value of taxes imposed to 17% because the nominal coefficient is 0.83. In season 2017-18 also increased taxes imposed to 78% because the nominal coefficient is 0.22. This indicates that the border price was higher than the price of domestic producers. In the last season, the government raised the focus price and thus increased the price of domestic producers higher than the border price. The interpretation of the high value of the indicator nominal protection coefficient 1.36 (greater than one) is the existence of support for producers with rate 36% as shown in table 2.

Table 2. Nominal Protection Indicators for Wheat (2015-19).

Indicator	2015-16	2016-17	2017-18	2018-19
Nominal protection coefficient of producers	0.90	0.83	0.22	1.36
Nominal protection coefficient of consumers	0.94	0.75	0.20	1.29

Source: Results of Study, (2019)

Also from the table 2 it is noted that subsidy consumer with rate 0.94 that is supported by 16% because the nominal coefficient is 0.94. In season 2015-16, in season 2016-17 increase supported by 25% because the nominal coefficient is 0.75. In season 2017-18 the increased in subsidy continued to reach 80% because the nominal coefficient is 0.20 due to the deficit in the budget and increase in inflation rates and the worsening of the economic crisis and in last season (2018-19) the results showed that there imposed taxes with rate 29%because the protection factor is 1.29 greater than one.

3.3. Effect of Subsidy Policy on Production and Consumption

3.3.1. Effect of Subsidy Policy on Production

The results of the analysis showed the negative response of producers to the focus price policy during the season 2015-16 did not achieve the goal of the policy to increase production because the production reduced from 812130MT (without policy) to 778600 MT (under the policy) as show on figure 2.

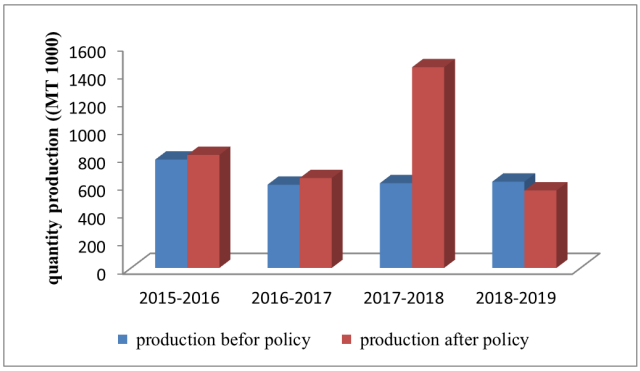

Figure 2. Production Before and After Policy.

Source: Results of Study, (2019)

In season 2016-17 decrease is production from 645520 MT to 598500MT and season 2017-18 decrease from 1442210MT inefficient market to 60920MT under policy can be noted during these seasons that the policy led to the decrease in the quantity produced under the policy and this indicates that there is waste of resources and misuse of exploitation of resources production (figure 2).

In season 2018-19 there was increase in the quantity produced from 556650Mt in equilibrium market to 619900 under the policy because of the increase demand in wheat and also as a result to the increase in focus price to 1850SDG as a promotional price and a catalyst for the production as shown on figure 2.

3.3.2. Effect of Subsidy Policy on Consumption

There is decrease in the consumption during of the seasons (2015-18) considering that the purchase price was higher than consumer ability, can be note the following:

In season 2015-16 the amount consumed under policy was 227000ton was less than the amount consumed in the absence of policy by 2285250ton. In season 2017-18 also quantity consumption reduced from 2407700 ton without policy to 2320800ton under the policy as shown in figure 3.

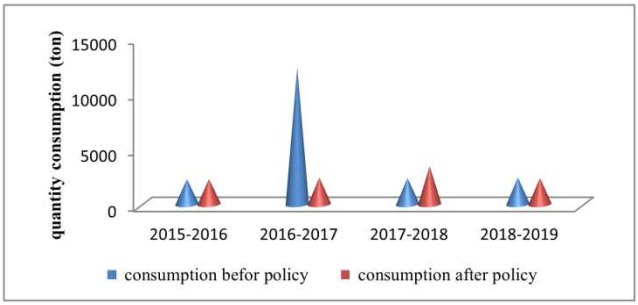

Figure 3. Consumption Before and After Policy.

Source: Results of Study, (2019)

Also from figure 4 noted in season 2017-18 reducing the quantity consumption from 3434240ton without policy to 2371800ton under policy, during all these seasons the consumer could have consumed more under the efficient market but in the case of intervention consumption decreased due to lack of consumer desire for wheat and arising market prices and also availability of alternatives to wheat such as maize and millet, but in season 2018-19 the quantity increased from 2360100tonwithout policy to 2422700 ton under the policy increase consumption led to increased imports and consequently increased pressure on the local currency compared to world prices.

3.4. Change in Supply and Demand

In season 2015-16 the change in quantity supplied by amounts to 33530 MT because the quantities produced in the case of non-intervention was greater than the quantities produced under intervention policies, there was a waste of resources of production. The change in the quantity demanded is 15250MT the amount consumed in this season under the policy was less than the amount consumed in the absence of the policy, i.e. the policy reduced consumption. In the seasons (2016-17)the change in the quantity supplied was increased to 47000MT higher than the previous season because the policy has reduced the quantity produced, change in the quantity demanded increased to 86300MT this means that the policy has reduced the amount consumed. In season (2017-18), the change in quantity supplied is increased to 833010 MT because the quantity produced under the policy is much less than what would have been produced in the absence of policy i.e. there was a significant waste of resources, the change in quantity demanded is increased to 1062440 MT in absence of policy.

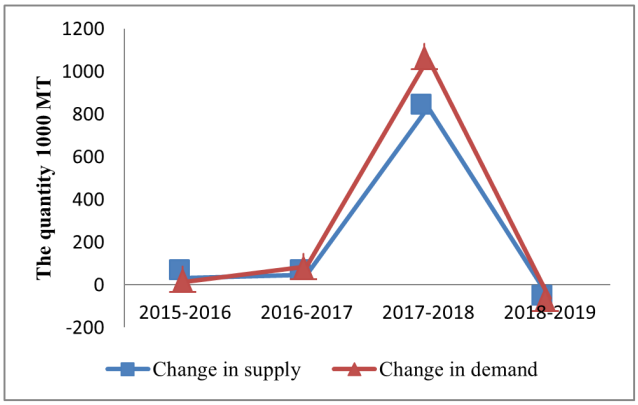

Figure 4. Change in Quantity Supplied and Demanded of Wheat.

Source: Results of Study, (2019).

In season (2018-19), the change in quantity supplied and demanded decreased by -63200 MT and -62200 MT respectively, was a result of the focus price policy increasing quantity production and consumption compares with quantity

without policy this result to producer response to focus price policy in began of the season but in medium season and after harvesting the farmer reject the focus price with considering that it is inefficient and does not cover the costs of production.

3.5. Efficiency Loss in Production and Consumption

Form table 3, in season 2015-16 the efficiency loss in production is 8.5SDG/ton because the quantity produced under the policy is less than the quantity produced in the case of non-intervention that is greater efficiency loss in consumption 2.1SDG/ton as a result to the amount consumed under the policy is less than the amount that can be consumed in the absence of policy and loss in total efficiency 10.6SDG/ton resulting of loss in production efficiency and consumption. In season 2016-17 the efficiency loss in production increased more than the previous season by 26.57 SDG/ton because the policy led to a decline in production, and efficiency loss in consumption by 70.77SDG/ton because the policy led to lower consumption, the consumers are leaving wheat and finding alternatives to consumption, also as a result of the high efficiency loss in production and consumption arising the loss in total efficiency of the society by 97.34SDG/ton.

Increase efficiency loss production in season 2017-18 with value 1172.4SDG/ton as a result of his production under the policy 609200MT was less than the production in the case of non-intervention 1442200 MT which led to distortion resulting to increase cost inputs production, also increase in marketing taxes, the efficiency loss on consumption in season 2017-2018 is 14515.2SDG/ton due to inability of consumer to buy Wheat and thus reduced consumer surplus. Also in season 2017-18 the loss in total efficiency 15678.6SDG/ton results to the impact on society with increased loss in the efficiency of production and consumption of society as a whole.

In season 2018-19 the loss efficiency of production by 156.1SDG/ton due to the production under the policy was more than the production in the absence of a policy, that is waste of resources in production, also the loss efficiency consumption 123.1SDG/ton because the policy led to increased quantities consumed, The loss efficiency of society 279.2SDG/ton.

Table 3. Evaluation of Efficiency Loss (M/SDG).

Indicator	2015-16	2016-17	2017-18	2018-19
Loss in production efficiency SDG/ton	8.5	26.6	1172.4	156.1
Loss in consumption efficiency SDG/ton	2.1	70.8	14515.2	123.1
Loss in total efficiency SDG/ton	10.6	97.34	15678.6	279.2

Source: Results of Study, (2019).

Finally, we note the quantities produced under the policy were less than the quantities produced in the absence of a policy also the quantities consumed under the policy are less than the quantities consumed in the absence of a policy. Thus, it can be said that the policy did not achieve its objectives and was not supportive.

4. Conclusions and Recommendation

4.1. Conclusion

The study aimed to partial analysis of Wheat equilibrium and based on secondary data about quantities of production and consumption and prices, using the model of partial analysis after analysis the study finding results showed at the previous chapter in this chapter we can review the summary of finding:

1. The elasticity of supply and demand for Wheat is inelastic
2. When comparing seasons (2016-2017-2018) with the current season (2018- 19), results showed that there are taxes imposed during the previous seasons on producers and in the current season there is support for producers.
3. When comparing seasons (2016-2017-2018) with the current season (2018- 19), results showed that there are subsidies to consumption during the previous seasons but in the current season 2018-19 removed subsidies from consumption.
4. The change in quantity supplied is less than change in quantity demanded.
5. The quantities produced under the policy are less than the quantities produced in case of non-intervention except season 2018-19 increase quantity produced after policy.
6. The quantities consumption under the policy are less than the quantities consumption in case of non-intervention except season 2018-19 increase quantity consumption after policy.
7. Increase the loss efficiency of production and consumption.

4.2. Recommendations

Based on the results, the study recommends the following:

1. The government should find an alternative policy for the price focus policy to encourage domestic Wheat production.
2. Study the economic impact of the policy on the producer, consumer and society before the policy is implemented.
3. Encourage small farmers to produce by reducing taxes and subsidizing inputs.
4. Controlling the Wheat market and controlling prices.
5. Integration of efforts between producers, consumers and the government to fight market monopolists.
6. Make easy access to agricultural finance.
7. Increasing interest in research and economic studies to provide a database that contributes to solving price problems.

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